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DEVOTED TO THE INTERESTS OF THE PROFESSION.

EDITED BY

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THE DENTAL RECORD.

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Original Communications.

NOTES ON THE TREATMENT AND FILLING OF TEETH.

By W. CASS GRAYSTON, L.D.S.

(*Continued from page* 533.)

TIN FOIL.

Chemically pure tin foil has been used for many years for filling teeth. Since the introduction of amalgams and other plastic materials, it does not appear to be so much employed. It is somewhat softer than gold and is therefore more easily worked against the walls of cavities. It is a low conductor of heat and cold, and can therefore be placed with safety nearer the pulp than gold. Its softness enables a filling to be more easily started than with gold, for in an awkwardly shaped cavity, where just the cutting necessary to fix the first pieces of gold cannot be made, one or more pellets of tin foil will often, if wedged between the walls, remain firm and make a good foundation, where gold similarly packed would roll about and refuse to stay in place. On to this base of tin the gold can be readily worked, and the filling completed. In deep cavities particularly crown cavities, where the pulp is nearly exposed, it is often convenient, and saves time, to pack tin foil on to the floor, and then to build up with gold. This is quite as safe as flooring with guttapercha or osteo. Gold can be made to adhere to tin, and therefore a thicker protecting layer can often be made than is possible with the other materials. In using tin to start gold fillings it is always inadvisable to allow it to extend to the margins. It sometimes happens that the tin becomes disintegrated and eaten away by the action of the oral fluids at the cervical edge, and as this is very annoying, it is well to prevent its happening. To make a filling entirely of tin is, except in simple cases, more troublesome than using gold, for it possesses very little cohesion, and is consequently usually worked by the non-cohesive wedging principle, which with our present knowledge of the value of contour, limits its application, and in front teeth the discoloration of the surface of the filling, and the dark appearance that it gives to a tooth in this position if the labial wall is at all thin, precludes its

use. Tin *can* be worked cohesively, and I have made some perfectly cohesive fillings with it, but it is laborious, and takes up far more time than working cohesive gold. To enable a cavity to be satisfactorily filled with tin foil it should be thoroughly and carefully prepared, and, given a well prepared cavity, I have never seen any results from tin, or from a combination of tin and gold, which lead me to suppose that beyond making a tight filling it has any preservative effect on a tooth, or that a tooth well filled with gold will not prevent decay quite as well; and as I have seen several cases where tin and also the tin gold advocated by Dr. Miller has rotted at the cervical edge, I consider its only reliable value lies in being a convenient starter for gold, and an excellent low conducting lining under gold.

White Cement or Osteo Fillings.

Osteo, or artificial bone, fillings are usually oxychloride of zinc or phosphate of zinc. The oxychloride is now, comparatively speaking, rarely used. It is more troublesome to work than many of the phosphates, and must be kept perfectly dry during insertion and carefully protected from moisture while setting by careful varnishing. It appears to be harder than the average phosphate, but is, as a rule, considered to be not so durable in the mouth. It often causes pain on insertion, but is said to have a hardening effect on soft dentine, although I cannot say I have observed this myself.

Phosphate of zinc, like the oxychloride, is in the form of a powder (oxide of zinc) and a liquid (phosphoric acid) which are mixed together when required in proportions sufficient to make a paste or cement for the case in hand. A little of the liquid and a little of the powder are placed on a glass slab, and then the powder is gradually worked into the liquid with a spatula until the mass is of a putty like consistency, when it should be rapidly pressed into the cavity and the surface trimmed to shape as it sets.

There are many makes of this material on the market. Some are very easy to mix and manipulate, others are difficult and troublesome. Some are too sticky to be packed in a tooth one moment, and the next are too stiff, the least addition of powder to overcome the stickiness resulting in too rapid setting. Some preparations will work from the sticky condition to the stiff on the slab, and as soon as they are placed in the cavity become sticky again (probably owing to the heat of the mouth); there are again makes that mix

and work easily and give no trouble, and as the average duration of these cements (before needing replacement) is from one to two years, and as the "awkward" cements do not appear to have any greater average duration to make up for the difficulty and trouble of using them; it is better to confine oneself to a reliable cement that is easy to work.

I find from an observation of osteo fillings inserted during the the last ten years, that the cervical failure, so often alluded to, is in my experience the exception rather than the rule. I am inclined to think that cervical failure must usually be due to the use of cements that are difficult to manipulate. The filling, if sticky, is probably drawn from the cervical edge during the packing, or else owing to the rapidity with which it sets, it either never reaches this part or only in a crumbly condition. It is presumed, of course, that the tooth at this part is kept perfectly dry.

Phosphate fillings possess the inestimable advantage of adhering somewhat to the dentine (providing it is dry), consequently in sensitive cavities there is often no necessity to cut retainage in the sound tooth structure. The decay, if possible, should, however, always be removed. The principal use of these fillings is in cavities of the front teeth, when for any reason gold is contra-indicated; for fillings where a pulp has been capped or the roots treated, when it is thought desirable to postpone the use of a more permanent material; for fixing crowns and bridges; for lining cavities before filling with amalgam, and for fixing inlays. It is occasionally useful for sealing up arsenical dressings and for filling roots.

Wherever it is possible the rubber dam should be used, so as to exclude all moisture. A phosphate filling will become perfectly hard in water, but it is generally considered advantageous to varnish the surface. Chloropercha soon dries, and is as useful as anything for this purpose. A phosphate filling saves a tooth probably better than any other material, with the exception of guttapercha. It is rarely that cavities are as accurately prepared and such care taken with the edges as where gold is skilfully used, and yet it is exceptional to find a tooth filled with either phosphate or guttapercha decaying at the margins as long as the filling remains intact. Nay, more than this, the filling may become worn down somewhat without any decay taking place. It is only when it is considerably worn that the tooth is again attacked. Now take a gold

filling, and instead of making it flush with the margins leave it depressed, and with the enamel projecting, like the average osteo after a year's wear, and how long, no matter how carefully the gold might be smoothed, would any dentist expect it to last? As before mentioned, the fluids of the mouth appear to attack the weakest part, viz., the osteo, and to leave the enamel intact. Arguments based on single cases are of very little value, but the following as an experience is interesting. More than ten years ago I replaced two large osteo fillings on the mesial surfaces of two upper centrals. Since then I have regularly replaced these fillings every eighteen months or two years. No decay has again attacked these surfaces, nor have the margins required recutting during this time. Decay has attacked the distal surfaces, and also the laterals and cuspids, and they have been filled and refilled when necessary with osteo and guttapercha. In no case has decay again taken place in or at the edges of the cavities. The fact that it is dissolved away so surely, and the fact that patients will not, as a rule, present themselves for regular examinations so as to have these fillings replaced in time greatly reduces their value as tooth savers and leads many dentists to use gold in doubtful cases.

Guttapercha.

The guttapercha specially prepared for filling teeth is a very valuable material if judgment is exercised in its use. The softer kinds as coverings for dressings are most useful, and the harder, or more permanent preparations, if used in small cavities not exposed to the force and friction of mastication, probably give better results, taking one case with another, than any other material.

Small cavities in the front teeth are readily filled with this material and it will usually last some few years. Sometimes guttapercha rots in the mouth; usually (although the surface may become soft and apparently porous and not very sightly) it only fails from downright mechanical wear. A medium or large sized cavity in a front tooth is better filled with osteo (when gold is contra-indicated), but in all cases where the cavity does not extend either to the lingual or labial surface, the guttapercha will last longer and is easier to replace. Small pin head sized holes on approximal walls of bicuspids and molars should usually be filled with guttapercha under any circumstances. For instance, if a pin head hole is discovered in this

position, and after much time and trouble is filled with gold, decay will usually attack the margins within a year or two, whether this is due to difficulties of manipulation or the absence of free edges I am not prepared to say, but I should always expect a guttapercha filling to last here longer than a gold filling, and it can if necessary be replaced in a very short time. Even the most ardent contourist and believer in the necessity for free edges would not think it right to cut away all the side of a tooth and hollow out its interior in order to convert a minute cavity into a magnificient contour filling. Guttapercha shrinks slightly, and although lining the cavity with copal ether varnish or resin dissolved in chloroform is said to prevent this, the fact remains that leaky guttapercha fillings usually save teeth until the material is considerably worn. It is considered that leakage in a filling is a very bad thing, and that absolute moisture-tightness is one of the most, if not the most important, factor in preserving a tooth. With the record of guttapercha before us, it appears doubtful if slight leakage is of very great importance, providing it does not cause chipping of the edges, or discoloration of the tooth.

Many labial, buccal and lingual cavities may also be satisfactorily filled with guttapercha. A cavity for this material should have a general retaining shape, and, consequently, a little more cutting is usually needed than for osteo, but owing to the smallness of the cavities generally filled with guttapercha, the preparation is as a rule rapidly effected. It is also a very valuable material for filling root canals. Dissolved in chloroform it is known as chloropercha, and is an excellent protecting varnish for osteo fillings, and, in connection with cotton wool, for covering dressings. For filling all cavities (not too much exposed to mastication) where a clasp or band or part of a plate will be in contact with the filling, guttapercha seems to answer better than anything else.

(*To be continued.*)

PRESIDENTIAL ADDRESS.*

By Percy T. Naden, L.S.A., L.D.S.

Gentlemen,—In commencing my address I must first thank the Members of this Society for the honour they have conferred on me by electing me as their President.

* Presidential Address, delivered at the Annual Meeting of the Birmingham Dental Students' Society, October 31st, 1895.

This evening I intend to say a few words on the importance of a proper appreciation by the public of the value of keeping the teeth in a healthy and efficient condition. I shall touch upon dental hygiene, and upon the appointment of dental surgeons to public institutions, including the Army and Navy. The greater number of the people of this country do not seem, as yet, to be impressed with the necessity of having the mouth periodically examined and thoroughly overhauled; and in many cases they never think of interviewing the dentist until they are forced to do so by their sufferings. Now, I understand that this statement does not hold good for every country; in the United States I believe it is more general to have a dental examination about every three months. I think there is no doubt that a large number of people are deterred from a visit to the dentist by a vivid recollection of a painful interview which they had with him years ago. On enquiry, it will be often ascertained that the patient went to have a tooth extracted and chanced to consult an unqualified man, who had undergone no special course of dental education. I have heard patients exclaim that "they did not believe in the filling of teeth," and proceed to narrate that they have had teeth filled, and that the stopping either came out or caused them so much pain after the insertion of the filling, that the tooth had to be extracted in the end. Now that a thorough course of dental training is compulsory, the incompetent practitioner should die out; this result has not been attained, for up to the present time we occasionally hear of the art of dentistry being tampered with, even by hairdressers. I am here reminded of an incident which occurred in the practice of a brother professional, who is well known to me. This dental friend of mine told me that one day a nurse girl brought three children to his rooms. On seating in the chair the first one to be attended to he asked the youngster to open his mouth, when the nurse exclaimed: "Oh, I didn't bring him to have his teeth seen to, I brought him to have his hair cut." But, to continue my subject, there is another reason why dental treatment is too often deferred. I refer to the fact that there are some people who unfortunately are of an exceedingly neurotic temperament, and on whom the slightest operation will cause intense pain. Such individuals require greater care and patience on our part. It may sometimes be thought that, because a tooth is affected with caries to a slight extent only, there must necessarily be little or no pain attending its preparation for filling. We know by experience, however, that the amount of pain does not depend upon the size of the cavity. It must be borne in mind, therefore, that if such cases as these are not dealt with by using all possible gentleness our nervous patients may take advantage of our skill as a last resource only. Of course, we must be able to discriminate between actual pain and a make-belief of suffering.

When we consider the number and gravity of the affections arising from an unhealthy state of the mouth, the urgent necessity for a stricter attention to this particular part of our organism becomes evident. I will here mention some of these affections, the causation of which we can directly trace to the teeth. Let us take

a few examples :—(*a*) Neuralgia, after defying medical treatment, is often found to yield when brought under the care of the dental surgeon. (*b*) Dyspepsia is sometimes traceable either to an unhealthy mouth or to insufficient means for the proper mastication of the food. As a sequel of dyspepsia gastric ulcer sometimes arises. (*c*) Epithelioma of the lips, cheek, or tongue has frequently been traced to constant irritation from the jagged edge of a tooth. (*d*) Trismus occurs in connection with diseased or impacted conditions of the wisdom teeth. (*e*) Fits have also been mentioned as resulting from dental trouble. Again, there are instances quoted in which forms of (*f*) Paralysis are found to give way to dental treatment.

I should like to give the details of a somewhat peculiar case, which came under my notice when I occupied the post of House Surgeon to this Hospital. I don't think I can do better than give you the history of the case from some notes which I took at the time. C. J., aged 26 years, had an attack of measles when one year and eight months old, since that time her right arm and hand had (so she said) been paralysed. When I saw her muscular wasting was marked from elbow to wrist, but not so marked from elbow to shoulder. The affected limb was considerably shorter than the corresponding limb. She could not move the paralysed arm, which was fixed to the side. She had ether at this hospital, and twelve carious teeth were extracted. A fortnight after this the patient told us that she was recovering the use of her arm and hand, and four or five weeks after the operation she could raise her arm above the head ; before the operation this was quite impossible. As this satisfactory result was arrived at about a month or five weeks after the extraction of the teeth, it is reasonable to suppose that the patient would recover, to a great extent, the use of the limb. This was most probably a case of infantile paralysis, and I should say the removal of the teeth acted as a strong counter-irritant to the nerve endings, thereby producing a beneficial effect ; for we know how extensively the nerves of the limb may be affected by apparently trifling causes. An instance of this sort was given in a paper read at one of the meetings of this Society last session. It was a case recorded by Brown-Séquard, in which a boy had a bit of gravel imbedded in the ball of the toe. Every time he trod on the ground, he had a reflex convulsion. On clipping away the irritated skin a cure was effected.

Passing on to the next point in my paper, we find that researches instituted in order to discover the predisposing causes of caries, have established beyond doubt the fact that not the least important of our duties is to pay special attention to hygienic measures, and to the quality of the food-stuffs to be consumed. Now, we know that the smaller the quantity of lime salts that is absorbed by a tooth during the process of its development the softer it is, and the more liable it is to give way to the ravages of decay. In support of this, we have the results of the careful and exhaustive investigations of Dr. Röse, of Freiburg, who proved that the drinking of water poor in lime, and also the consumption of food poor in lime, produce an influence

which is unfavourable to the healthy structure of the teeth. It is also proved that the eating of a soft sticky wheat-bread is a very active cause of decay; this being brought about by the large quantity of acids which are formed by saliva-mixtures with bread. On the other hand, it has been demonstrated that course brown bread is much less likely to be a factor in the production of decay, inasmuch as it requires the muscles of mastication to be used with considerable force; and as a consequence of this increase in the action of the jaws a larger flow of saliva results, and any remnants of bread which may cling to the teeth are to a great extent washed away. Coarse brown bread has a beneficial action mechanically, for it helps to keep the teeth clean, thereby taking the place of the toothbrush; and we find that it assists to maintain the mucous membrane of the gums in a healthy condition. In order to prove the relative value of the different kinds of bread, so far as they can assist in influencing the structure of a tooth, it will be necessary to point out that dentine contains 72 per cent. of inorganic matter, and of this 66·7 per cent. is calcium phosphate. Enamel contains 96·41 per cent. of inorganic matter, and of this 89·82 per cent. is calcium phosphate and fluoride. Now, whole meal bread is richer than white in phosphates; for we find that white bread contains of mineral matter 0·7 per cent., and whole meal bread con tains 1·7 per cent. These salts are largely made up of earthy phosphates and alkaline phosphates. Alkaline phosphates probably combine with lime in the system to form the important calcium phosphate.

It is my intention now to proceed to the consideration of the appointments of dental surgeons to public institutions These appointments, in my opinion, are still far too few. Although a town may possess a dental hospital, nevertheless, I contend that an institution, like our General Hospital, should have a duly qualified man on the staff, to attend solely to troubles connected with the teeth; for such troubles do frequently complicate cases in the medical and surgical wards. In a certain number of paid appointments which are open to us, we are expected to give up a large amount of time (indeed, this is necessary if the work is to be carried out conscientiously), but often the remuneration for our services is quite inadequate when compared with similar medical appointments. What I should suggest with regard to these salaried positions is that the remuneration should be sufficient to make it possible for us to give plenty of time to the patients, thus ensuring the best kind of work.

I shall now dwell on the advisability of appointing dental officers in the Army and Navy. It has always appeared to me that there is a certain amount of inconsistency in the facts, that before passing recruits into the services special attention is paid to the number and condition of the teeth, but that after enlistment no further notice is taken, except when a complaint of odontalgia is made, when the offending tooth is extracted.

Fillings, I believe, are rarely inserted, although materials such as amalgams and gold can be obtained, together with scaling instru-

ments, from the head-quarters of the district. No hard-and-fast line is laid down in the regulations regarding dental efficiency of an intending recruit, but all is left to the discretion of the surgeon. The rule usually followed is this : that if at least half of the teeth remaining in the jaws are in good order and are fairly evenly distributed, the man would be accepted. It has been found from the experience of Surgeon Captain Saw, who is at present stationed in this city, and to whom I am much indebted for the kindly way in which he answered my enquiries, that men recruited round large manufacturing towns have bad teeth, especially in Lancashire ; but it is satisfactory to learn he considers that in Birmingham the teeth are very good indeed. From returns made on this subject out of 891 rejections in this district only two were due to defects and deficiency of teeth. I also made enquiries with a view to discovering whether there were any disadvantages attending the appointment of dental surgical officers to the services. And from what I could gather, the difficulties to cope with would be: first of all the expense ; and, secondly, the practice of malingering, which it is feared would be frequently resorted to. It was stated that the men would make a pretence of suffering toothache, with the idea of evading duties, fatigues and punishments. Another point suggested is that the men's time would be wasted. I was informed that in India 10 per cent. of the men composing a regiment were always in hospital, and the additional absence of men reporting sick from various causes, either to be relieved from toothache or undergoing dental operations, would so materially reduce the number of soldiers at drill as to be a serious matter. On the other hand we hear that odontalgia was prevalent to such a degree amongst the officers of the Chitral Force during the late war that Sir Robert Low has advised the Government in all future expeditions to appoint a staff of dentists with a principal dental officer attached to the headquarters staff. I understand that the Indian subordinate medical department consists of Eurasians (these are half-castes, being a mixture of Europeans and Asiatics), who take the place of the medical staff corps, who are non-commissioned officers. The members of this subordinate medical department receive two years' medical education at the expense of the Government. These men do most of the teeth extractions, and by practice become very skilful. In this connection, it is interesting to know that in the days of the old muzzle-loading guns, when greased cartridges were used, teeth in the front of the mouth were a necessity. This, of course, arose from the fact that in order to load a rifle the end of the cartridge was bitten off, the powder it contained was poured down the barrel of the gun, and then the bullet and paper cartridge case were rammed down above it. Men who were deficient in front teeth were not received into the army, and those men who were in the army and did not find it to their liking, adopted the plan of knocking out their front teeth in order to obtain their discharge.

Before concluding my address, through which I fear I have wandered in a somewhat desultory manner, let me call your attention

to an incident which recently happened, and which no doubt most of you have read of in the newspapers. I am glad, however, to say it is in no way connected with the professors of our art. A barber in the Strand, London, was summoned for extorting money. It was stated that he had notices of dentistry hung up in his shop, and that by persuasion his customers sometimes allowed him to scale their teeth, for which operation he charged the not very moderate fee of four pounds! I have no doubt most of the practitioners in this city would only be too happy if they could get a similar fee; but, as I am credibly informed, each of them has a conscience which is not elastic enough to allow him to attempt such a charge. It was brought out in the evidence that one old gentleman was charged five pounds for this operation, and not only did this venturesome barber deal in dental scaling, but also in scales chromatic, for he also bullied the poor old gentleman into buying a musical box!

Fortunately the status of our profession has much improved since the compulsory examination has been the law, and now a much better class of men adorn our ranks. Still, as in every other walk of life, we must find some black sheep; and the general public has not quite got rid of the idea that we are associated with either mountebanks or barbers. It is within my recollection that a lady was located on a piece of land at the back of New Street Station, gaily extracting teeth, while the cries of her victims were drowned by the alluring strains of a brass band. But let us hope that all these will soon be things of the past, and that our profession will occupy a position second to no other branch of medical art, and that quacks and mountebanks will never be found in its ranks again.

This much desired end can be distinctly furthered by the co-operation of the younger members of the profession, and their determination not to be connected with any unprofessional or undignified methods of practice. By such means, we should obtain the confidence and respect of all branches of medical science, as well as of the general public.

ALVEOLAR ABSCESS.*

By Stanley Colyer, L.D.S. Eng.

Alveolar abscess is one of the affections which is both common to man and the lower animals. In the majority of cases connected with animals the abscess runs its course unabated, so in them it is a much more serious complaint than in man.

As an example that animals are sometimes treated I may cite the case recorded by Mr. Bland Sutton of the celebrated elephant Jumbo, who, in a fit of rage, broke both his tusks off just within their

* A paper read before the Students' Society of the Dental Hospital of London.

alveoli. In due course, around each, arose abscesses which, after two attempts, were skillfully opened by Mr. Bartlett with a probe three feet in length. The sagacious animal, appreciating the relief which it had received, allowed the abscess to be washed out and permitted the one round the other tusk to be opened without flinching. But, as I said, the majority of animals go untreated. Several examples are furnished by the kangaroos, who contract abscess from fracture of their procumbent lower incisors. "Kangaroos," to quote the same author, "like animals of even high moral pretensions, have domestic differences which occasionally lead to unpleasant consequences." In the encounter the tips of the incisors are broken, the exposed pulps inflame, suppurate, and lead to alveolar abscess, which in some cases terminates in death from absorption of septic matter. There are several other equally interesting cases, as the beautiful case of skulls in the Odontological Society's Museum proves.

Turning now to alveolar abscess as it affects man, we find that morphologically it may be divided into two distinct classes—

(1) Those which arise either within the substance of the periosteum or between it and the cementum.

(2) Those which occur in the tissue outside the periosteum.

Adopting the nomenclature of Mr. Dolamore, I shall refer to the former as sub-periodontal, to the latter as extra-periodontal. The sub-periodontal includes the majority of chronic abscesses. Their position on the root is variable, they may be situated anywhere, but around the apex is the usual seat. The infection comes as a rule from a septic pulp, either dying or dead, and is carried either by the blood vessels or lymphatics, if there be any, to a spot on the periosteum, where it becomes arrested. If the condition of the tissue be favourable to their growth, they speedily multiply, giving off ptomaines, which irritate and set up an inflammation in the part. Now the inflammation and its results are directly regulated by three conditions :—(1) The resisting power of the tissues ; (2) The duration of its action ; (3) The intensity of the cause. For instance, a strong healthy man will rapidly recover from a blow on the shin, whilst in a syphilitic man it may lead to a chronic periostitis, the inflammatory material of which may undergo ossification or break down and form pus ; so it is with the periodontal membrane. The duration of the action is most important, a slight irritant acting

some time will probably be productive of inflammatory fibrous tissue ; it also lowers the vitality of the tissue, so that any increase in the intensity of the cause will lead to a rapid breaking down of the tissues.

It is necessary to realise these facts, or else we cannot possibly understand the condition met with—termed abscess sac—which certainly implies that the sac is a necessary part of an abscess, which it is not. For, as it has been ably pointed out, where suppuration occurs between bone and periosteum, there cannot possibly be an abscess sac. Now, if you examine these sacs, you will find that they are of three kinds, those which are merely granulomata, the result of a productive inflammation ; those which are the centre of inflammation, the result in the first place of a productive inflammation with a subsequent increase in the intensity of the irritant or diminution of the resistance of the tissues ; those which do contain pus, in an enlarged and distended periosteum. Whether this last variety consists always of broken down granulomata, or whether the periosteum has been distended and thickened relatively with the increase in volume of the pus I am unable to tell you. Of the second class, the extra-periodontal, they are I think most frequently caused more artificially, by the forcing of septic matter through the apex by force from above either during mastication or by instruments. They, as a rule, assume the acute variety. As I have said, the most frequent cause of abscess is inoculation of the tissues from a septic pulp ; this is by no means the only cause. There are many others, both predisposing and exciting ; thus, we have rheumatism, giving rise to an affection called acute rheumatic periostitis, which is described by Senftleben as frequently attacking healthy and robust individuals with good teeth after severe cold, commencing with a violent toothache along one side of the jaw ; there is high fever and the other signs of inflammation are present ; pus is apt to form and necrosis is a frequent consequence. Influenza also has an important bearing upon abscess. It is said that after an epidemic of it there is an epidemic of periostitis, one or two cases of abscess are reported subsequent to it. Impacted wisdoms and pyorrhœa both predispose to abscess, and, lastly, we have that class called idiopathic, called so because their pathology is unknown.

The symptoms vary in intensity and character according to the stage in which we consider them. In the early stages it is difficult

to distinguish it from periostitis. The tooth is tender, raised in its socket, and loose. There is but little swelling, but considerable pain of a dull throbbing character, due to the tension of the pus within the bone, which is worse in strong healthy men. Later on, owing to pressure, the osteoblasts take on osteoclastic functions, the bone is absorbed, and the pus escapes, leading to considerable increase of swelling and decrease of the pain. Soon the pus points, and the gum or skin over it, deprived of its blood supply, sloughs, and it is enabled to escape. During all this time the usual symptoms of pyrexia have been present, namely a quick pulse and a high temperature, a furred tongue and a hot and dry skin, scanty and high coloured urine, a general feeling of malaise. I have only found one case in which the temperature was accurately recorded, so that I shall take the liberty to repeating it. It was a case under the care of Dr. Marshall, in which the patient was confined to bed for 26 days, the primary cause being an abscess in connection with a right lower wisdom. Before the tooth was extracted the pulse varied between 100—116, and the temperature between 100·1—104·8. After extraction pulse fell to 96 and temperature to 103. Examination with a probe showed the abscess cavity to extend four and a-half inches down the neck. He treated the case by injecting into the cavity half an ounce of hydrogen peroxide every four hours, and the temperature fell one degree each day for the next three days. Owing, however, to the pain caused by the evolution of the oxygen, the patient refused the treatment, there was an immediate rise of temperature and increased pulse rate. She was again induced to go under the same remedy and I believe eventually got well.

Treatment—There are two methods—the radical and the conservative. We should adopt the former when the utility of the tooth does not warrant an attempt to save it, and nearly always in the case of children. And with regard to children I would impress upon you the fact that they require rest, now sleep is rest, and anything which deprives them of it will deprive them of that which is essential for their growth. "Repair," says Hilton, "is the repetition of growth. The interruption of rest by local disease occurring to persons in the middle period of life does not cause the same exhaustion and wasting as in the young. They bear the loss of sleep better, because their constitution has to sustain the stress of

repair only, not of both development and repair, as in the child." It is a significant fact that children who sleep well grow well, children who sleep badly grow badly. It rests between this fact and the possible subsequent irregularity of the teeth which course we should adopt. The conservative method is indicated in teeth either serviceable for use or appearance. It consists in evacuating the pus, either through the root or through the sinus, rendering the whole aseptic. The sinus will granulate up and the tooth must be filled. General treatment is indicated in all cases. I have purposely discussed the treatment scantily that I might have the more time to enumerate and describe as far as possible the more important complications.

Fistulæ.—The direction of the pus is variable, but subject, more or less, to constant rules. It usually points on a level with apex of the tooth, so that you will see, if the apex is below the sulcus, it will probably point outside the mouth, if it is above the sulcus inside the mouth. In connection with laterals, second bicuspids and first molars, it may point in the palate ; with canines, in the nasal fossa ; with second bicuspids and first molars, in the antrum ; with lower incisors and bicuspids, on the chin ; with lower wisdoms at the angle of the jaw, or, as in the case I have just quoted, and in that classical one of Salter, just above the clavicle. Nicolai records a case where the cause of fistula, just above the nipple on the breast, was discovered the day after a visit of the patient to a dentist by the discharge smelling of a drug he had used. Cochineal injected into the root appeared at the opening two hours later.

Cellulitis.—Of this complication there are several cases, of varying degrees of severity. Of the more serious cases, Heath quotes two occurring in patients of intemperate habits. In the DENTAL RECORD for March, a similar case is recorded. In it, an abcess in connection with the right lower wisdoms was the focus of the mischief, spreading down the neck, the inflammation reached as far as the nipple. In all three cases death occurred from œdema glottidis.

Necrosis.—Alveolar abscess may cause necrosis in two ways. It may start as an ordinary apical abscess, and in attempting to point, may fail to perforate the periosteum, strip it up and lead to necrosis of large or small extent, or it may form *round* an erupting wisdom and burrow beneath the perisoteum and lead to death of the bone in

a similar manner. As an illustration of an extreme case of the first variety, the *Lancet* for January furnishes an extremely interesting one. The patient, a woman, stated that twelve months ago she had several lumps at the angle of her jaw, which were incised and pus let out. On examination, the second and third lower molars were found carious. The patient being unable to open her mouth, it was forced open under an anæsthetic and the tooth extracted. There was no improvement ; she was still unable to open her jaw. A second anæsthetic was administered, and the ascending ramus and joint were exposed, the former was found dead and the latter suppurating. The condyle was disarticulated and the necrosed bone removed. The patient recovered and left the hospital a few days after.

Trismus.—This is of almost every day occurrence, and is due to inflammatory effusion into the soft tissue. An impacted wisdom is frequently the cause.

Meningitis.—There are now several well authenticated cases of this on record. The most interesting one is that of Wehl. In his case the pus burrowed along the jaws, ascending by the ramus to the base of the skull, into which it gained access through the foramina ovale, rotundum and spinosum.

Thrombosis of the Cavernous Sinus.—There is only one case on record, and that was under the care of Mr. Pearce Gould. The mischief started in an abscess in the lower jaw. The pus found its way backward into the pterygoid region and caused thrombosis of the venous pleans there, which later on spread to the cavernous sinus· The patient died in a comatose state.

Empyema of the Antrum.—The cases of this are, comparatively speaking, common, and generally due to abscesses in connection with second upper bicuspids and first upper molars. It is due, of course, to the proximity of the molar and bicuspid roots to the antrum, and an abscess forming at their apices, following the course of least resistence, enters the antrum.

Septicæmia and Pyæmia.—There are a fair number of cases on record, all of which ended in death in a few hours. It is very common in animals. Cases of pyæmia are more common. Mr. Howse relates one arising from an alveolar abscess in a child aged four.

Spreading Traumatic Gangren.—A case of this was reported in the *Cosmos* some years ago. The patient was a labourer, and was

admitted into hospital with temperature of 102, pulse 105, and respiration 22. The patient died some few days later. Dr. Marshall, in commenting upon it, said that "he believed it to be due simply to an untreated alveolar abscess," and remarks "that if the dentist who first saw it had properly treated the case the patient's life would have been saved."

Gentlemen, I have shown you, I hope, alveolar abscess in its mildest and worst forms, and although it is seldom that it reaches these more severe stages, you will see the necessity for early treatment; we must persuade those who are wavering and compel those who are obstinate. And I feel certain that if we pursue this course, neither they nor ourselves will ever have any cause to regret.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting took place on December the 2nd, Mr. David Hepburn, L.D.S.Eng., President, in the Chair.

The minutes of the previous meeting were read and confirmed.

The President said that Mr. Todd, of Brighton, had presented to the museum a portrait of M. de Chemant, the inventor of mineral teeth. He would also pass round a book in his possession, printed in 1804, of which M. de Chemant was the author. It had the author's autograph on the first page; it also gave illustrations of spiral springs, a form of velum or obturator, a variety of methods of pivoting with bridge work and other matters appertaining to the teeth.

Mr. Charters White said a short time ago a request was made by the Curator for anything like old teeth for presentation to the museum. He had had one set in his possession about fifty years, and another about thirty, and he should be very happy to present them. The first was a set worn by Turner, the artist, and gave a very good idea of the way in which they made teeth in those days. Turner was a very stingy man, in dental matters especially—the race was not extinct now—and having lost four teeth in the centre he sent to the dentist who he employed for a piece of, what was called in those days, "granulus," the soft part of an old sea cow tooth. He fitted it in himself and filed it up roughly, so that it

really showed some of Turner's own work. He thought it might be interesting for the museum. The other set showed an example of natural teeth inserted into bone. It belonged to a roaring old Irishman named Dr. Clark, whose appearance with these teeth reminded one remarkably of a gorilla. The lower part of the face was very prominent, and these teeth did not add to his beauty at all. It was a specimen of the way in which in those days natural teeth were inserted in bone. Another specimen showed what was considered a very handsome set carved from the tooth of a hippopotamus. The patient in that case would not have them carved up in the proper way, with molars, incisors, and canines, but he wanted double teeth all round, and it would be seen how difficult it was to make them masticate. Afterwards he had another set made, and as he (Mr. Charters White) did not care for the carving of hippopotamus teeth, he made him a vulcanite plate, but that would not do unless he inserted in the front three rows of mineral teeth, which gave the gentleman great satisfaction.

Mr. H. L. ALBERT presented a model illustrating the case of a young man, aged 25, who when eight years old fell out of bed and completely displaced an upper central. He was taken to a dentist the next morning, some eight hours afterwards, and the dentist replaced the tooth after filling the root with gold. Being taken home in a hansom the tooth was jolted out; he was taken back to the dentist, who replaced it and used ligatures to retain it in position. The tooth did very well but never grew. For fourteen years the young man retained it in his mouth, and about a month ago brought the crown of the tooth, which was a mere cap of enamel, all the dentine being absorbed. An interesting point about the case was to know how the dentine was absorbed. In the centre, occupying what was normally the root canal, there were some fair sized granulations, about the size of a pin's head, and the patient said that one or two loose pieces of soft gold had come out. He was inclined to ask the question whether it was possible that chronic periostitis and granulation had actually found its way into the pulp canal, monopolising the functions of the dentine? or whether the root had become absorbed? He did not think the root had become absorbed; in fact on looking at the crown of the tooth, there were evident signs of fracture.

The PRESIDENT said the case was a very interesting one,

especially as to the arrest of development which had taken place. In a case which came under his own notice, a child met with an accident by which two of the incisors, lateral and central, were knocked out. They remained out of the head some thirty-six hours and were replaced by the dentist and retained by the regulation plate she was wearing at the time. He had the opportunity of seeing that child some four or five years after the accident, and the distinct arrest in the progress of the dead teeth was very peculiar. The other teeth had grown and assumed a normal articulation with the lower incisors, but the teeth which were replanted had been quite arrested in their development. Whether absorption of roots had taken place he could not say, because they were still firm.

Mr. PATTERSON said some specimens of teeth prepared by John Hunter would be found in the College of Surgeons Museum in which vertical sections had been made through the cone, and in the root they would see growing up cockscomb tissue. Mr. Albert had asked whether granulation might not have grown up into the root of the tooth. Probably it had, it being very similar to the specimen to be seen in the College of Surgeons Museum.

Mr. E. LLOYD WILLIAMS thought there could be no doubt of the fact that granulation tissue did grow up into the pulp canal. He had a specimen in his own possession showing this distinctly.

Mr. HUMBY thought there was another explanation, that sometimes where gold was inserted, occupying a root, absorption would take the place of the root tissue, leaving the gold projecting from the end of the root as a point, and producing irritation.

Mr. ALBERT said he could only imagine that the granulations found their way into the apical foramen from the obvious reason that there was a hole there. There were evident signs of fracture. Moreover it was broken simply by the muscular action of the lip, not fractured in biting.

The FOREIGN SECRETARY (Mr. J. Howard Mummery) read a communication from Dr. W. D. Miller, of Berlin, on "The Transparent Zone in Decay of the Teeth."

Dr. Miller stated that his notes did not pretend to give an exhaustive treatment of the subject, on the contrary, the question seemed to him further from solution than he thought years ago. His only excuse for presenting them now was that the other side might be heard in connection with the communication of Mr.

F. J. Bennett to the Odontological Society of Great Britain in May last. Mr. Bennett seemed to infer that the transparent zone was due to nothing more than a partial decalcification of the dentine, basing his conclusion on the fact that enlarged and thickened tubes might be demonstrated in the transparent parts. This was in diametrical opposition to results obtained by Walkhoff, Wellauer and Baume by the aid of the microscope. The views which Dr. Miller urged were arrived at without the aid of the microscope, and were rather intended as supplemental to the deductions of the investigators he had named. Secondly, where decalcification of the dentine takes place, as in caries, the process advances in a fairly regular line, so that if the softened dentine from a cavity of decay be removed, a smooth, regular, concave surface resulted. True, the margin between the decalcified and the hard dentine is sometimes found irregular and jagged, but scarcely, Dr. Miller thought, to such an extent as the inner border of the transparent zone. And in particular, narrow bands or spurs of decalcified dentine extending quite to the pulp chamber were never seen in the transparent zone. Thirdly, where acid acts upon the dentine at any point, as in a fissure, the decalcification would be observed extending laterally, as well as in the direction of the dentinal tubules, and, in fact, almost, if not quite, as rapidly in the former as in the latter direction. Would they not therefore expect to find the transparent zone, if due only to decalcification, on the lateral margins as well as towards the pulp chamber? As a matter of fact, in the great majority of the sections which he had recently examined, where the transparent zone is due to caries alone, he did not find it appreciably broader than the broadest diameter of the decalcified territory, and he thought they might say that, as a rule, the transparent zone is wanting on the lateral margins. These last two considerations he regarded as of minor importance, yet still deserving of notice. Fourthly, he had elsewhere given expression to the conviction that the transparent zone does not form in dead teeth; this conclusion was based upon the examination of a large number of teeth which had been worn on plates in the mouth. At that time he simply split the teeth and noted the appearances to the naked eye. He had recently ground sections from about a dozen different teeth worn on plates, but found no transparent zone in the specimens which he had examined. At least, he doubted if the appearances presented by

the cuts can be called analagous to those seen in caries of living teeth. He was inclined to believe that diffuse transparency may be only the result of a slight difference in structure, causing a difference in the permeability of the dentine to differences in thickness, &c. Again, typical cases were found of transparent dentine in places where the action of acids from without appears to be entirely excluded. Leaving the transparency of the roots of senile teeth out of account, they found transparency in cases where the enamel of the cusps has been worn done, even though the dentine may not be exposed thereby, and no traces of caries present. Further, chemical analysis does not give results which are consistent with the theory of decalcification. Some years ago he made an analysis himself, and had another made by a Berlin chemist, Dr. Jeserich. Teeth were chosen in which there was but a superficial defect in the enamel, split through the defect and the pulp chamber, so as to expose the transparent cone of dentine. The latter was burred out with a very fine round burr, avoiding the parts next to the enamel margin where there was any indication of decalcification. The powder was treated with a magnet in order to remove any possible particle of iron, dried at 102-105° C. and the ashes determined. His analysis gave 71·9 per cent. ashes, while normal dentine from the same teeth gave 72·1 per cent., a difference quite within the limits of the errors of experiment. The analysis of Dr. Jeserich gave for transparent dentine 69·5 per cent., for normal dentine from the same teeth 68 per cent. These results do not indicate any decalcification. The material was, in each case, obtained from about twenty teeth. Finally, the action of colouring matters upon transparent dentine is not what might be expected if a partial decalcification were present. It is well known that sound dentine does not readily stain with most of the dies commonly in use, such as carmine, eosine, &c. ; partially decalcified dentine, on the other hand, takes on stains very readily. Dr. Miller had found an aqueous solution of eosine a valuable means of diagnosing the presence of slight decalcifications. If a drop of strong mineral acid (nitric, hydrochloric) acts upon ivory for a single second, a subsequent application of the eosine solution will immediately produce a bright red spot where the acid came in contact with the ivory. A minute drop of a 1 per cent. solution of acetic or lactic acid will bring about a sufficient decalcification in twenty seconds to cause a deep staining

with the eosine solution. So, too, they found carious dentine becoming deeply stained by eosine. If, now, transparent dentine represents a partial decalcification, would they not expect it also to stain more readily than normal dentine? This is, however, not the case; on the contrary, they found the transparent dentine even more difficult to stain than the normal. In view of all these facts, some of which are of minor, others of vital, importance, Dr. Miller found it impossible, at present, to accept the decalcification theory of the typical transparent zone found in caries and other pathological conditions of the teeth.

With the communication Dr. Miller sent a number of cuts and slides as illustrating and supporting the views he advanced.

Mr. F. J. Bennett gathered from the paper that Dr. Miller objected to the proposition that the area of translucency was due to partial decalcification of the dentine and nothing more. That was not at all the position that he (Mr. Bennett) took up in his paper; from first to last there was not an allusion to "partial decalcification and nothing more," and nothing in that direction at all. The fact was the term was used, not by himself, but by a subsequent speaker. His point was to disprove the vital theory, and to clear the ground of this difficult subject by first showing what was not, in order that they might subsequently show what was. Dr. Miller had said that hard ground sections of dentine presented the appearance recognised, because the tubes themselves were empty (save of air) and also the intertubular tissues had a different refractory index. Anything which would bring those two appearances nearer together might be taken to produce translucency, and this might occur in one of two ways, either by decalcification or by an increased calcification. Dr. Miller said that a decreased calcification or a decalcification most assuredly did not take place, and added that this was sufficiently proved by chemical analysis. What was this chemical analysis? Dr. Miller stated that he took twenty teeth with translucent area and submitted those to chemical analysis. The ashes from the translucent area came to 71·9, whereas ordinary dentine submitted to the same analysis yielded as ashes 72·1. Dr. Miller started to prove that there was increased calcification and this was the result: 71·9 in the translucent zone—positively smaller than in the normal dentine, which was given as 72·1. Assuming it was an increased calcification, imagining for a moment that the tubule, instead of

being filled with calcified matter, was the reverse, they immediately had the optical appearance vanishing instantly. One specimen in particular showed the typical pipe-stem appearance in the translucent zone, and obviously there could have been no calcified fibril. Did the appearance change? not in the least; it was exactly the same. It was a jump from the calcified condition to a totally opposite condition without any optical change, and that was most conclusive that it could not originally have been an increased calcification in the fibril. Dr. Miller had alluded also to the dark tubes alternating in the translucent area—that he found dark tubes also in the translucent area. That, he (Mr. Bennett) would quite admit, but in specimens which he had shown, taking from the carious area to the pulp, they found this translucent area, dark tubes, again translucent area, and then the pulp. What utility was served by this? By the dark tubes he meant that they were patent when dried, but occupied by a soft fibril. It was not conceivable that nature would calcify one little piece, leave a large margin uncalcified, and again calcify. No barrier would then be formed for the prevention of caries, and that was what was held by those who advocated the increased calcification theory. He would now pass on to the question of natural teeth mounted on plates. Dr. Miller had examined several specimens, and sent two. He had examined three specimens, each of which he claimed to show the translucent zone pretty clearly. With the permission of the President he would hand round two of these pulp cavities. In one it was almost incontestable that the translucent zone appeared in these artificially calcified teeth. It was admitted, of course, by the vitalists that if it could be proved that there was a zone connected with caries, even in one specimen, the downfall of that theory was inevitable, for it was inconceivable that vital action could take place in a dead tooth. Dr. Miller alluded to the attrition of worn caps of enamel, and said that he got translucency in those cases also. According to the specimens shown that evening, they also equally got in some cases black tubes, which represented the patency of the tube, and, therefore, that did not show that there was increased calcification, even in attrition. He would refer to the very significant communication made recently by Mr. Tomes, in which he actually found in teeth much worn down by attrition, so far from there being increased calcification, the chemical analysis made was ·5 less than

normal, that was to say, 71·4 instead of 71·9, which was the normal. That was rather a staggerer for those who believed there was increased calcification in attrition. Coming now to the stains, Dr. Miller had used eosin, and, as had been explained, on applying lactic acid and acetic to normal dentine, he found that a portion became very much stained after the part had become decalcified. He further mentioned that the translucent zone did not stain with eosin. That might be so in the generality of cases, but he should like to point out one rather contradictory thing which Dr. Miller in his candour had stated. In specimen No. 2 he actually pointed out the non-stain of eosin in which translucency had occurred, as he considered, in response to attrition, and a little way off caries had attacked that translucent zone, and although obviously it must have decalcified the zone, according to his theory eosin did not stain, That showed that eosin did not always stain the decalcified condition. and Dr. Miller recognised that fact. It occurred to him on first reading Dr. Miller's book, and the more so after hearing his paper to ask why Dr. Miller was a vitalist, if one might call it so. He thought they would all have been of his opinion if they had had the fortune to reproduce caries artificially. As he said in his book, all the phenomena of caries were reproduced artificially, except the translucent zone. It was easy to talk of other people's skill, but there was the point to have seized hold of. That was the one exception. The discovery of argon was delayed a hundred years because Cavendish failed to note a slight discrepancy in his calculation. He had perhaps spoken strongly, but he thought the position he occupied in his paper was supported by his specimens. It only remained to thank the members for so patiently hearing him, and to express the hope that in anything he had said he had not gone beyond the retort courteous.

Mr. Leonard Matheson read a paper entitled

"A Few Practical Points."

He was there in fulfilment of a promise, and regretted he had nothing to offer in the shape of original research or new methods of practice. All that he had to present to their notice was one or two considerations in respect of some practical details of every day work. Just as, when one or two met for a chat they compared notes as to their experience, and discussed their personal preferences for different ways of attaining the same end, so he had ventured to

enumerate a few points concerning instruments and materials which might possibly be not quite ancient history to everyone, but which, at all events, might, he hoped, raise the spirit of discussion.

To begin with, for the examination and definition of roots more or less hidden, and of the cervical margins of labial cavities extending below the edge of the gum, he preferred the form of probe with a straight, tapering shank, which is bent upwards at a very slight angle for about a quarter of an inch, and then downwards for an inch, at an angle of forty-five degrees. This instrument he found much more handy than that ordinarily sold, the latter being too nearly rectangular, and did not sufficiently clear the anterior teeth in the examination of posterior roots, especially when the teeth stood high, and the roots are low in the gum. This probe was not blunt, but pointed—a very unorthodox shape, but he confessed he found the point much more effectual than the dull edge of the usual form. Another kind of probe was one tapered to a fine point, and quite straight, except at the extreme tip, which was bent at a right angle to the shaft, for the length of a sixteenth of an inch or less. Similar instruments were a pair of curved probes, of the form commonly used, but having the rectangular tip of the one just mentioned. These three shapes were invaluable for discovering hidden approximal cavities, and for dropping into the marginal flaws of fillings, which produce such different emotions, according to whether the filling is of one's own, or of somebody else's insertion. Passing from probes to rubber dam, he used Fernald's dam holder. The discomfort of one's patients was diminished in three ways. In the first place, the frame, to a large extent, did away with the bridled gagged feeling that the retractor produced. In the second place, the rubber not being drawn closely against the cheeks, moisture did not pass by capillary attraction on to the skin of the face, and one got rid of the slimy, messy, condition of things so common were retractors are used. In the third place no band being required round the back of the head, the necessity no longer existed of having to bring into close contact with one person's head the elastic tape that has been in close contact with other people's heads. Taken separately, these advantages might look small; but taken together, and in practice, they were far from insignificant.

Another matter he felt strongly about, was the use—or rather, the abuse—of clamps with the rubber dam. Occasionally the first

upper molar required clamping, and very occasionally a bicuspid, but by the well-known device of a bead, or a bit of amadou knotted into the silk, the ligature would often effect the same purpose as a clamp, and with very much less distress to the patient.

Into the consideration of the various means of excluding moisture other than the use of the rubber dam, he did not propose to enter, except to mention one method which he valued very highly, and which was not he thought used nearly as much as, with advantage, it might be. He alluded to the combined use of clamp, saliva ejector, and paper-fibre lint. For a short operation on lower molars, such as the application of a dressing, or the insertion of an amalgam, or gold-tin filling, time was saved, and the convenience of the operator and the comfort of the patient best consulted by this way of working.

The mention of cases in which the rubber dam may be dispensed with led him to speak of tin and gold as a filling material. Used in the form of tape or loose rope, in the proportion of two sheets of Abbey's non-cohesive gold, No. 4, to one sheet of White's tin, No. 4, this combination was a very valuable one. In many instances it was not merely a good alternative to gold, but it was much superior to the precious metal used alone. In particular, it was most useful in dealing with coronal and labial cavities in second and third molars, especially in small and medium-sized cavities, and in teeth of a low standard of strength. The rapidity with which it could be safely worked made it extremely useful in cavities far back in the mouth And the fact that absolute dryness is not essential to its successful working made it pre-eminently suitable for cases where there was a difficulty in the exclusion of moisture. And further, there seemed to be no doubt that tin, and tin and gold together, do exercise a marked preservative action on teeth of loose structure or imperfect calcification.

Tin and gold worked of course non-cohesively, and was quite unsuitable for use with the mallet ; and this brought him to a part of his paper which must provoke some antagonism, inasmuch as it dealt with the comparative merits of hand pressure and mallet work. Using hand pressure, as he did, to the entire exclusion of the mallet, he could not consider himself an absolutely impartial judge, any more than an operator who made the mallet a *sine quâ non* could be considered an impartial judge. But this much he would venture to say, that the brilliant attractions of mallet work had tended to throw

into the shade the less dazzling qualities of hand pressure fillings. That a fine, dense, smooth surface could be more readily obtained ; that more gold could be packed into a given space, and the hardness, compactness, and specific gravity of the filling greatly increased ; and that a good deal of time and strength, on the part of the dentist, might be saved by the use of the mallet, as compared with hand-pressure, all these facts must be admitted. But what he wished to point out was this—that a splendid surface did not by any means imply undercuts soundly filled ; that perfect cohesion and high specific gravity were quite compatible with imperfect adaptation to the walls of a cavity ; and that, when time was balanced against comfort, it was not always in favour of time that the scale dipped. It would be urged, quite rightly, that a good operator would take more care over the undercuts than over the surface of his fillings, and that he would pack them perfectly, using, if necessary, in deep angular corners and places difficult of access, either a flooring of oxy-phosphate, or gold inserted by hand pressure, or both, so producing a plug the solidity of which could not be questioned. This might be freely granted, and yet it might remain true that it was easier to overlook and leave faulty the proper treatment of undercuts with the mallet than with hand pressure. With regard to close adaptation of the gold to the walls, and especially the margins of the cavity treated, it would, he knew, be hotly contended that it is just here that the value of the mallet so conspicuously showed itself, but he could not help feeling very strongly that there was a serious danger in the vibratory nature of the mallet's blow of shaking the filling *en masse*, and so of obtaining a compacted homogeneous nugget of gold, at the expense of that clinging to the walls of the cavity which was so desirable, and which was so characteristic of good hand pressure work. As to the important question of time, it was possible, of course, to say that it affected the patient as much as it did the operator—that the former was as glad to get the work done quickly as the latter. Other things being equal, that might be so ; but he maintained that, to the vast majority of patients, the gain in time afforded by the use of the mallet was as nothing compared to the comfort of doing without it. And herein lay his chief indictment against the mallet, namely, the distress that its use occasioned ; the matter resolved itself not so much into the question how much

pain we can induce our patients to bear, as how much it is necessary for them to bear. In weighing results, the all-important matter of durability stood first. Given two teeth of average structure, presenting similar cavities, and with operators of equal ability to fill them—the one using a mallet and the other hand pressure—he thought that the latter may be depended on to hold its own; he would go so far as to say it would—in approximal cavities, and especially in teeth of weak structure—more than hold its own. Comparative comfort during the filling process, and the natural satisfaction of the patient thereat, must certainly count among results—not only immediate, but far reaching ; for he had frequently been forced to the conclusion that fear of the "hammer," as patients irreverently call it, frequently added so much to the dread inspired by dental operations as to prolong, disastrously in many cases, the intervals between the periodical visits that ought to be paid. One more word he might perhaps be allowed to say on this subject, and he would, if he might, address it to those young operators who had only recently come under the fascination of the mallet. To them he would say this, that whilst, with all its drawbacks, very beautiful work might be, and was, done with that instrument, and whilst he was not prepared to dissuade them altogether from its use, he would, in addition to what he had already said, add this, that the difficulties of doing first-rate work with it were far greater than to the beginner they appeared to be. It was so easy to make a filling perfect in appearance—so difficult to make a filling perfect in reality. A dense central mass, a splendid surface might be obtained by anyone ; but to build solidly against the walls and into the out-of-the-way corners of the cavity, and to obtain perfect margins without damaging enamel edges, required the utmost care and circumspection, and the greatest watchfulness in testing at every step each layer of gold inserted. Whatever else might be said in favour of the mallet, it could not be said that the operator could *feel his way* so well with it as with the hand plugger ; at least, not at first, nor for many a long day. And here he would venture to make an urgent appeal to those just entering upon dental practice, and to those whose business it was to teach their students, not to make time a matter of the first importance. Three things there were which went to make an ideal operator—thoroughness, gentleness, quickness—and surely one should cultivate these qualities in the order named. If gentleness of touch and manner were put

first, then thoroughness must suffer ; if rapidity were put first, then one might say good-bye both to thorough work and to considerate work. It always made him shudder when in his hospital rounds he heard a student boast of rapid work, or even ask how long such and such an operation ought to take. Such a question asked of him received the invariable answer, " Just so long as to ensure, in the first place, absolutely sound work ; and in the second place due consideration for your patient's comfort. Given sound work, given due consideration for the patient, you may then think of the pace, but not till then."

Turning to contour filling, the longer he practised the more value did he set upon it as a means of preserving the teeth from caries ; that is to say, when the filling could be so shaped as to knuckle quite closely to the neighbouring tooth or filling, so closely as to prevent the passage of food towards the interstitial gum. If this close approximation to the adjoining tooth could not be obtained, it was almost needless to say that the contouring of the filling became not only useless, but generally worse than useless, inasmuch as it rather favoured than prevented the lodgment of food at the gum margin. And whilst *such* contour fillings were to be deprecated, so too, in his opinion, were those extensive edifices which, having no preservative influence, were built up solely to restore the original outline of the tooth under treatment. They were, to his mind, uncalled for, alike from a surgical, an artistic, and a useful point of view. Likewise uncalled for and undesirable from the standpoint of our patient's best welfare were huge gold contour fillings in molars. Where filling was admissible, a carefully inserted and carefully finished amalgam served the required purpose best in the great majority of cases ; and where there was very extensive disease, both mesial and distal, gold collar crowns, duly and properly adapted, afforded the most satisfactory means of restoration. In the insertion of large contour amalgams he had lately found great assistance in the use of the new " Dentine Screws " just introduced : their application was very simple and easy, and they formed a valuable addition to the ordinary Howe screw post, which was so convenient in the case of dead teeth. The contouring of fillings as a safeguard against decay led one naturally to that other, and diametrically opposite, means of attaining the same end—he meant the isolation of approximal surfaces by the extraction of teeth. It

was, he thought, abundantly proved by experience that in nine cases out of ten young mouths were vastly improved and benefited by the extraction of one tooth out of every eight, and that even in those few cases in which the articulation was somewhat disarranged by such extraction, the mal-occlusion was a lesser evil than that resulting from the retention of the full thirty-two teeth. One point with regard to overcrowding he would like to emphasise, as it was apt not infrequently to be lost sight of. Cases presented themselves of patients whose age might be anything between thirteen and eighteen, or even more, and whose teeth were closely set, with, perhaps, a very slight tendency in the canines or laterals to overlap adjoining teeth, but without any noticeable appearance of overcrowding, or consequent irregularity. This was prior to the eruption of the third molars. Directly these teeth began to show themselves a marked change took place in the arch, the canines, or laterals, or both, being forced out of place, so as to badly overlap their neighbours. Then it was one wished that timely extraction had been performed at an earlier age, so as to prevent the tremendous forward pressure exerted by the third molars from affecting the front teeth.

Mr. MATHESON concluded his paper by a detailed reference to Mr. Whittaker's modification of Collar Crown, which he described and recommended.

Mr. ROBBINS said, with reference to the difference between hand pressure and malleting, he had in his mouth something like twenty-six fillings that were put in by one of the most thorough men he knew, and to whom he owed very much, but on humanitarian grounds he could not honestly ask nineteen-twentieths of his patients to endure those beautiful little retaining bits, the malleting directly upon the most tender part of the tooth, and the long sitting, even for the ultimate beautiful result. A point not mentioned by Mr. Matheson he would like to name, because he had spoken about it in another place, and it was somewhat smiled at, the question of using for the first third of the filling, when one did not wish to exaggerate contour, that most valuable material, mat gold; and where the tooth was of a very fragile nature even underlying that with oxy-phosphate, setting the mat gold in like wood blocks in a wood pavement. They could then with firm but gentle hand pressure work down the surface and bring that up to within one-third of the finish.

Then if they wished the edges to be absolutely right and used gold foil, the malleting would not be so very serious a matter, and they might have a cohesive surface with a great deal more comfort to the patient. He agreed perfectly with Mr. Matheson that there was as much value to the patient got out of a good honest amalgam put into those large cavities in the back of the mouth, and sometimes a little more, than in those extraordinary acrobatic performances that took so long —tiring both patient and operator.

Mr. W. Hern had seen the contrivance spoken of by Mr. Matheson for holding the rubber dam, but had not used it much, because it got a little in the way. He thought the difficulty might be overcome by bending the wire somewhat in the shape of the lower jaw, the end would then lie back out of the way and would not alter the outline of the lower jaw. The one point to which Mr. Matheson devoted a good deal of the paper was a defence of non-cohesive gold. There was a time when he thought that no good work could be done, at any rate in contouring, with anything but cohesive gold, and he would go further, and say there was a time when he thought cohesive work done with hand pressure was not at all equal to cohesive work done with the mallet. He had now come to the conclusion that very excellent work could be done with hand pressure. In criticising the mallet the fact should be taken into consideration that it was frequently used with a blow far out of proportion to the requirements. The cohesion did not depend so much on the force of the blow as on going accurately over the whole surface, doing what the great master of the cohesive method used to call "bringing each piece of gold into the sphere of cohesion." His sympathies were entirely with Mr. Matheson with regard to the importance of contour. Contouring was the most important thing in their work. He also agreed as to the value of collar crowns, which had a value beyond all other crowns because they could be contoured in a way that could not be done with any other fixed crown such as the Logan.

Mr. J. H. Badcock had used tin-and-gold in the way described for a good many years, and with more success than he had found from any other filling material. If he were obliged to make his choice as to any one filling material, and to be deprived of all the rest, he should certainly choose tin-and-gold. He had used it chiefly in the way described, one sheet of No. 4 tin between two

sheets of No. 4 gold, but lately he had been using No. 5 gold, simply as wishing to improve the colour of the combination. He found in all cases, except quite small ones, it worked very well, and distinctly improved the colour of the resulting filling. He was trying to get some No. 3 tin made to use with No. 4 gold, and so obtain the same result with more ease to himself. The value of the filling was extremely great in interstitial cavities in the bicuspids, and even in molars when foil could be used. He had felt how unsatisfactory amalgam is in such cases, and foil could be used easily, fairly rapidly and very satisfactorily in this way.

Mr. Dennison Pedley said, with regard to the difference between malleting and hand pressure in gold, a short time ago a young lady, aged 21, consulted his partner with regard to caries in her teeth. He found a large portion of her teeth were very carious. On carefully examining the mouth he came across a very beautiful gold filling. On asking her why with that good gold filling in her mouth she had allowed her teeth to go so long she said "Well, my mother took me when I was 16 to one of the best dentists, and I had such a terrible time of it with the mallet that I vowed I would never have another tooth stopped." He always confined himself to filling teeth with hand pressure until he found out what sort of nerves his patient might have. He thought the combination of the two, filling first with hand pressure, and finishing off with the mallet, was about the best method they could have, but practically they could not lay down any definite law on the subject.

Mr. Beadnell Gill believed that an enormous amount of pain was inflicted perfectly unnecessarily by malleting work; in other words, that those men who still advocated the use of the mallet could continue it with a considerable amount of success and saving of time to themselves and their patients by judicious management as to the *direction* of their blows. He thought mat or crystal gold was a material well worthy of investigation. He had filled with crystal gold for over twenty years, and it was still his special favourite. He believed that if a man was willing to adapt himself to circumstances and according to his material he would find that in all round filling there was nothing better than crystal gold. It could be used either cohesive or non-cohesive, either by hand pressure or by malleting.

Mr. Baldwin said, with regard to the rubber dam holder, one advantage which had not been mentioned was, that, at least on one side, the patient could easily breathe, and they knew that many patients could not breathe except through the mouth. He agreed with Mr. Matheson on almost every point of his paper except that he should not like to do away with the mallet altogether. Hand pressure was perhaps the more useful of the two means, but the mallet had its own special uses, especially in finishing off the filling. When a filling was of any size, it would certainly produce a better continuous surface, taking a higher finish and therefore being less visible afterwards. It also did away with the great tendency of hand pressure instruments to slip, which was a serious thing both for the operator and the patient, especially when working with a mirror.

The usual votes of thanks having been passed, the Society adjourned until 13th January.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

An Ordinary General Meeting of the Students' Society of the Dental Hospital of London was held on Monday, December 9th, the President, Mr. F. J. Bennett, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following gentlemen were admitted as members :—Messrs. N. Miller and R. H. Manning.

There was no further discussion on the paper on "Fractures of the Jaw," and Mr. W. F. Forsyth, Jun., briefly replied to the questions already asked.

On Casual Communications being called for—

Mr. Hey showed models of an interesting case of open bite with slight anterior protrusion, occurring in a patient aged 12. There was a distinct history of thumb-sucking.

Mr. D. P. Gabell remarked that the lower incisors were somewhat raised above the level of the other teeth, he consequently did not think that thumb-sucking had much to do with the deformity.

Mr. Douglas thought the slight amount of superior protrusion was due to too long retention of the upper temporary incisors.

Mr. McDonald said that the formation of the jaws and the arrangement of the teeth seemed to him perfectly normal everywhere, except in the upper incisor region, and he thought the deformity was entirely due to arrested development of the premaxillary bones.

Mr. Hey, in replying, said that the patient had had a habit of continually passing his tongue over the biting surfaces of the upper incisors only; this was sufficient to account for the deformity, and would not tend to push the lower incisors outwards, nor prevent them being slightly raised.

The President then called upon Mr. Stanley Colyer for his paper on "Alveolar Abscess and Its Complications" (see page 10).

In the discussion which followed—

Mr. Densham said that rheumatic periostitis seldom resulted in suppuration, and usually subsided under the application of counter irritants and suitable general treatment. He thought it was in most cases a mistake to extract temporary molars on account of abscesses arising from them; for in the majority of such cases rhizodontrophy and filling would render the tooth comfortable and quite serviceable for a long time. In the case of adults, it was often a matter of considerable difficulty to decide which tooth was really the cause of an existing abscess.

Mr. D. P. Gabell said that during the last fortnight he had met with two cases of abscesses arising in connection with apparently sound teeth. One of these resulted in considerable loss of tissue, and the patient had since undergone a surgical operation. He was rather surprised that Mr. Colyer had made no mention of antiseptics.

Mr. W. S. Nowell thanked Mr. Stanley Colyer for his very interesting paper. He said that untreated dead teeth were the seat of frequent abscesses, owing to their canals becoming periodically blocked with food. He mentioned two cases of alveolar abscesses arising from lower molars penetrating down the cervical fascia, and eventually causing death by bursting into the trachea. He thought it possible that the more severe of the two cases recorded by Mr. Gabell might have been due to actinomycosis, the actinomyces might have obtained an entrance down the side of the tooth socket, or through a wound of the gum; it was a pity he had not kept some of the pus and cultivated the bacteria. He thought a free

vent, followed in a week by a thorough use of peroxide of hydrogen was as good as any treatment for chronic abscess.

Mr. DOUGLAS gave an account of two instances of abscesses caused by impacted lower wisdom teeth.

Mr. DAY wanted to know whether it would be better to extract a temporary molar on account of intractable abscess and cause subsequent overcrowding, or to leave the temporary tooth in and run the risk of its injuring its permanent successor?

Mr. DENSHAM remarked that pyorrhœa alveolaris was frequently a cause of an apparently healthy tooth becoming the seat of an abscess. He had recently had a patient who complained of great pain from an apparently healthy tooth; finally he had endeavoured to open up the pulp cavity and canal, but though he had carefully drilled to very near the apex of the root, he had been unable to find any trace of a pulp chamber, nor was there any discoloured dentine to indicate the presence of secondary dentine.

Mr. MCDONALD said that he had suffered great pain about a week ago from a tooth; he decided to have the pulp exposed under gas. Three consecutive attempts were made to do this, but they were unsuccessful. He then had the tooth extracted, and the pain ceased. On splitting the tooth no trace of any pulp, nor any indication of its situation could be found.

Mr. COYSH recorded an interesting case of an abscess existing round the apex of a tooth (a single rooted bicuspid), the pulp of which was living. The pulp was acutely sensitive, and after being extracted entire with a Donaldson bristle, a considerable quantity of pus came down the canal.

The PRESIDENT said that heavy biting was far the most frequent cause of abscess arising from apparently healthy teeth. He thought it a mistake to regard an alveolar abscess as a trifling matter; one came to respect them more and more the longer one was in practice. Dying pulps often remained acutely sensitive to the last.

The PRESIDENT then called upon Mr. Stanley Colyer to reply.

A vote of thanks was accorded to Mr. Colyer for his paper, and to Mr. Hey for his casual communication.

The Annual General Meeting would take place on Monday, January 20th, when Mr. McKay would read a paper on "Amalgams."

The proceedings then terminated.

THE DENTAL RECORD, LONDON: JAN. 1, 1896.

DEATH DURING THE ADMINISTRATION OF PENTAL.

It is our unfortunate duty to record the death of a woman during the administration of pental at the Victoria Dental Hospital, Manchester. The only account to hand is a newspaper report of the coroner's inquest, and this contains but little information of real interest, though some statements made by a medical witness excite our surprise. For instance, this is certainly not the first death during the use of pental, there are at least three others recorded. Nor is it at all accurate to say that the deaths during the administration of anæsthetics are equal to one n a thousand. The question which concerns us, however, is, whether it is advisable to give pental for dental operations. We recognize the fact that it is credited with giving a longer period of anæsthesia than gas, but with a correspondingly increased risk. We do not know of data on which to base a comparison of the relative danger of these two anæsthetics, but if we take the experience of the Dental Hospital of London as typical of the use of nitrous oxide, we have a drug which has been administered during the past twenty-five years an enormous number of times, now amounting to 8,000 or 9,000 a year, without a single fatal accident. Contrast this with the limited experience with pental in the whole of the United Kingdom, yet there is already one death to record, to say nothing of the frequent occurrence of dangerous symptoms. Surely the slightly increased period of anæsthesia cannot compensate for this increased risk, more especially when, after all is said and done, two short periods of anæsthesia are usually, in dental cases, almost as advantageous as one long period.

The report also suggests the remark, that, when pental or any other drug is given, the idea should not be allowed to creep abroad that "gas" has been ad-

ministered. In this case the patient meant to have "gas," and so doubtless the error arose in the minds of the reporters for the lay press, from whose printed report one might fairly assume that, if pental and "gas" are not the same thing, they are closely allied. We are, indeed, of opinion that it is never wise even to give "a whiff of ether" during the administration of gas without having previously told the patient, for we are convinced that half the objections which patients feel to taking gas arises from their own or their friends experience of "a whiff of ether."

News and Notes.

THERE is a vacancy for an Assistant Dental Surgeon and for a Demonstrator at the Dental Hospital of London. Applications must be sent on or before Monday, January 6th, 1896.

WE understand that a new dental society—"The Liverpool District Odontological Society"—is about to be started by practitioners resident in that district. The obligations of membership are the same as those of the British Dental Association. Mr. J. A. Woods, 76, Mount Pleasant, Liverpool, is Hon. Secretary, *pro tem.*

THE second Ordinary Meeting of the Odonto-Chirurgical Society (Session 1895-96) was held in the Rooms, 31, Chambers Street, Edinburgh, on Thursday, December 12, at 7.30 p.m., Mr. J. Stewart Durward, L.D.S., President, in the chair. Casual Communications were brought forward by Mr. C. F. Sutcliffe (South Shields):—"Model of Irregular Teeth of a Male Patient, 19 years of age, with Explanation of Treatment by Immediate Torsion"; and Mr. J. T. Jameson (Newcastle):—"Models, showing Hutchinson's Teeth, with Direct History of Syphilis."

THE following two notes are those sent by "D. D. S.," and mentioned in his letter published in our last issue. We shall be glad to welcome others of like kind.

A USEFUL PLASTER.—Take a piece of blotting paper, the size required, saturate with mastic varnish or carbolised resin, pulverize a tabloid of cocaine, spread on surface and apply, the varnish will hold cocaine where required, and lips tongue and throat will not be affected; the result in all painful cases is most gratifying.

BEFORE attempting to remove tartar from roots of teeth apply Ac. Sulp. Arom. on cotton wool or asbestos fibre, leaving it in the pockets for some minutes it will assist the operation greatly. The drug is antiseptic, stimulating and astringent, and acts as a solvent. (Dr. Kirk.)

THE Inaugural Address of the season of the Glasgow Dental Students' Society, was given on November 8th, by J. C. Woodburn, M.D., the Hon. President of the Society. His address took the form of general advice to the students, and was greatly appreciated by the large number of officers and students present. An ordinary Monthly Meeting was held in the Lecture Room of the Hospital, on Friday evening, 6th December, when Mr. R. S. Grant, Vice-President read a very interesting and practical paper on Gold Plate Work.

FRANCIS J. VAN DER PANT, L.D.S., has been appointed Dental Surgeon to the Princess Louise Home for Friendless Girls, Kingston-on-Thames.

AT an ordinary Council of the Royal College of Surgeons, on December 12th, Mr. Christopher Heath, President, in the chair, the following resolution was received from the Board of Examiners in Dental Surgery, and was referred to a committee of the Council for consideration and report: The Board of Examiners in Dental Surgery have fully considered the letter from the National Dental Hospital as well as other questions arising out of it, and whilst they do not recommend that an examination in mechanical dentistry be

instituted "for dental students previous to their commencing their surgical training," yet they are of opinion that the time has now come when it is desirable that the examination for the licence should be divided into two parts, and should include chemistry and physics and metallurgy. The importance of these subjects to the dental practitioner cannot be questioned, and it is generally felt that under the present system candidates do not obtain a proper knowledge of them, doubtless owing to the fact that there is no definite examination in chemistry and metallurgy. A letter was read from Mr. Frank Marshall, Honorary Secretary of the Newcastle-on-Tyne Dental Hospital, applying for the recognition of that institution by the College for the purpose of teaching. The matter was referred to the Board of Examiners in Dental Surgery for consideration and report.

GENERAL MEDICAL COUNCIL,

November 29, 1895.

Sir Richard Quain, President, in the Chair.

The President announced the receipt of the following letter from the British Dental Assistants' Association :—

"Sir,—A deputation will wait upon you to-morrow (Friday) in reference to my petition and others at 1.45 p.m., at the Royal College of Physicians. Trusting that you will receive us,

"I remain, Sir,

"Yours most obediently,

"A. L. Burlin."

Sir William Turner: I see the deputation is now present. This is entirely out of order, any deputation being present. If a deputation is to be called in, well and good, but at this stage no deputation can be here till the Council has consented to receive it. I move that the deputation withdraw.

Dr. Glover: They are entitled to be here as members of the public.

Sir Wm. Turner: If these gentlemen are to be here as members of the public, I shall move "That the Council shall consider this question *in camerâ*."

Sir Dyce Duckworth seconded the motion, which was agreed to.

Strangers then withdrew.

On their re-admission,

The PRESIDENT: I have to inform you that the Council have passed this resolution: "That the Council has already fully considered the question on which the British Dental Assistants' Association wishes to send a deputation to the Council; and not being prepared to depart from the decision of May 29, 1891, cannot receive a deputation on the subject."

The deputation then withdrew.

REPORT OF THE INSPECTOR IN THE QUALIFYING EXAMINATIONS IN DENTISTRY. NOTICE OF MOTION BY MR. BRYANT.

Mr. BRYANT: I beg to move "that the Report by the Inspector, Mr. C. Tomes, on the Qualifying Examinations in Denlistry of the Faculty of Physicians and Surgeons of Glasgow, together with the remarks by the body inspected, be received and entered in the Minutes." I only ask that it be placed on the Minutes, I do not want it to be considered yet.

Dr. CAMERON: I have to ask the Council to pause before they enter this on the Minutes, all the more as it is a matter which is not going to be considered at this session. My reason I can explain in a single sentence. Those who have read the report perceive that there is considerable conflict between the Inspector and the Examiner, not on matters of opinion but in regard to matters of fact, and I think that by a little intercommunication between the Inspector and the Council of the Faculty, these difficulties may probably be cleared up. I will explain the matter in this way. At this Board, as at all the Boards of the Corporation in Scotland, each student is examined by two persons—one who acts as assessor and listens to the examination, and notes down at the time on an official paper all the subjects on which the examination takes place. That was done in this case, and we have records of the subjects on which each student was examined. The Inspector has found it to be his duty to make what is a very serious charge, viz., that two of the six candidates who passed should have been rejected, and he further gives some of the subjects taken up at both of these examinations. But it happens that the subjects as so detailed do not agree with the list of subjects on which any one candidate was examined, so that, as a matter of fact, there is no doubt whatever that he was in error, and that he had got confused in regard to the particular men who were examined. And the Council of the Faculty remark in consequence, "As regards

the results of the examination, the Inspector is of opinion that the candidates who passed and failed at the First Examination deserved the respective awards, but that two of the six candidates who passed at the Second Examination should have been rejected.

"Unfortunately the data on which he formed his judgment are not given at all in the case of one of these two candidates, and only to a very small extent in the case of the other. The Council submit that in recording such an opinion the Inspector was bound to state in detail the facts on which it was founded ; and the obligation was all the stronger that he had no one with whom to share the responsibility. All that the Council on their part can say on the matter, therefore, is that they have not the materials on which to review the Inspector's judgment. If any over-marking there was they have certainly no wish to extenuate it. It is simply a case of the Inspector's opinion formed, as has been explained, under circumstances which practically preclude an adequate judgment against that of the Examiner." There will also be found in those remarks by the Body Inspector a statement which I have made that "he gives some of the subjects taken up at both ; but it happens that the subjects as so detailed do not agree with the list of subjects on which any one candidate was examined. The Inspector is therefore probably in error on this point. The list of subjects on which the candidate is examined is taken down by the assessor on the candidate's marking schedule. These schedules were in the Inspector's possession for some weeks (as were the written papers) ; but this discrepancy appears to have escaped him." Under these circumstances I think it is undesirable to make these statements public property, and I have no doubt that before it is necessary really to put this on the minutes, some communication between the Inspector and the Council of the Faculty will clear up this matter. I therefore have to ask Mr. Bryant to let this remain off the minutes. I am very sorry I had to be absent at the Dental Committee on account of an accidental delay to the train in which I travelled from Scotland, or I would have mentioned the matter there. I think Mr. Bryant will find it consistent with his duty to allow this to remain off the minutes till we meet again. It will be in accordance, I know, with the wish of the body which I represent.

Mr. BRYANT : There is not the least objection to the suggestion of Dr. Cameron.

COMMUNICATION FROM THE BRITISH DENTAL ASSOCIATION.

The REGISTRAR: The next business is to receive the following communication from the British Dental Association.

"British Dental Association,
(Incorporated June 3, 1880),
40, Leicester Square, London, W.C.,
November, 25, 1895.

DEAR SIR,—I beg to submit the following matter of urgency to the attention of the Medical Council at its present session.

"Joseph Stromier, of Glasgow, having obtained the D.D.S. diploma of Michigan University, U.S.A., presented himself last October for examination at the Faculty of Physicians and Surgeons, Glasgow, for the L.D.S. Diploma. He ubmitted as his dental curriculum that of the Michigan College, and upon that curriculum he was admitted to the L.D.S. examination of the Faculty. He failed in the examination but it is his intention to present himself again in April next.

"The point I wish to draw the Councils attention to is this—the Faculty of Physicians and Surgeons, Glasgow, *accepted the dental curriculum of Michigan*, a curriculum no longer recognised as satisfactory by the Medical Council, in lieu of their own, and admitted Stromier to Examination. In doing so I venture to submit that the action of the Glasgow Faculty is *ultra vires*, and I beg the Council to take steps, as they may deem necessary, to prevent a recurrence of such action.

"I am, dear Sir, Yours truly,
"W. B. PATTERSON,
"*Hon. Secretary.*

"W. J. C. MILLER, Esq., *Registrar*."

Dr. CAMERON: In regard to this I have really no information, I had not heard of this case until I saw it here now.

Mr. BRYANT: Was not that before the Dental Committee?

Dr. BRUCE: It is a pity that such accusations as this should not be made direct.

Mr. WHEELHOUSE: I beg to move that this letter be received and entered on the minutes.

Dr. CAMERON: Surely we could have this settled by the Dental Committee before it is put on the minutes; one does not know the truth of it in the least. I will move "That this communication be referred to the Dental Education and Examination committee."

Dr. MCVAIL: I will second that.

Dr. Cameron's motion was agreed to.

Monday, December 2.

SIR RICHARD QUAIN, President, in the Chair.

The Report of the Students' Registration Committee was adopted and entered on the minutes. The following is the portion of the Report relating to dental business.

II.—Dental Business.

1. From the following students, who desired to antedate their commencement of professional study, their Preliminary Examination having been fully completed before they commenced :—

Name	Date of Preliminary Examination.	Date of Commencement of Professional Study.	Date of Registration.	Date to which Student desired to be Antedated.
Carpenter, Alex. C. ...	April, '94	Oct. 1, '93	June 13, '94	April 1, '94
Colyer, Stanley W. R.	Mar., '91	May 1, '91	Oct. 3, '93	May 1, '91
Crombie, Walter P. ...	April, '89	Jan. 3, '90	Aug. 15, '95	Jan. 3, '90
Fyfe, David	April, '95	May 17, '95	Oct. 28, '95	May 17, '95
Goldfoot, Moseley M..	Sept., '93	Oct. 21, '93	Oct. 10, '95	Nov. 10, '93
Moore, Hubert Wm. ...	June, '92	Aug. 11, '90	July 29, '92	June 1, '92
Mullord, Charles	Dec., '90	Feb. 11, '84	Jan. 30, '93	May 1, '92
Ryle, Arthur B.	Dec., '88	Sept. 10, '91	Feb. 1, '92	Sept. 10, '91
Steveni, Geo. Henshall	June, '95	Jan. 1, '95	Oct. 1, '95	June 1, '95
Stoner, John W.	Dec., '92	Mar. 31, '84	Jan. 26, '93	Dec. 8, '92
Tebbitt, Ernest R.....	Dec., '91	Sept. 29, '91	Dec. 31, '91	Dec. 1, '91
White, Eustace B. L.	June, '95	Sept. 5, '92	July 26, '95	June 1, '95

Resolved :—That these applications be *acceded to*."

2. From the following student, who desired to antedate, his Preliminary Examination having only been deficient in one subject at the time of commencement of professional study :—

Name.	Dates of Preliminary Examinations.	Date of Commencement of Professional Study.	Date of Registration.	Subject in which deficient.	Date to which Student desired to be Antedated.
Newton, Joseph R.	{ Sept.,'92 / Dec., '92 }	June, 20,'88	Jan. 20,'93	French	Sept. 1,'92.

Resolved :—"That this application be *not acceded to*."

3. From the following student, who desired to antedate, his Preliminary Examination having been deficient in more than one subject at the time of commencement of professional study :—

Name.	Dates of Preliminary Examinations.	Date of Commencement of Professional Study.	Date of Registration.	Subjects in which deficient.	Date to which Student desired to be Antedated.
Mountain, Wm.	{ Aug.,'91 / Aug.,'93 / Aug.,'95 }	Nov. 2,'92	Aug. 21,'95	{ Algebra / Euclid / French }	Nov. 2,'92.

Resolved :—"That this application be *not acceded to*."

4. From John B. Watson, who passed in all the subjects of the Preliminary in October, 1891, except Latin, and who passed in that subject and became registered in April, 1894, requesting that he might antedate to October 1, 1891, on the ground that during the years 1892-1893 he was suffering from hyperæsthesia of the retina, respecting which he sends a medical certificate."

Resolved:—"That this application be *acceded to*."

Sir DYCE DUCKWORTH: I beg to move the following resolution:—

"That on and after January, 1897, the registration of students under Resolution XI., of June 2, 1891, shall be discontinued, so far as concerns the preliminary examinations of the Pharmaceutical Society."

I may say that the Committee have sat and heard all the cases mentioned in the report, and it is satisfactory to note that the students are coming more under the regulations of the Council. It has been the custom previously to allow students who have passed the preliminary examination of the Pharmaceutical Society to register as medical students on taking the previously omitted subjects, but the Council wish to discourage that in future, and to encourage students to enter the profession who can show that they have passed a good preliminary education before they start on professional work.

Dr. MACALISTER: I beg to second the motion.

The motion was agreed to.

COMMUNICATION FROM THE MIDLAND BRANCH OF THE BRITISH DENTAL ASSOCIATION.

The following Communication from the Midland Branch of the British Dental Association was on the agenda paper of the Council, and was, we understand, received and entered on the minutes:—

"British Dental Association (Midland Branch).

"*Hon. Treasurer.*—G. G. CAMPION, 254, Oxford Road, Manchester.

"*Hon. Secretary.*—I. RENSHAW, Drake Street, Rochdale.

"*May* 30, 1895.

"DEAR SIR,—I am desired by the Members of the Midland Branch of the B.D.A. to convey to you the enclosed Resolution, with the request that you will place it before the General Medical Council at its next meeting.

"I am, dear Sir, Yours truly,

"I. RENSHAW, *Hon. Sec.*

"W. J. C. MILLER, B.A., Esq.,

"*Registrar of the General Medical Council.*"

"*Resolved*:—That the best thanks of the members of the Midland Branch of the British Dental Association, assembled at

Bradford, be given to the General Medical Council, for their resolution in regard to Dental Advertising, the Branch expressing the hope that the Council would continue its policy until such advertising was suppressed.

"I. RENSHAW, *Hon. Sec.*"

ASSOCIATION OF UNREGISTERED DENTAL ASSISTANTS.

A memorial from an Association of Unregistered Dental Assistants was also presented to the Council.

Legal.

COMER *v.* GWYNNE.

Before Mr. JUSTICE MATHEW, *without a Jury.*

THIS was an action, on December 6th, by a dentist to recover £105 for professional charges and work done to the teeth of defendant's wife. The defendant, without admitting liability, paid into Court 50 guineas, which he said was sufficient to satisfy the plaintiff's claim. Mr. Bray appeared for the plaintiff; Mr. Macaskie and Mr. Glynn for the defendant. Mr. Bray, in opening the plaintiff's case, said the action was for £105 for work done in fitting what was called the removal bridge work to defendant's wife's teeth. The plaintiff was a dentist practising the American system of dentistry. In July, 1894, the plaintiff did some work for the defendant. In May, 1895, the plaintiff got a letter from defendant's wife asking for an appointment. On May 4 she went to plaintiff and he found she had a broken bridge-case, which she wanted removed. The plaintiff said he could not state his fee until he knew what had to be done, but it would not be more than his printed terms, which he put up in his waiting room. It was settled that defendant's wife should come up again. Her broken bridge work was removed. She was then told that she might have the removable bridge work in duplicate. It was put on in such a way that it could be removed. She came again on the Friday to have it fitted. On the same day the plaintiff sent in his account: "To agreed price for professional services rendered for Mrs. Gwynne, and supplying four-tooth removable bridge-case in duplicate, £105." The defendant then wrote to the plaintiff that the plaintiff agreed to do the work on the same lines as he worked for defendant—namely, £31 10s. for seven teeth. The plaintiff refused to alter his account, and brought his action. Mr. Frank Comer, the plaintiff, examined, said he was a specialist in advanced American dentistry. He practised at 9, Hereford-square, South Kensington. In July, 1894, he had a communication with defendant, and agreed to do the work for 30 guineas. The defendant had a fixed bridge-case broken in upper jaw. He agreed to make a small case for his lower jaw and repair the broken case. The case was made of gold and platinum. The platinum screws were screwed into the old stumps. By unscrewing the bridge it could

easily be removed. He gave the defendant one of the books showing his prices. The defendant's wife told him she had a broken fixed bridge. He looked at her mouth and said he did not know what it would cost, that defendant knew what his regular printed fees were, and he should not charge more. The defendant's wife said it would be all right, as witness would charge only what was fair. On May 8 Mrs. Gwynne came. He removed the broken bridge, which was difficult to remove. He then picked up one of his pamphlets, opened it at his list of fees, and said, "It now rests with you to decide what you wish to have done. If I put in a four-tooth case with a fixed bridge it will be 60 guineas; if with a removable bridge-case in duplicate it will be 100 guineas." Mrs. Gwynne said she wanted the best. He said, "Very well, it will cost you 100 guineas." He was occupied on the case from Wednesday to Friday almost continuously. Cross-examined—He had a diploma from Central America. Removable bridge work had never been done by any dentist but himself. He charged £31 10s. for two or three hours on May 8. On May 10 she was with him about three hours. He never made a removable bridge case unless he made a duplicate set. Mr. Gwynne did not agree that the price was to be 100 guineas. He suggested that Mrs. Gwynne did not know the meaning of the word duplicate. Mrs. Gwynne refused to accept the duplicate bridge. That closed the plaintiff's case.

Mr. Macaskie, for the defendant, said his case was that there was no bargain to pay 100 guineas; that the defendant was not party to any such bargain; and that the charges were excessive and unreasonable. Mr. Gwynne, the defendant, called, said the plaintiff told him he could not exactly say the price. The plaintiff said he would do the work for his wife on the same lines as his own. He never agreed to pay 100 guineas or authorized his wife to agree to those terms. Cross-examined.—He saw the testimonials with the price list. Mrs. Gwynne was called, and corroborated the defendant as to what plaintiff said about terms, and further said that the plaintiff did not mention the cost to her and said nothing on the first occasion about a duplicate set. Cross-examined.—She could not get the teeth out. The plaintiff did hand to her a book of fees while she was in the chair. Miss Allen, called, said she was with Mrs. Gwynne at the plaintiff's. Nothing was said about terms. Mr. Charles S. Tomes, F.R.S., examined, said he was a consulting dentist. Had been examiner at the College of Surgeons on dental surgery for 13 years. He had examined Mrs. Gwynne's teeth. The work was very ordinary, and was done by hundreds of dentists here and in America. It was an average piece of work. For one set a fair charge would be from 15 to 20 guineas, but it was difficult to answer the question, as most dentists charged by time. Two guineas an hour was the recognized charge for dentists in first class practice. That was while the patient was with the dentist. A good deal of the laboratory work could be done by a skilled artisan. For the duplicate set he would say ten guineas was ample. The duplicate

set was not required. Cross-examined.—He thought the charges in plaintiff's book most extortionate. He thought some of the statements in the plaintiff's pamphlet showed great ignorance of anatomy and physiology. He did not look upon the plaintiff as a professional equal. He had often made removable bridge plates. The principle was not new. There was no such thing as dentistry special to a country. There was no jealousy between English and American dentists, when they practised on professional lines. Mr. W. B. Paterson, honorary secretary to the British Dental Association, examined.—Said he was a practising dentist. He agreed with Mr. Tomes as to the charges being excessive. Cross-examined.—He had made several removable bridges. He did not know of the Comer system.

Mr. Justice Mathew, in giving judgment, said that the true explanation of the action was that the plaintiff believed that because he put his price list into Mrs. Gwynne's hand, she, therefore, must be taken to know what was in it. What were the probabilities about that? The defendant had been attended to by the plaintiff, and for the work he did he was willing to take 30 guineas. The defendant said he went to see what the charge for his wife would be, and was told on the same lines as his own. If the evidence in the case supported the defendant's version, and not the plaintiff's, what occurred subsequently? The plaintiff put the book of charges in Mrs. Gwynne's hand while in the chair. He was satisfied that the plaintiff did not call the attention of the lady to the charges. He advised the plaintiff if he meant to make such a charge as this to write first to the person he intended to make liable. He had evidence of men of experience called before him, who stated that there was nothing unusual or extraordinary in the work done by the plaintiff. He would allow him 30 guineas, and direct that the remaining 20 guineas paid into Court be paid out to the defendant, with costs of the action.—*The Times.*

THE DENTAL HOSPITAL OF LONDON.

The Annual Dinner of the past and present students took place on the 30th November, at the Café Royal. A large and representative gathering met under the chairmanship of Mr. F. Canton. The health of "The Queen and Family" having been duly honoured, the chairman proposed "The Past and Present Students." As an old student himself, to propose this toast seemed like proposing his own health, and when it was first intimated to him that he was expected to undertake that pleasurable duty, he put the case before their worthy Dean, but the Dean was immovable, and replied that this being the students' dinner "The Past and Present Students" was the toast of the evening, and must come from the chair. His position then must be accounted for by the fact that he

did not feel sufficiently separated from the hospital to defy the Dean with impunity. On reflection he was sure that the Dean was right, for though there were other important toasts down on the list, the one that was entrusted to him must claim priority when they remembered that if there were no students there could be no Dental Hospital of London. Further, the students of to-day were the practitioners of the future, and therefore, in their hands lay the honour and dignity of the profession. Fortunately for them the path had been made smooth by those who had preceded them. The large majority of hospital appointments held by the past students of the school was abundant testimony to the ability of the men turned out by the London School of Dental Surgery and the thoroughgoing study and work in the right direction which they had undergone.

Mr. JOHN ACKERY, in replying for the past students, alluded to the fact that it was twenty years since he entered the hospital, and reviewed the progress and development of the work since ; only two of the staff that existed then now remained with them, viz. : Mr. David Hepburn and Mr. Bailey. As the chairman had said, most of the important dental positions at the hospitals in London and in the provinces were held by past students of the Dental Hospital of London. In speaking of the new building which they looked forward to possessing at an early date, he referred with satisfaction to the amount subscribed by past students. It was now for the public to come forward and supply what was wanting.

Mr. W. H. PIDGEON appropriately responded for the present students.

Dr. SYDNEY COUPLAND proposed "The Hospital and School," connecting Dr. Joseph Walker's name with the Hospital, and Mr. Leonard Matheson with the School.

Dr. WALKER (the Treasurer of the Hospital), in reply, referred to the fact that this was the 37th anniversary of the wedding of the Hospital and School, and he had the pleasure of being present at that wedding thirty-seven years ago. The married couple had worked amicably together since, and they could only wish the same harmony might prevail for another thirty-seven years. He had the pleasure to announce that the negotiations for the purchase of the new site were going on most favourably, and that they were within measurable distance of seeing the foundation-stone of the new

Hospital laid. He took the opportunity of thanking the Staff and Students for the noble response they had made to the request of their Dean. He was not going to ask the Students for any more contributions, but the further necessary sums should come from the public, and to them appeal must continually be made if they were to see their way out of their difficulties. Dr. Walker also paid tribute to the great business capacity of their Secretary.

Mr. LEONARD MATHESON dwelt in eloquent terms upon the noble traditions which had grown up in the past thirty-six years, of which everyone connected with the Hospital and School might well be proud. In alluding to the names connected with the past he mentioned Mr. Gregson's long connection with the Institution, and made sympathetic reference to his serious illness. He also spoke of the debt of obligation the School was under to their Dean, without whose services during the period he had been Dean the School would have been a very different one. Mr. Morton Smale worked in such a quiet, unostentatious way that few perhaps realised how much they owed him.

Mr. W. H. DOLAMORE proposed "The Visitors," for whom Mr. ERNEST LANE responded.

Mr. J. SMITH TURNER proposed the health of "The Chairman," and referred in eulogistic terms to the services he had rendered the profession. He had held nearly every official position that it was possible for him to hold.

Mr. CANTON, who was most cordially received, briefly, but feelingly, returned his sincere thanks.

Reviews.

THE DENTAL SURGEON'S DAILY DIARY AND APPOINTMENT BOOK. Published by John Bale & Son.

An excellent book for the purpose indicated by the title, price 6s., interleaved with ruled or blotting paper, 7s. 6d.

THE DENTIST'S DIARY FOR 1896 WITH SUPPLEMENT. Published by the Dental Manufacturing Company.

A diary in small compass, well arranged, neatly bound, and containing much information useful to dentists, price 3s. 6d., or interleaved with blotting paper, 5s.

THE DENTAL RECORD.

VOL. XVI. FEBRUARY 1ST, 1896. No. 2.

Original Communications.

NOTES ON THE TREATMENT AND FILLING OF TEETH.

By W. CASS GRAYSTON, L.D.S.

(*Continued from page* 5.)

COMBINATION OF FILLING MATERIALS.

Many dentists consider that a combination of filling materials is of great value.

It is considered very advantageous to line all cavities with osteo before filling with amalgam. This is easily accomplished by mixing the osteo rather soft and placing it in the cavity with a small spatula, scraping the cement off the blade against one of the edges. A pellet of amalgam is then placed on to the cement, and with suitable instrument, using the amalgam as a buffer, the osteo is readily adapted to the floor and walls, the excess that is pressed out being at once removed, firm pressure against the edges preventing any cement being here exposed. More amalgam is then added until the filling is completed.

The shrinkage of the amalgam seems to be somewhat controlled, and it does not appear to so readily become defective at the edges. The unsightly appearance given to a tooth by amalgam if the walls are thin is avoided, and the tooth is considered to be better preserved altogether.

In many cases front teeth may be filled with this combination without their appearance being spoilt. It is important in these cases that the cavity does not encroach on the labial wall.

If preferred, small pellets of a tough, slow setting cement may be first carefully worked against the floor and walls, and then, when the lining is thus made, the amalgam is introduced. The former method is perhaps better when the retainage is doubtful, and it is desired to rely somewhat on the sticky properties of the osteo to cement and hold the amalgam in place.

Some operators have mixed the filings of amalgam alloy with osteo, and others, after mixing the alloy with quicksilver in the usual way, have then mixed it with osteo, the resulting mass being introduced and packed like osteo. Neither of these methods in my hands has given any better results than osteo alone, and the colour of the resulting filling is disagreeable if exposed to view.

The mixing of amalgam prepared in the usual way, with osteo may be very valuable if the surface is protected with amalgam. There may be a better union between the amalgamised osteo and the amalgam itself than between osteo and amalgam alone. Experiments in this direction are worth trying.*

To line a cavity with osteo and fill with gold is very difficult, and except in occasional cases is not worth the extra time and trouble.

After placing the osteo in the cavity several pieces of gold are pressed into it, and it is allowed to set, keeping it dry all the time. The pieces of gold embedded in the cement are then consolidated and form so many retaining points, on to which the gold is built. It is unwise to rely solely on these retaining points for holding the filling in place, and some other retainage must also be obtained or the gold will be dislodged if subjected to much strain. Either the gold will break at the retaining points or if the union here is strong the cement will break at this part. To test the strength of phosphate cement I took a piece of No. 240 foil, which is as thick as thin plate, bent the ends at an acute angle ⟨ ⟩ and placed it in a tooth out of the mouth that was filled nearly up to the enamel with osteo, first placing osteo carefully on the under side of the plate and in the angles. After leaving it to set until the next day, I scratched the surface of the plate and built up a gold filling with hand pressure. On trying to dislodge it with an excavator the whole of the gold came away "en masse" bringing with it part of the osteo. A combination of guttapercha and osteo is useful in cases where it is difficult to keep the cervical wall perfectly dry throughout the operation. Place a layer of guttapercha at this part and then complete with the cement.

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* The combination of osteo and amalgam was first suggested by Mr. F. A. Bellamy, and described by him in the "British Journal of Dental Science," February, 1887. In reply to a letter asking for his views on the adhesion of an amalgam surface to a filling of a mixture of osteo and amalgam, he informs me that although he usually presses the amalgam into the mixture, he finds the union is very good in cases where the amalgam is simply laid on as a veneer, and that unless the filling has been strained in biting before it is set, the veneer will very rarely break away. He also finds the adhesion of amalgam to the mixture decidedly stronger than the adhesion of amalgam to osteo alone. Mr. Bellamy does not, however, advocate simply veneering with amalgam, preferring, whenever it can be satisfactorily accomplished, to secure in addition mechanical union by pressing the amalgam well into the mixture.

Gold and Amalgam.

A combination of gold and amalgam is very useful in many cases of approximal decay of molars and bicuspids. It is often difficult to pack the gold accurately against the cervical edge and the lateral walls of the cavity where they approach the cervical edge, and it is at these parts that recurrence of decay is usually to be feared. If amalgam is used from half to two-thirds of the way towards the crown the dangers of defects in the filling are greatly lessened. By making the masticating part of gold, the chipping of the edges, so often found with amalgam, is avoided. When gold and amalgam are thus used in combination, the amalgam usually turns black, but does not appear to shrink.

In manipulating this combination the amalgam may be allowed to set, and at a subsequent sitting the gold may be inserted, or the gold may be packed at once directly on to the amalgam. In the latter case a matrix is usually used, very tightly clamped or tied in place, so as to prevent the pressure of packing the gold forcing the amalgam out of the cavity. Sponge or crystal gold unites fairly readily with amalgam. At first it appears to be swallowed up by it, but after a time this ceases, and the gold works in the usual way. As soon as this occurs the filling can be completed, if desired, with foil. It is claimed that an intimate union takes place between the gold and the amalgam, but it is unwise to rely in any way on this union for retainage. Undercuts should always be made in the coronal part of the tooth. Personally, I have found it more convenient and easier not to begin working the gold on to the amalgam, but to extend the cavity well across the crown and commence the filling in a small pit or undercut made in the dentine at the part furthest removed from the amalgam and then to work the gold solidly from this starting point back across the crown until the amalgam is reached (Fig. 2), being careful to attach each piece of

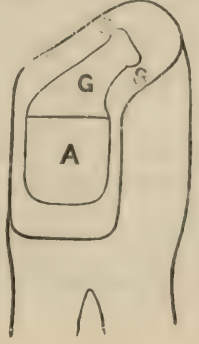

Fig. 2.

A. Amalgam.

G. Gold.

S. S. Starting points for the Gold.

gold (foil or crystal gold as preferred) to that already in place before working it on to the amalgam. By proceeding in this manner the matrix may be dispensed with, and if care is taken in packing the gold to apply the force as far as possible at right angles to the long axis of the tooth, the amalgam will not be forced out of the cavity or broken by the pressure.

In packing gold on to amalgam that is in a more or less plastic condition, the absorption of some of the quicksilver by the precious metal probably prevents any shrinkage of the amalgam taking place: for this reason, and also because by the time all the gold is packed the amalgam is just in the right condition to be easily and smoothly finished, it is usually better to complete the operation at one sitting.

To make a combined filling by either of these methods sometimes takes up as much time as making the filling entirely of gold, but those who have given it a long trial consider these teeth are better preserved by it than by gold alone, and this is probably the case, particularly in difficult cavities.*

Mr. Humby in making fillings of this description takes the extra precaution of first lining the cavity with osteo.

It will be readily understood that all the materials used for filling teeth are valuable and indispensable if a dentist is to do the fullest justice to his patients. To quickly grasp the peculiarities of each case, and select the most appropriate material demands considerable experience; but as far as general rules can be laid down it may be said that when the mouth looks clean and healthy, and the decay is not rapidly reducing the teeth to weak shells, and the teeth themselves do not show distinct pits or chalky patches in dangerous positions, diseased conditions have not been recently treated and neither the tooth nor the patient is unduly sensitive, gold is indicated, unless pecuniary considerations stand in the way, with the exception, perhaps, of very small cavities in the approximal surfaces of molars and bicuspids, and of cavities in general which present extraordinary difficulties in the way of manipulation, or of front teeth so much broken down that gold would be unsightly.† Amalgam, preferably

* Dr. Kingsley, of New York, was, I believe, the originator of the method of packing gold directly on to amalgam; and to Dr. Clapp belongs the credit of showing how it can be done with a matrix and Steurer's plastic gold.

† An osteo filling, if exposed to view, soon, however, becomes unsightly' owing to wear, or destruction of its surface.

with an osteo lining, is indicated in all cavities in the molars or bicuspids, and sometimes, if not in any way exposed to view, in the front teeth (always in that case with an osteo lining) where gold is for any reason contra-indicated, unless there is any fear of having to refill in a short time, when osteo or guttapercha is preferable.

Osteo, besides being useful as a lining for all, or nearly all, amalgam fillings, is indicated for filling medium and large-sized cavities in the front teeth where gold is contra-indicated, for filling saucer-shaped shallow cavities that are too sensitive to be properly shaped, and as a test filling in doubtful cases in general.

Guttapercha is of principal value in the filling of small cavities not exposed to mastication on approximal and labial, buccal and lingual surfaces, where it is not desired to use gold, and for filling cavities, particularly if not large, for delicate patients and children where rapid and easily renewed operations are desirable.

It must not be forgotten that by commencing with osteo and guttapercha fillings, and replacing them when necessary, the teeth will in many cases be preserved until an improvement in the conditions admits of the use of gold, whereas if gold had been used at the commencement in unfavourable or doubtful cases, the teeth would have probably been lost. Should the conditions not improve, the osteo and guttapercha must be renewed as often as necessary, and if the patient will only attend to this matter and have the teeth examined at regular intervals, they will be preserved for a number of years and the wearing of artificial teeth postponed until late in life.

It is very discouraging for a dentist to find that his advice respecting regular and *continuous* examination of the teeth is often disregarded, and in consequence his services have been of comparatively little benefit, but he can only do his duty, and if the carelessness of patients causes much good work, and the money that has been paid for it to be practically wasted, he can only regret it and continue to do his best according to the conditions he is called upon to treat, and keep on giving good advice. In many cases he will find it bears fruit.

To sum up the merits and demerits of the different materials, it may be said that gold is indestructible in the mouth, that if skilfully manipulated a tight filling can be made that will not wear or chip at the edges. This edge strength is possessed by gold alone. That,

mechanically, it is therefore decidedly the best material. It is difficult to work, and consequently a good patient is necessary. A healthy mouth and fairly good teeth are also demanded. It must be inserted by one who is skilled in its use, who recognises the tendency of tooth structure to decay at the margins of fillings, and who realises that this can be prevented in the majority of cases by what is known as contour and free edges. The colour of gold is objectional in many badly decayed teeth at the front of the mouth, but in the majority of cases front teeth can be so filled that it is not noticeable. Gold is a good conductor of heat and cold, and in some cases this causes death of the pulp. This can usually be avoided (wherever there is room for it) by flooring the cavity with a non-conductor or a low conductor before inserting the gold.

Amalgam is second to gold in durability as a material, and a better filling than gold for many difficult patients and for many extremely difficult cavities. Its appearance is disagreeable, and consequently it must not, as a rule, be used in cavities exposed to view. The same rules as to contour and free edges apply to amalgam as well as to gold, although for difficult patients it is not always possible to obtain them.

Tin foil is of value principally as a low conductor under gold and as a convenient starter for gold fillings. It should not be used in front teeth as it gives a dark appearance to the labial wall.

Osteo and guttapercha are not in themselves as durable materials as gold or amalgam, but, as already explained, there are many cases in which they can be more satisfactorily used.

Combinations of filling materials are often far more valuable than the use of any of them separately. Thus, an osteo lining adds to the value of an amalgam filling. Amalgam at the cervical part often adds to the value of gold fillings on the approximal sides of molars and bicuspids, and guttapercha at the cervical part of osteo fillings in certain approximal cavities also is valuable.

The Manipulation of Filling Materials.

Gold.—A description of the manipulation of gold for filling teeth may be divided into a consideration of the preparation of cavities, preparation of the gold, packing the gold, and trimming and smoothing the surfaces of the fillings.

To prepare a cavity for the reception of gold it is necessary, in nearly all cases, to cut away part of the tooth, to enable the instruments to be freely used, in the removal of decay, the cutting of the retainage, and the insertion and packing of the gold.

A certain amount of "opening the cavity," as it is called, is necessary, no matter what material is selected, but the cutting must be much more freely done if gold is to be used, for every piece must be placed at once just where it is wanted, and condensed by the direct action of the plugger. There is no possibility of pressing the gold round a corner and squeezing it into position. This cutting away of part of the tooth does no harm. The part removed is replaced with gold, and it can be done in such a manner that the tooth is in no way weakened or in any way made less useful. To open a crown cavity, the overhanging edges of enamel are cut away until they are level with the interior walls. It must be remembered that, owing to the body of a tooth being composed of dentine, it usually decays to a greater extent than the enamel, and on the removal of the decay, the interior is consequently larger or more hollowed out than the orifice. (Fig. 3*a*). The rule in crown cavities is to make

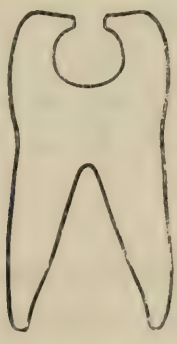

FIG. 3*a*.

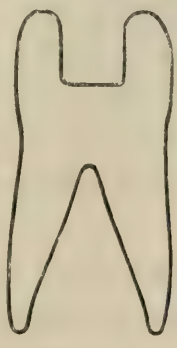

FIG. 3*b*.

the orifice as large as the interior, so as to do away with any overhanging ledge under which it would be almost impossible to accurately pack the gold. (Fig. 3*b*). This applies also to cavities on the labial, buccal and lingual surfaces of the teeth, and to a certain extent to all cavities.

To open a mesial or distal cavity in the six upper front teeth it is usually advantageous to cut away either part or the whole of the lingual wall. Occasionally part of the labial wall may be removed instead, but this should, as a rule, be avoided, for, although it makes the whole operation considerably easier, and it can be completed in less time, the gold shows somewhat, and this should

always be prevented if possible. Some operators, instead of cutting away either the lingual or labial wall, separate the teeth widely by pressure, and beyond trimming the edges to obtain smooth, firm margins, do not remove any of the walls for the purpose of obtaining access. Having originally practised this wide separation method with preservation of both the lateral walls, I must say I infinitely prefer a slight separation, and the access obtained by cutting away one of the lateral walls ; the packing of the gold can then be done with greater certainty, the nuisance of obtaining a wide separation is avoided, the patient is not worried with keeping the cotton wool or tape, or whatever may be used to obtain the desired space, between the teeth for a considerable time ; the teeth rarely become sore, and the cutting secures free edges at parts of the filling, at any rate. It is advisable, however, to obtain a slight separation by pressure, so as to admit of the gold being accurately carried over the labial edge if working from the back, or the lingual edge if from the front, and to admit of the trimming and polishing tapes and discs being easily used. This space can be obtained immediately, if desired, by pressing a wedge of wood between the teeth or by cutting with a thin separating file. In the latter case, the slight division thus made will not spoil the appearance of the teeth, and is decidedly preferable to showing a line of gold ; but, personally, except for preventing the exposure of gold, I rarely file or cut away more of the labial wall than is absolutely necessary to obtain a smooth border at this part.

To obtain access to all medium and large sized cavities on the approximal surfaces of molars and bicuspids, the overhanging enamel at the coronal part is entirely cut away, and if necessary, as it sometimes is in a distal cavity, part of the buccal wall is also removed. In all medium and large-sized cavities in these teeth, both the lateral walls should be cut away sufficiently to secure free edges, but more than the cutting necessary for this purpose is admissible in certain distal cavities where the access is difficult.

(*To be continued.*)

AMALGAM.*

By R. McKay.

Mr. President and Gentlemen,—In the treatment of dental caries there are certain cases in which the use of gold is impracticable, so that a substitute must be used which will be of equal service in mastication and in resisting the action of the fluids of the mouth. The only substitute at present known is "Amalgam," and I think amalgam is indicated in preference to gold in broken down teeth where the walls are frail—in teeth of weak structure—in large cavities occurring in the teeth of those who are unable to bear the strain of a prolonged operation—in cavities at the back of the mouth, or in positions difficult to get at—and in teeth of children.

The advantages of amalgam are that it is quick and easy of insertion, it is also claimed that some varieties have a preservative action upon the tooth substance, but whether this would be possible with a watertight filling—and of course every filling should be watertight—is open to doubt, for palladium, the only absolutely water tight amalgam with which we have long experience, does not do so, notwithstanding that its sulphide is black and is freely formed upon its surface.

Amalgam also has its defects. An objection raised to its use when first introduced was "that the mercury is so feebly held that it can escape and exert its poisonous effects upon the person in whose mouth the filling is, and upon those who handle it." With regard to the latter, even now some practitioners tell us that they cannot mix amalgam in their hands without their health being markedly affected, but no one still believes that the mercury in a filling could produce the dire effects which have been ascribed to it in times past, viz., mercurial salivation, headache, insomnia, diarrhœa, amaurosis, aphthae, loss of memory, gangrene of the mouth, and many others, it is very much like the story of red rubber dentures producing salivation and other untoward results.

The valid defects are classified by Tomes as five, viz:—

1, Shrinkage in setting; 2, Change of form in setting; 3, Want

* A paper read before the Students' Society of the Dental Hospital of London.

of toughness or hardness ; 4, Discolouration of the surface of the amalgam itself, and 5, Staining of the substance of the tooth by it.

Shrinkage takes place in the setting of all amalgams, with the single exception of palladium, which slightly expands. It has been found that the greatest changes in bulk occur in the first few hours after the amalgam has been mixed, and subsequently is slight in amount, though it is often not completed for twelve hours.

Change of form.—Until last year this was supposed to be due to the tendency to assume a spheroidal shape during setting, by reason of which Dr. Dodge said, "every point of the surface most distant from the centre of the mass would move towards the centre, and every point less distant would move from the centre," in other words, all long diameters would shorten, all short ones lengthen, therefore, in preparing cavities for amalgam, the depth should be greater than the width, the walls of the cavity being left round rather than straight. But this theory was upset by Dr. Black when he announced his discovery of a property unique to amalgams, viz., that of flow This is the property of yielding constantly to a heavy stress and yielding repeatedly to the same amount of stress even when applied at intervals, it is the antithesis of rigidity and elasticity and accounts for the cup-shaped depression on the surface of old large amalgams.

Want of toughness or hardness.—This chiefly affects the edge strength, for no edges can be safely left thin, as the edges of a gold filling may be, hence the edges of the enamel should be left straight and not bevelled, as the thin layer of enamel thus left is less liable to fracture than the thin ledge of amalgam which would be present if the edges were bevelled. The hardness or toughness seems to depend on the toughness of the metals composing the alloy, but this point has not yet been definitely settled.

Discolouration of the surface of the filling and of the substance of the tooth.—This is due to the presence of silver or copper. In the case of silver, the sulphuretted hydrogen of the mouth forms with it the sulphide of silver, while the same should also be true of copper, but Tomes says "that the sulphide of copper under the influence of exposure to air and moisture readily becomes oxidised and forms the sulphate. Hence it is almost certain we shall have sulphate of copper

formed upon the exposed surface of the filling. Now this sulphate is freely soluble, and hence is likely to permeate the dentine, when it will again be converted into the sulphide, whilst the sulphides of other metals, not being so readily converted into soluble salts, will not so thoroughly permeate the teeth." Whatever the reason, it is undoubtedly true that a tooth so discoloured is at the same time preserved.

To overcome these defects and obtain a perfect filling very numerous experiments have been carried out, and these may be detailed under three headings, viz :—

1, The composition of the amalgam ; 2, The preparation of the cavity ; and 3, The methods of mixing and insertion of the amalgam.

1. *The composition of the amalgam.*—To M. Taveau, of Paris, is due the introduction of amalgam, for in 1826 he advocated the use of what he called his "silver paste" for permanent fillings. Some few years after this the two brothers Crawcour presented their "Royal Mineral Succedaneum" to the American dental profession, it was made from silver coin filings which were composed of an approximate to nine-tenths silver and one-tenth copper, the amalgam was made by mixing about equal parts of mercury and filings, the result being a mixture of fifty parts mercury, forty-five parts silver, and five parts copper in 100. Although this material saved teeth, its surface blackened and the teeth were deeply stained by it, it was the origin of the "Amalgam War" in America, and was used by comparatively few dentists. In 1845, Dr. Clowes, who used it, made the discovery that tin overcame this tendency to blacken, in the following manner : Two large approximal cavities presented themselves for filling, one in front of a molar, the other at the back of a contiguous bicuspid, in such cases his usual practice was to fill the cavity fronting with tin, and the opposite one with amalgam at different times for fear of getting things mixed, but in this case he performed both operations at the same time, got the materials mixed, and supposed the fillings spoiled, instead, at the next visit, to his amazement and joy the surface of the amalgam presented a silvery whiteness. Of all the known metals, nearly everyone has been pressed into the service of amalgam, but only silver, tin, copper, gold platinum and zinc are of any utility, and their comparative usefulness is indicated by the order given. Silver forms the bulk of all amalgams, the *setting* is hastened by copper and probably by gold

while tin materially retards it, besides increasing the amount of contraction and decreasing the edge strength, zinc in the proportion of 1 to ½ parts in 100, or even less, seems to control shrinkage perfectly, gives a fine working quality and adds whiteness and maintainance of colour to the filling. Besides zinc, copper and antimony diminish the contraction, but the latter is so very dirty to use that it has been almost entirely abandoned.

Amalgams consisting of mercury and one other metal, as copper amalgam and palladium amalgam, have been termed Binary, ternary, quaternary, etc., when they contain three, four, or more metals. An example of a ternary amalgam is found in the old coin-silver amalgam, while both contour and submarine come under the quarternaries. Contour amalgam contains silver, tin, and gold. Submarine—silver, tin, and copper, and standard amalgam—acknowledged by the best authorities to be an excellent material—contains silver, tin, gold and copper.

Of front tooth alloys there are two, one contains silver, tin, gold and zinc ; the other, copper, silver, and tin.

The composition of *Flint Edge* I have been unable to find.

2. In the *preparation of the cavity* besides the points already noticed with regard to the shaping of the cavity, every care should be taken to sterilize and thoroughly desiccate it, for even if a watertight filling has been introduced and there is moisture left in the cavity, oxidation and precipitation of the salts will take place and the tooth be stained. To aid in readily accomplishing this Dr. A. C. Hewitt uses as a dentinal desiccant.

℞ { Alcohol (pure), fl ℥. γ.
Chloroform, fl ℥. iij.
Beta Naphthol, gr. V̄.

℔ Apply to flood the cavity thoroughly and evaporate ē warm water.

Dr. Hewitt also proposes to coat the surfaces which are to be covered in by the amalgam with some resinous solution such as

℞ { Sandarach Varnish } aa fl. ℥j.
Damar „ }
Alcohol (absolute) fl. ℥j.
Beta Naphthol gr. γ.

after evaporation of the liquids the resins are left lining the cavity into which thin amalgam should be burnished.

3. *The Mixing and Insertion of the Amalgam.*—Since chemical combination takes place between the metals (for evidences of chemical combination are found in the very property of setting, in the elevation of temperature and in the changes of volume of the mass attendant upon the act of setting) the best results will be obtained by a method in which all the constituents are chemically united in atomic ratios. The method of adding filings to the mercury until a proper working quality is produced to suit the taste of the operator, is a bad one, for there is no guide whatever to indicate when the chemical affinity of the mercury employed has been exactly satisfied ; another objection to this method is that the filings are liable to be added in excess when the resulting mass will be lacking in homogeneity and liable to local electrical disturbance. The best result is obtained by using the parts in *such proportions by weight* as have been found by experiment and trial, and for this purpose either Kirby's or Fletcher's balance should be employed.

After mixing with the pestle and mortar or by shaking up in Kirby's tubes the mass should be rubbed in the palm of the hand, which must be absolutely free from grease, until crepitation is obtained ; this is a sound like that produced by bending a bar of pure tin and is said to be indicative of an excellent alloy ; and the make should be held in the palm of the non-operating hand by closing the fourth and little finger upon it, as the warmth helps to keep it in a degree of plasticity.

In inserting his fillings, Flagg introduces small quantities of amalgam into the cavity at a time, and *taps* each into accurate apposition with the walls by light blows from a serrated plugger ; without the blows he says the unions are imperfect, the lines of demarcation between the pieces clearly apparent, and leakage inevitable.

Kirby mixes two portions of amalgam, a soft and hard portion ; the soft consists of equal parts by weight of filings and mercury, the hard of twice as much filings by weight as mercury. He then fills the first half or two-thirds of the cavity with the soft amalgam, using a burnisher for this purpose, and the remainder with the dry amalgam in much the same way. By this method, as was proved by analysis, equal distribution of mercury throughtout the filling is obtained, the mercury passing from the moist to the dry part.

Bonwill uses fairly plastic amalgam and expresses the excess of mercury by firm pressure with pads of bibulous paper ; the exuded mercury left on the surface is then raised away and more amalgam added and treated in a similar manner. This same result may be produced by using either a round soft rubber point, gutta-percha, chamois skin leather, or rubber dam.

Kirke, who mixes his amalgam by adding mercury in excess to comminuted alloy and then removing the excess by squeezing with heavy pliers through chamois skin till a workable mass is obtained, finishes by absorbing all excess from the surface by pellets of freshly annealed sponge gold ; this he says gives a better result than either gold foil (recommended by Rhein and Ottolengui) or tinfoil which is sometimes used. After absorption of the mercury the filling should be burnished over and finally polished to a mirror-like surface as usual.

Mr. Tomes, as the result of a series of experiments devoted to the means of getting the best results with the amalgams in ordinary use, told the Odontological Society in January of last year that :—

1. With the exception of palladium it was found impracticable to get absolute water tightness by any method of packing in vogue.

2. Perfect results can be obtained by making the mass of an osteoplastic, using the amalgam only as a protective agent, to keep the fluids of the mouth from having access to the plastic filling.

3. Advantage, short of perfect results, can be got by diminishing the amount of fresh amalgam with its shrinkage still to do, either by imbedding rings, lumps of hard amalgam, or other foreign bodies in the soft mass.

4. The larger the mass the worse the shrinkage ; no large filling should, therefore, ever be composed of fresh amalgam alone.

5. Absolutely perfect results can very generally be got by using old standard amalgam heated and packed in small pieces, burnishing it well against the walls ; but this is troublesome and in some classes of cavity perhaps impracticable.

6. In a large number of cases equally perfect results can be got by a mixture of new amalgam with old that has been heated to its softening point and a beautiful finish can at once be got upon the plugs.

Mr. Tomes in using amalgams after this fashion says that matrixes are invaluable, and that the easiest method of manipulation is to rapidly burnish a small quantity against the walls, then to take a large piece which will fill up the bulk of the cavity and to finish by the addition of small pieces. If during the accomplishment of this, the amalgam has set, heat the final portions just as though the whole filling were being made with old amalgam and use hot instruments. If old amalgam is to be used for the whole operation, the best plan is to heat the whole lump in a spirit or bunsen flame and lay it on a hot plate over the flame so as to keep it soft. As good results are only obtainable with a rapidity of setting which is rather inconvenient, the cavity must be dried and protected from moisture before mixing up or heating the amalgam mass.

One of the most useful possibilities in connection with plastic filling is expressed by the phrase "*cold soldering*," for it is a property of amalgam, that additions of this material can be secured firmly and homogeneously to either gold or amalgam fillings, whether they be old or of recent introduction. In this way old fillings may be joined on to and made subservient for retaining purposes in cases of new decay encroaching upon such fillings. Large reparations may be made in cases where masses of tooth structure have been broken away from heavily filled teeth. Pins and tubes for pivoting may be fixed in position by amalgam.

The face of the metal to be soldered upon should be made bright by scraping with an excavator, smoothing with a file or cutting with a burr, and very soft amalgam rubbed over it until thoroughly amalgamated, after which all superfluous amalgam should be removed, the appropriate amalgam mixed, and the filling made in the usual way.

In cases where it is wished to use gold, and the cavity is far beneath the gum, it is a good plan to fill the part beneath the gum with submarine and continue with gold. In doing this one of two methods may be employed ; either the amalgam may be allowed to set, trimmed up and polished before the gold is started, or the gold may be started on the moist amalgam, when the first few pieces of gold will seemingly disappear, a matrix is also necessary to carry out the latter method.

In accessible cavities, where dryness can be obtained and maintained, in which lining with oxychloride and final filling with either

a single or combination amalgan is thought to be the proper practice, Dr. Flagg advises a "*guard*" of gutta-percha at the cervical edge ; this, he says, should be made as thin as possible consistent with certainty that it thoroughly protects the cervical edge. It may be given bulk in moderate degree within the cavity and worked to a feather edge at the cervical margin, it is also better that it protrudes so that the lining and final filling having been accomplished and the amalgam having sufficiently set, the guard may be neatly trimmed off with a heated instrument, this ensures nice adaptation, desirable finish, and excellent protection.

In concluding, I may say that the last year has been an important one in the history of amalgams, for very interesting communications have been published by Tomes, Black and Kirke, and for the detail of these I would refer you to the originals, since the points therein treated are too long for a short essay like this.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting of the above Society was held on the 13th ultimo, the President, Mr. David Hepburn in the Chair.

Mr. W. A. Maggs (Librarian) announced the usual exchanges.

Mr. Storer Bennett (Curator) stated that several specimens of bone plates had been sent to the Museum, some of them with the teeth themselves carved in the bone, and others with natural teeth let into the bone base. They were very interesting specimens, kindly sent to the Museum by various members of the Society in response to the appeal made a few months ago. Mr. Aubrey Fairbrother had sent a specimen of vulcanite plate of rather primitive workmanship, and had also sent four upper incisor teeth affected by erosion. Three of those teeth were very deeply eroded, but the right upper central had only a very slight groove ; looked at by itself that right upper central might be supposed to be affected by pressure of the teeth, but the other teeth were so differently affected that the contrast of the erosion between that one and the other three was very remarkable. Erosion was said never to occur in dead teeth, but in looking at the

tooth referred to it was difficult to decide whether it was alive or dead when it was first attacked by erosion. Two specimens had also been presented by Mr. Morton Smale, both pathological specimens of animals, namely, the skulls of two deer affected by alveolar abscesses.

Mr. GARTLEY presented a model showing two supernumerary teeth in a boy aged 12 to 14.

Mr. MUMMERY showed specimens of ivory of great interest. One was part of an elephant's tusk, showing a very large pulp stone in the centre. It might possibly be, he said, that some foreign body formed the nucleus of the pulp stone, but he had not had the opportunity of opening it properly. He also presented, on behalf of Dr. Miller, of Berlin, a particularly large and very interesting specimen taken from an Indian elephant which had been moved from one part of the country to the other and undergone a change of food. For about a year the animal had fed on some vegetable substance which stained the ivory in exactly the same way that matter stained bone, and a ring of green would be seen all round. The elephant then appeared to have been moved back again to another part of the country where the food was different, and ivory of a natural colour formed over the stained growth.

Mr. MUMMERY then read a brief Paper, by Dr. T. H. Denz, Utrecht, on "Causes of Deformity in the First Temporary Incisor."

Mr. J. F. COLYER brought forward an example of very rapid decay in a comparatively young child. The patient was in attendance. She was about eight years old when she first came under his observation, and at that time the upper central incisors were very badly attacked about half way down. The four lower incisors were decaying very badly, and her temporary molars were also in a similar condition, being practically level with the gum; the first permanent molars too were carious. The decay was of so very soft a character that it seemed almost hopeless to do anything for the patient, but the following treatment was adopted with apparent success. Once a week, for the first month, the teeth were given a thorough coating of nitrate of silver, whilst at the same time he suggested to the mother that twice a day the teeth should be dried, and spirits of wine applied to the surface, keeping the mouth open for two or three minutes if possible, in order that the spirit might evaporate, and by that means harden the dentine. He saw the child every two months, and applied a fresh coating of nitrate of silver. The result had been

very satisfactory. The objection that nitrate of silver turned the teeth black, though equally true with regard to the temporary teeth, had not the same force as with respect to the permanent ones.

Mr. VAN DER PANT asked Mr. Colyer whether he went into the history of the case at all with the parents. Was the child anæmic, or could the premature decay be accounted for in any way? There was no doubt something in the nitrate of silver treatment, and he should like to ask Mr. Colyer as to how he had applied it. He (Mr. Van der Pant) had heard that it was applied on a piece of platinum wire. They could not very well get nitrate of silver into the interstitial cavities of teeth without some special method.

Mr. BEADNELL GILL'S experience of nitrate of silver extended over twenty years. He was of opinion that it did not make much difference whether spirits of wine was used or not. Spirits of wine seemed somewhat outside the mark of practical use, but the nitrate of silver, both in temporary and in permanent teeth, when judiciously applied, would, no doubt, if persevered in, give very good results in cases where nothing else was of any avail. He would like to ask if Mr. Colyer had used it in permanent teeth to any extent, and over what period he had had the opportunity of applying it.

Mr. F. J. BENNETT suggested that as the child was young when the teeth were shed, Mr. Colyer should save them and make sections, because when nitrate of silver had been applied for a known period, and the previous condition of the teeth was also known, it would be very valuable to see the exact effect upon the dentine under such conditions.

Mr. F. J. COLYER said he had no wish to claim the use of nitrate of silver as anything new, but he thought that now and then even a well worn topic bore reviving. He could not account for the extensive decay in the teeth of the patient any more than the fact that she was of an extremely strumous type. The way in which he applied nitrate of silver was that which he had learnt as a student from Mr. Storer Bennett, by melting it on a piece of wire. That was certainly the best way, because it could be taken to any part that was desired, and there was no possibility of its slipping and passing down the throat. He had constantly used nitrate of silver ever since he had been in practice, and always found the most satisfactory results. With regard to Mr. F. J. Bennett's request, he should be only too pleased to give him one or two of the teeth when they were extracted.

Dr. DUDLEY BUXTON then read a Paper on

"THE NATURE OF ANÆSTHESIA."

To understand precisely what anæsthesia is had proved a difficult problem to many. To explain it was no mere academic exercise, for given such an explanation, it must influence alike the methods adopted in handling the various anæsthetics and the means we employed to prevent inherent dangers or to avert accidental perils. For example, in days when nitrous oxide was deemed to be an asphyxiant it was the practice to give it rigidly excluding all air. Now it was recognised to have a true anæsthetic action, and so it was given, as other general anæsthetics were exhibited, with air or oxygen, to avoid the occurrence of asphyxial symptoms, as unnecessary as they were undesirable. Nor would it be justifiable to employ substances as powerful as were anæsthetics unless their physiological behaviour could accurately be appreciated. It was to inquire what was known about anæsthesia that this note was written.

Paths of Anæsthesia.—All would be familiar with the disorders of sensation, which occur in various forms of nervous disease, and give rise to hyperæsthesia on the one hand, and anæsthesia upon the other. (*a*) Variations in the internal relations of the end-organs of the skin or mucous membrane; (*b*) of the sensory nerve, or nerve of conveyance; (*c*) of the ganglionic nerve centres which translate the sensory stimulus into a feeling; and (*d*) the consciousness which perceives the feeling as pain or pleasure, may under morbid conditions of the organism give rise to true anæsthesia. Hypnotism furnished an example of a state in which pain was felt, but perceived as pleasure. Although there was every reason to believe that both the end organs in the skin, the sensory tracts, and the ganglionic nerve tissue, were intact, and capable of producing and conveying sense stimuli, nevertheless the perception arrived at was not that of pain. The perceptive mechanism was blocked.

Peripheral Sense Organ Anæsthesia.—Local anæsthesia—the blocking of the sense stimulus at the skin or mucous membrane—was, of course, of little value for any save the most trivial operations. The agents employed and the elaborate plans suggested to produce it had not proved themselves safe or sufficient.

Bichât taught the duality of life, a life of mere functional existence and one of relativity. In anæsthesia produced by agents

such as nitrous oxide, ether, chloroform, the life of relativity falls into abeyance, while the functional life or existence persists. But just as it is found impossible to limit the activity of a local anæsthetic to a regional area, so it is impossible to draw a hard and fast line between the influence of a general anæsthetic upon the cerebral centres and its overthrow to the vital centres.

Aim of Anæsthesia.—The problem was to discover how best to produce anæsthesia without allowing the ordinary processes of life to be trenched upon. Some advance along the road leading to this discovery had been made, but much remained to be learned, and very much more to be unlearnt.

Definition of Anæsthesia.—It seemed to be now generally admitted that although many things might produce loss of sensation through abeyance of the faculty whereby pain was felt, yet none should be regarded as anæsthetics unless they exerted some definite influence upon the tissues of the body rendering them indifferent to pain, and that quite irrespective of their preventing due access to the tissues of some vital constituent.

True and false Anæsthesia. — Rendus Brown-Sequard has pointed out that when CO_2, chloroform and other vapours are allowed to impinge upon the mucous membrane of the larynx, trachea, or even upon certain skin areas, while they are prevented from entering the lungs, they produce unconsciousness of pain although the animal is awake and alert. Carbonic anhydride had been also used as a general anæsthetic. Ozanam employed a mixture of 75 CO_2 to 25 of air ; he rendered a young man unconscious while an abscess was opened. It had also been suggested that ether was rendered more effectual by combining its use with that of CO_2, and even nitrous oxide had been used in combination with the inspired air of patients, thus producing a mixed anæsthesia due to these two agents. Waller had further shown that CO_2 produced a brief abolition or diminution, followed by prolonged augmentation of electrical excitability in the isolated nerve of frogs. This however, was influenced by the amount of CO_2 used. The use of carbonic anhydride as a local anæsthetic took them back to the days of Pliny. But experiments had been undertaken which prove that carbonic anhydride possesses the power of producing unconsciousness only so long as the oxygen tension in the blood remains below a

certain level. Gréhaut employed mixtures of common air and carbonic anhydride, and found that when the animals experimented upon were completely narcotised, the gas of the blood contained 95·4 per cent. of CO_2 as against the normal 34·3 per cent. Gréhaut's results had been obtained by Lallemand and Perrin as early as in 1860. This state of unconsciousness, however, was not one of anæsthesia, and was only obtained at the expense of grave peril to the individual. The bodies commonly employed as anæsthetics—nitrous oxide, ether, chloroform—must then, differ in their action from CO_2. That this was so, their present knowledge permitted them to say, but compelled them to admit that so far as many of their methods were concerned, anæsthesia was, as Dastre had said, the first step in a general poisoning of the organism. It was the realisation of the truth of this dictum which compelled them at once to recognise the necessity of understanding the precise range of safety limiting artificial toxæmia, and to appreciate the responsibility falling upon those who undertake the control of producing and limiting it.

Theories of Anæsthesia.—The theory of Flourens and Louqet, two very careful observers, that anæsthetics possess a selective action on the nervous tissues was now known to be false, inasmuch as the nervous tissues do not actually take up more of the anæsthetic, but retain more of it.

Mode of Action of Anæsthetics.—Knowledge as to the way an anæsthetic enters the organisation, what path it takes, and by what means it is thrown off, was essential in order to ascertain how far anæsthesia trenches upon the vital processes of the organism. The lungs, the heart, and the brain have been called the tripod of life. Death must occur when the lungs or the heart cease to perform their function, but of the cerebro-spinal axis only the lower ganglionic centres are, even in mammals, essential to the existence of the animal. Hughlings Jackson in his lectures on the Evolution and Dissolution of the Nervous System, after pointing out that the evolution of the nervous centres is the "putting together of the nervous system," and involves a correlation of the most automatic with the most voluntary, goes on to show how dissolution is the reverse of this evolution—is, in point of fact, unpicking the lock of life. He adds : "In uniform dissolution the whole nervous system is under the same conditions or evil influence—the evolution of the

whole nervous system is comparatively evenly reversed. In these cases the whole nervous system is 'reduced,' but the different centres are not equally affected. An injurious agency, say alcohol, taken into the system flows to all parts of it, but the highest centres being the least organised, give out first and most; the middle centres being more organised, resist longer, and the lowest centres being most organised, resist longest. Did not the lowest centres for respiration and circulation resist more than the highest do death by alcohol would be a very common thing." If the word alcohol be replaced by alcoholic anæsthetic in Dr. Jackson's remarks, the pith of the subject, in Dr. Buxton's view, is arrived at.

It is the sum and aim of the scientific use of anæsthetics to act upon the higher and more unstable centres of the nervous system without affecting the lower or automatic centres. But the problem could not be narrowed down to this easily appreciated theorem. The inter-relations of the higher with the lower centres, in highly differentiated animals, were many and intimate. Dangers appear in every zone of narcosis, lest impulses become initiated which involve the stable centres through the unstable ones.

Under normal conditions the purely vital functions of life are controlled by the lower centres, and indeed, in the more humble animals, are incapable of being influenced by higher centres. In man the cerebro-spinal axis influences the processes of life in obedience to impulses from without which require some modification of the routine of life. The diver, for example, can control the automatism of his breathing; while under the influence of pain, of shock, or of suggestive fear of pain, the heart's action may be inhibited. Such interference, however, is seldom excited without voluntary connivance. The simple reflexes of life are controlled when the higher centres are working in health. As soon, however, as any disturbance of these centres occurs, though it may be an "injurious agent," as Dr. Jackson calls it, there is a danger—and a very real danger—lest simple stimuli from without cause the most widespread reflex actions. Even those protective of the vital processes become, when unrestrained by limiting nervous control, inco-ordinated and make for the destruction of those very processes of life which it is their function to preserve. And, further the due performance of the vital processes requires that nerve

impulses and viscera and muscles shall be in such a condition of vitality that they can perform their physiological duties and be able to meet unusual calls made upon them. It also necessitates that throughout the whole time of the action of the injurious agent the tissues of the body shall receive their due quota of nourishment, implying that the blood stream shall be maintained pure and in sufficient circulation. Nor was this the whole problem. Elimination of the injurious agent is at least as essential as the due control of those safeguarding vital processes against which it militates. In the same way heart failure might occur in spite of a normally acting system of safeguards in the nervous system. If in response to demands made upon the heart by impulses from the nerve centres, that organ through disease were unable to execute the work required of it, fatal syncope would arise. All anæsthetics in common use enter the blood stream through the lungs. The inhaled vapour in passing over the pulmonary mucous membrane produces changes in its epithelium which, according to McKendrick Newman and Coats, is inflammatory in character, "The capillaries are contracted, their walls become less distinct, and the blood corpuscles in them become partially dissolved." In every case blood removed from the body and shaken with an anæsthetic shows destruction of the corpuscles, and reduction with pouring out of the hæmoglobin. It would appear also that a similar if less marked phenomenon occurs in the body. Da Costa has demonstrated that "Etherisation produces a marked diminution in the hæmoglobin of the blood." He finds also that with destruction of the red discs, a change in the character of the leucocytes becomes apparent. Dr. Buxton was at present investigating this point, and had up to the present time found that a decided diminution in the corpuscles takes place under nitrous oxide, ether and chloroform. It was, however, not improbable that factors other than the anæsthetics may be found at work in bringing about the result.

The combination or association between the gaseous anæsthetics or vapours and the constituents of the blood must be a loose one, since in their presence oxygen is displaced. Were they to form combinations as stable as that which carbonic oxide establishes, not only would the anæsthetic displace but would render it impossible for the reformation of oxy-hæmoglobin. Hence death must result. Whether or not, in certain conditions, the corpuscles have less power

of again taking oxygen after prolonged anæsthesation it was impossible to say. It seemed that probably such was the case. Deoxydation of the tissues at one time was thought to be the explanation of anæsthesia; it was now recognised this was not so, for among other reasons profound anæsthesia with hyper-oxygenation could be produced, and many deoxidating bodies had no anæsthetic properties.

When it was remembered that the tissues are dependent upon the red corpuscles for their nutrition this question of their destruction by anæsthetics assumes a position of great importance. It was not impossible that the behaviour of anæsthetics towards the corpuscles, which it had been shown they affect so profoundly, might be such as to modify in a material degree their capacity for conveying oxygen to the tissues. The behaviour of anæsthetics towards corpuscles also had an important bearing on the question whether the central nervous system absolutely controlled the vagaries of anæsthetics. Certainly in the case of chloroform the belief was delusive. Waller and others had demonstrated the changes in isolated nervous tissue, but as yet no full research had been conducted upon the nervous elements as they occur in the body. An attempt was made in this direction by Dr. Buxton in working out the physiological action of nitrous oxide with results which he thought proved the anæsthetic properties of that gas. It must then appear probable that the changes brought about in the blood elements react upon the more stable tissues by lessening their supply of oxygen while the tissues themselves were brought under the influence of the anæsthetic which the blood stream conveyed to them. The next changes which were brought about by the anæsthetic were those connected with respiration, circulation, and nerve regulation. In obedience to stimuli conveyed from the lungs, diminution of the amount of oxygen or its excess lead to corresponding respiratory efforts. In association with these were the somewhat complicated series of changes in the blood-pressure, the cardiac rhythm, the dilatation and constriction of the capillary areas which go to form the blood circulation. Not only might these be thrown out of gear by impediment to the pulmonary circulation arising from asphyxia, the commonest danger of anæsthetics, but might be profoundly affected from without through skin or visceral stimuli, leading to disaster. Under chloroform especially, the shock conveyed by the removal of a tooth would,

if the anæsthesia were not deep in a certain number of cases, produce reflex inhibition of the heart. That this reflex inhibition did occur, had been proved by many observers, but the results of Amrus and Gärtner were conclusive. Even where the animal is deeply anæsthetised, they found weak faradic currents applied to the vagus produced a very prolonged heart-stoppage. When the heart-pause had persisted for a certain time, respiration also failed, and slight spasms succeeded. Lauder Brunton insisted upon a form of death under anæsthetics which was certainly a common one, and which, when recognised, must relieve anæsthetics of responsibility in very many fatalites. Adopting Caspar's views, he attributes these deaths to neuroparesis. Not only do circulation and respiration fail simultaneously, but all the nervous centres are instantly annihilated. The death is one of shock.

Anæsthetics were not simply dangerous *per se*. They too frequently had to be given to those whose tissues were already in a diseased condition. What, then, were the practical lessons our present knowledge taught? In general they must conclude that the action of the anæsthetic should be restricted within those clearly defined limits which involved only the higher ganglionic centres; that under no circumstances should incomplete anæsthesia be deemed sufficient for even the most trivial operation.

Of methods, their present knowlege allowed them to say much, but it was impossible for him to do more than indicate in the briefest way what rules should guide them. All methods involving asphyxial symptoms were open to grave censure. In the case of all anæsthetics it was possible to produce unconsciousness, and yet to avoid cyanosis. Nitrous oxide, once thought to be an asphyxiant, was now known to be a true anæsthetic, and to be capable to being given with oxygen or air, and to produce peaceful anæsthesia without any asphyxial phenomena. Of ether the same is true. Of chloroform it must be said that any association between it and asphyxia must lead in the healthy subject to grave peril, in the diseased to fatal results. A word further. Close study of the behaviour of anæsthetics made him certain that all methods which employ a large quantity of anæsthetic substances are faulty. The pneumonia, the renal catarrh, the cardiac asthenia following anæsthesia are due, in most cases, not so much to the anæsthetic as to the unwary way in which it is employed. When anæsthesia is better understood, and those who employ anæsthetics recognise more the responsibility they

incur ; when the Examining Boards demand of their candidates at least a nodding acquaintance with anæsthetics and their uses, then will there be fewer fatalities and more common-sense practice of this branch of the healing art.

Mr. Storer Bennett said that in the time he was justified in occupying he could not do more than refer to two very interesting points brought out by Dr. Buxton in his paper. First, the solution of blood corpuscles that took place when chloroform had been administered, and the very happy explanation of those otherwise inexplicable deaths that occurred soon after the patient recovered from anæsthesia. It had often seemed a mystery why a patient, who had apparently recovered to a certain extent from the anæsthesia induced by chloroform, without any adverse results, should later succumb. Hitherto, the cause of these deaths had remained unexplained, but Dr. Buxton's theory seemed correct, and was a happy solution of the mystery. The second point was the one alluded to as a sort of fatty degeneration that took place when chloroform had been administered on several occasions. That had a very practical bearing, for patients often came to the dentist stating that they had had chloroform on more than one occasion, and urging it as a reason why they should have it again. They seemed to think that, having had it once, twice, or thrice without any unfortunate circumstance arising, was a reason why they might continue to have it. If, however, as explained by Dr. Buxton, each repeated administration left the patient less capable of withstanding the dangerous effects of chloroform, the dentist would in future feel more strongly supported than ever in resisting the wish of their patients to have chloroform administered.

Dr. Hewitt, responding to the invitation of the President, said he had listened with the greatest interest and profit to the very brilliant resumé of the whole subject of anæsthesia which Dr. Buxton had given them. He fully concurred in the views expressed by Dr. Buxton. It was certainly their duty to interfere as little as possible with the processes of life in the administration of anæsthetics, and that was the point which was so admirably brought out in Dr. Buxton's paper. He did not know that he could add anything to it.

The usual votes of thanks concluded the Meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

THE ANNUAL GENERAL MEETING of the Students' Society of the Dental Hospital of London, was held on Monday, January 20th. The President, Mr. F. J. BENNETT, in the Chair.

The minutes of the last meeting were read and confirmed.

The PRESIDENT then declared the ballot open for the election of Officers for the present year. Messrs. Dunlop and Carter being appointed scrutators.

Mr. MCKAY (the TREASURER), after reading the balance-sheet for the past year, said: In presenting to you this evening the Annual statement of the Students' Society's Accounts, I should like to state that although the year's expenses have been satisfactorily met, the subscriptions from the students are not nearly so great as they should be, in fact, but for our most generous staff, we should have had to draw on the balance of former years. The two new features of the year have been the insurance of the instruments of the members at the Hospital, and a grant of £5 for the purchase of books for the Library.

Mr. H. W. TREWBY (SECRETARY), said: In presenting you with their 33rd Annual Report, your Council regrets that the Society has not shown the usual progress. Your President has this year very generously offered a prize for the best Casual Communication, and the energy of the Members is shown by our Transactions. The Society's prize has been awarded to Mr. N. G. Bennett, for his paper on "The Micro-organisms of the Human Mouth." Your Library and Museum have received many additions, to the former your President has contributed several books. The Microscopical Demonstrations and Exhibits under the very able supervision of Mr. W. J. May have been well attended, and it is with very great regret that we hear of his intended resignation.

The PRESIDENT then called on Mr. McKay for his paper on "Amalgams." (See page 57.) In the discussion which followed :—

Mr. D. P. GABELL said amalgams made far more perfect fillings practically than one would suppose possible after considering them from a theoretical point of view. He thought any deep or sensitive cavity should be lined with a thin coating of varnish before filling with amalgam, this added greatly to their safety and comfort, effectually preventing thermal changes. In using amalgam he

thought it best to use it moist at first, and then add drier and drier amalgam in completing the filling ; and as the filling was setting the use of the burnisher prevented shrinkage to a great extent. He was in the habit of lining the cervical edge with gutta-percha in using copper amalgam.

Mr. W. J. MAY thought certain amalgams gave better results if they were mixed some little time before using.

Dr. MILLER thought the use of varnish under an amalgam was a decided advantage, he preferred sandrach varnish himself.

Mr. W. S. NOWELL said he did not believe in the use of gutta-percha in conjunction with amalgams, and if the cavity extended to, or below the cervical edge did not employ copper amalgam, but used some other kind which had not such a tendency to fail at this point. He liked to use amalgams as dry as they could be worked with comfort, and nearly always used a thin matrix. If it was getting near a meal time he used tin cylinders to absorb mercury and hasten setting. All amalgam fillings should be thoroughly polished at a subsequent sitting, and special care should be taken to see that the cervical edge was smooth, the bite quite free, and no amalgam left under the gum margin. He had not tried varnish in this connection, but employed osteo and amalgam combined as a lining to a deep or sensitive cavity.

Mr. DOUGLAS referred to the various properties of various amalgams, and the suitability of certain amalgams for contouring purposes.

Mr. MCKAY then briefly replied.

Mr. D. P. GABELL proposed a vote of thanks to the President, which was seconded by Mr. Douglas, and carried with acclamation.

The PRESIDENT then said a few words of farewell.

The names of the newly elected officers are :—*President*—Mr. J. Colyer ; *Vice-Presidents*—Mr. D. P. Gabell, Mr. H. W. Trewby ; *Treasurer*—Mr. Heath ; *Secretaries*—Mr. W. S. Nowell, Mr. Stanley Colyer; *Curator and Librarian*—Mr. J. C. Douglas ; *Second Year's Councillors*—Messrs. Malone, Turner, Padgett, Myers and James ; *First Year's Councillors*—Dr. Austen, Dr. Miller, Mr. Thew and Mr. Woodhouse.

A vote of thanks was accorded to Mr. McKay for his paper.

The next Meeting was announced for Monday, February 10th, when Mr. A. R. Heath would read a paper on "Honeycombed and Syphilitic Teeth." The Proceedings then terminated.

THE DENTAL RECORD, LONDON: FEB. 1, 1896.

GOLD AS A FILLING.

LIKE all the other ideas and inventions, that in recent times have enriched our Science and Art, that of filling teeth with cohesive gold has been abused. Gold having been used from time immemorial for this purpose, it is obvious that a new method of using a proved friend was a great boon. To a certain extent it was, and is, possible to contour fillings made with non-cohesive gold, but the potentialities in this direction of gold worked cohesively are very great. There is practically no limit to the extent to which gold can be built up save the sufficiency of the base. Otherwise it becomes purely a question of skill. But skill, however laudable in itself, is often apt to overstep the bounds of expediency. Gold is so beautiful a metal, and fillings made with it have so cleanly and finished an appearance, that it is perfectly easy to understand how attractive is the view that this metal is *par excellence* the best filling material. Thus it is easy to comprehend why a certain school should regard gold filling in each and every case as the ideal filling, and look upon skill in its use as the test of proficiency in the practice of dentistry. Such views have perhaps not found such acceptance at home as they have in the States, nevertheless, it was by no means an uncommon thing to hear, lack of time—due to difficulty in obtaining adequate remuneration—or reluctance of the patient to the appearance gold fillings urged as reasons for non-acceptance of this dogma. True it is that many have objected to gold as a proper filling for certain kinds of teeth, but we fancy we have detected a greater freedom of criticism on this point at recent society meetings than was the case some years ago. We are glad to notice this tendency, not because we do not fully recognise the use of gold, nor because we wish to see diminution of skill in its use, nor lack of finish in the results;

but because we believe the use of gold has been and is abused, and because if we once accept the belief that, even among the somewhat narrow limits of filling materials known to us, gold is always the best, we degrade ourselves into mechanical gold fillers and narrow the possibility of finding other and, perhaps, even better materials. What are the objections to gold, and in what direction is it abused? It is abused when used for large fillings in out of the way places, difficult of access, and in which perfection is but rarely obtained. It is abused when by the necessarily wearing tediousness, or even pain, in its manipulation a weakly patient is worn out, or so sickened of the very process as to neglect the care of the teeth for the future. It is abused when its use in unneeded places is made the excuse of taking money from a poor patient. But over and above these and other perhaps obvious abuses is the vexed question of expediency of its use in certain kinds of teeth. This is a subject worthy of more discussion than space permits now, but for this very reason we welcome the evidence of others on this point, for doubtless the clinical observations of careful men are even more worthy of weight than more or less theoritical deductions from experiments, no matter how carefully made.

News and Notes.

Mr. J. Hopewell Smith has been appointed Lecturer on Dental Surgery at the National Dental Hospital.

Mr. J. M. McMillan, L.R.C.S., L.R.C.P.Edin., L.D.S.Glasgow, has been appointed Lecturer on Dental Surgery and Pathology to the Dental Hospital, Glasgow, in room of Mr. Rees Price, L.D.S. Eng., who has resigned; and Mr. John G. S. Angus, L.D.S.Glasgow, has been appointed House Surgeon to the hospital in room of Mr. J. M. McMillan, above mentioned, who has resigned.

A Practical Tuition Class for the next Examination (May, 1896) in Mechanical Dentistry for the L.D.S.Eng. will be held at

the Institute of Dental Technology and School of Mechanical Dentistry. Mr. C. Browne Thomas and Mr. E. C. Dimock, L.D.S. Eng., under the superintendence of Mr. W. Lombardi; and will include both Demonstrations and Practical Work, on Tuesdays and Fridays, from 6 to 9 p.m., beginning February 4th and ending March 31st. Fee, 7 guineas, payable in advance.

THE following have been appointed on the Dental Staff of the Edinburgh Dental Hospital for a period of five years. *Dental Surgeons*:—Mr. Malcolm MacGregor, L.D.S., Mr. George W. Watson, L.D.S., Mr. J. S. Durward, L.D.S., Mr. James Mackintosh, Mr. J. S. Amoore, L.D.S., Mr. J. Graham Munro, L.D.S. *Assistant Dental Surgeons*:—Mr. Frederick Page, L.D.S., Mr. John Turner, L.D.S. (leave of absence granted), Mr. David Monroe, L.D.S., Mr. Thomas Gregory, L.D.S., Mr. H. B. Ezard, L.D.S, Mr. Sewell Simmons, L.D.S., Mr. R. N. Hannah, L.D.S., Mr. Frederick J. Turnbull, L.D.S., Mr. J. Malcolm, L.D.S., Mr. Robert Lindsay, L.D.S., Mr. D. Bailie Wilson, L.D.S., Mr. Thomas A. Mackintosh, L.D.S., Mr. John A. Young, L.D.S. (*ad interim*).

THE Students of the National Dental Hospital held a "Smoker" on the 11th ultimo at Ashley's Hotel, Covent Garden, Mr. Bland Sutton in the chair. The gathering was most convivial, and the programme excellent. Messrs. F. M. Farmer, Browne-Thomas, Etheridge, and Guy Harper specially distinguished themselves amongst the vocalists, and Mr. Yeatman-Woolf as a reciter. The occasion was taken advantage of by the students to show their appreciation and regard for Mr. F. M. Farmer by presenting him with a handsome timepiece. It need hardly be said to those who know Mr. Bland Sutton that he was very felicitious in making the presentation. Mr. Farmer, in acknowledging, expressed surprise at the kind feelings existing among the students for him, for he was afraid as House Surgeon he had at times been somewhat harsh. Although he was severing his connection with the hospital, he should always remember their kindly expressions towards him, and if in the past his poor efforts with the National Dental men had been of service, they would know where to find him, and he should always be pleased to help them in any way in his power. A cordial vote of thanks to Mr. Bland Sutton for presiding closed the proceedings.

THE 36th Annual Meeting in connection with the Birmingham Dental Hospital was held on January 23rd, at the Council House, under the Presidency of the Mayor (Councillor James Smith). The Surgical Committee reported that the work of the Hospital during the last twelve months had largely increased. The policy of reducing the number of operations under ether, by employing nitrous oxide wherever possible, had been carried out to a most satisfactory degree. The work for the preservation of the teeth was nearly double that of the previous year. Three students had obtained diplomas in dental surgery, and eleven new students had entered the hospital during the year. The operations performed from October 1st, 1894, to September 30th, 1895, numbered 21,127, compared with 18,336 in the previous twelve months; while attendance of patients numbered 9,801, compared with 9,733. The financial statement showed a balance in hand of £116 9s. 2½d., after clearing off the adverse balance of £48 19s. at the end of September, 1894. The appeal for funds which was issued in December, 1894, did not result in as large an increase to the subscription list as was anticipated, the sum of £43 11s. 6d. only being received. The Chairman referred with pleasure to the increased usefulness of the institution. The hospital was one at which the poorest could get the best skill, they could get their teeth saved as far as possible The report from the surgical staff, he thought, was very satisfactory, and they must be all very much indebted to the staff for the ability with which they performed their duties. The report was adopted. Mr. J. A. Jones moved the thanks of the meeting to the honorary hospital staff and officers, and Mr. J. M. Smith seconded the motion, which was unanimously agreed to. Mr. Huxley then proposed the election of the Mayor (Councillor James Smith) as President, Lord Calthorpe as Vice-President, Mr. J. Wilson as Hon. Treasurer, and Mr. W. C. Addinsell as Hon. Secretary for the ensuing year. The resolution was seconded by Mr. Donagan, and agreed to. On the motion of Mr. W. Thomas, seconded by Mr. Barrow, Messrs. F. R. Howard, W. T. Madin, J. Mountford, and J. E. Parrott were appointed Hon. Assistant Dental Surgeons; and Mr. Philip Bates was elected Hon. Auditor. The proceedings closed with a vote of thanks to the Mayor for presiding.

Obituary.

We regret to record that Mr. George Gregson passed away on January 17th, after a long illness. Mr. Gregson will be lamented by all who had the pleasure of his friendship. He was a man of a cheerful, gentle manner, who was known to many generations of students as a teacher, who taught kindly and well. He studied at the Middlesex Hospital, taking the L.D.S. in 1862 and the M.R.C.S. a year later. In due course he was elected an Assistant Dental Surgeon and afterwards Dental Surgeon to the Dental Hospital of London. For many years he was the senior Surgeon to this hospital and Chairman of the Medical Committee, indeed, it is but recently that he retired, amid the universal regret of his colleagues. He was a very old member of the Odontological Society of Great Britain, having been elected in 1857, and he retained his membership to the last; in 1884 he was a elected a Vice-President of the Society. He was also for some time Dental Surgeon to the Metropolitan Free Hospital. He was a Fellow of the Royal Geographical Society and a member of several medical and dental societies, though he took no very active part in these nor in dental politics. It must have been obvious to those who met Mr. Gregson during the last year, that his health was not as good as formerly, though he apparently did not admit it to himself; few, however, expected his early death, which is to us, and we are sure to others, a great grief. Mr. Gregson was unmarried. He was elected a director of the Dental Manufacturing Company in 1879. He took a keen interest in the progress and welfare of the Company, and retained his seat on the Board until his death. He was a very regular attendant at the Board meetings, and was much respected by his colleagues.

Legal.

THE DUNDEE DENTAL PROSECUTION.

In Dundee Sheriff Court, on January 17th, A. Davie, South Lindsay Street, was charged with offences against the Dental Acts, the complainer being the Honorary Secretary of the British Dental Association. The complaint, which was laid under the Summary Jurisdiction (Scotland) Acts, 1864 and 1881, and the Criminal Procedure (Scotland) Act, 1887, set forth that A. Davie,

3, South Lindsay Street, Dundee, not being a person registered under the Dentists Act, 1878, and not being a legally qualified medical practitioner registered under the Medical Act, 1886, did at the times and places mentioned in the complaint represent himself as a person registered under the said Dentists Act, or that he was a person specially qualified to practice dentistry, and was a legally qualified medical practitioner registered under the said Medical Act, or as possessing one or more of these characters and qualifications, by having, during the last five months of 1895, had attached to the gables of his house or the windows, "A. Davie, successor to Dr. Stewart," and during a portion of the time the additional words "Surgeon Dentist," the said Dr. Stewart having been a duly registered dentist. He was also accused of having displayed on the east gable a side-board bearing the words, "Mr. A. Davie, successor to Dr. Stewart. Teeth, teeth, teeth," &c. The fourth head charged him with advertising in somewhat similar terms on the private lamps in front of his house; the fifth with using the name or title of "dentist" by having it cut on a stone on the pavement; the sixth with having inserted in the "Dundee Directory" of last year the title, addition, or description of "Dental Institute" along with his name the seventh with causing to be inserted in the same publication an advertisement wherein there were *inter alia* "popular dentistry, "dentist," "surgeon dentist," "successor to Dr. Stewart;" and the eighth charged him with inserting an advertisement in the *Evening Telegraph* with references to his work and charges, hours of attendance, and signed "Mr. A. Davie, successor and ten years branch manager to Dr. Stewart, South Lindsay Street, Dundee. Established 1842." All these charges, it was alleged, Davie committed contrary to the Dentists Act, 1878, Section 3, as amended by the Medical Act, 1886, Section 26, whereby he was liable in a penalty not exceeding £20.

Mr. Andrew Buchanan appeared on behalf of the complainer, Mr. H. S. Glenny represented the accused, and Mr. A. M. Ferguson watched the case on behalf of the Unregistered Dental Practitioners' Association.

Mr. Glenny took exception to the complaint on the ground that the prosecutor was not present himself. Section 9 of the 1881 Summary Jurisdiction (Scotland) Act—one of the statutes on which the complaint proceeded—provided that every complaint at the

instance of a private prosecutor or complainer under the Summary Jurisdiction Acts must be signed either by the prosecutor or complainer or by a duly qualified law agent on his behalf, and such law agent might in the absence of the private prosecutor appear in Court and conduct the prosecution on his behalf. The complaint was signed, not by a law agent, but by the prosecutor himself. In these circumstances the authority which this Act conferred upon a duly qualified agent to appear on the prosecutor's behalf did not exist. It was only when the complaint was signed by an agent on behalf of the principal that an agent could appear. If a principal chose to sign the complaint himself he must conduct the prosecution personally.

The Sheriff asked what was the statutory authority for this English gentleman appearing at all as a prosecutor in a Scotch Court?

Mr. Glenny replied that he supposed the authority was conferred by Section 26 of the Medical Act, 1886, which made a complaint possible at the instance of a private prosecutor, where such a complaint had only previously been possible at the instance of the Council.

The Sheriff—The Medical Council?

Mr. Glenny said he wished the prosecutor had been present himself, because they would have had some interesting information from him as to the actual position of the body of men calling themselves the British Dental Association. A private prosecution was possible, but whether at the instance of an English gentleman was questionable.

The Sheriff—What kind of prosecution is it?

Mr. Glenny—It is a prosecution for a statutory offence.

Mr. Buchanan — Imprisonment being competent makes it criminal.

Mr. Glenny—Imprisonment is only possible if the fine is not paid.

The Sheriff—Will that make it a criminal offence?

Mr. Buchanan—A quasi-criminal offence.

The Sheriff—If it is a criminal case it must be sent to the Fiscal.

Mr. Buchanan said it was brought under the Dentists Act of 1878.

The Sheriff—This gentleman who prosecutes is a private person only? He does not prosecute in an official capacity?

Mr. Buchanan—I have inserted the designation of the prosecutor in order to remove any possibility of a suggestion on the other side that it was a trumped up case.

Mr. Glenny said the statute did not prohibit a man from practising as a dentist, but it prevented him from using the term dentist or dental practitioner, or words which would imply that he was registered under that Act; or that he was a person—and this was the crux of the whole case—not "qualified to practise," but "*specially* qualified to practise dentistry." Unless the Prosecutor could show that his client had been representing himself to be a person specially qualified in the sense of the Act there could be no case against him.

The Sheriff said he could not sustain the objection. As he read the Act, a private prosecutor might do the work himself if he liked, or he might employ a qualified legal practitioner to do it for him, or he might do part of the work and get a qualified legal practitioner to do the rest. It was a very common practice for a private prosecutor to sign papers and get a legal practitioner to do the work. His Lordship had had several poaching cases before him that day, and all the complaints, if he remembered aright, were signed by policemen. A qualified legal practitioner, however, appeared to lead evidence.

Mr. Glenny asked the Sheriff to note his objection in view of the case going elsewhere.

The Sheriff—I see plenty of confusion for the case to go anywhere.

Mr. Glenny said there were two "A. Davies" at the address stated in South Lindsay Street. He did not know which one his friend was to take.

The Sheriff—Take them both.

Mr. Buchanan—I'll take the man the complaint was served on.

Mr. Glenny proceeded to object to the relevancy of the sixth and seventh counts.

The Sheriff—It is a very long document. This prosecutor must have been descended from some Scottish evangelical preacher. His complaint has eight heads.

Mr. Glenny continued that the sixth count was entirely irrelevant, for the reason that the locus and time were not stated. The same

objection applied with equal force to the seventh count, it having to be averred also that the offence was committed within six months of the date mentioned. With regard to counts three and eight, it was said that his client was contravening the Act by having attacned certain words to the gable of his place of business. But he would point out to his Lordship that these words applied to Mr. Davie's work, not to Mr. Davie himself. In count number eight the words "a marvel of cheapness—unequalled in the profession" were taken exception to.

The Sheriff—What profession is referred to?

Mr. Glenny—Profession means anything. I have known a man who was a joiner subsequently register to draw teeth, and call himself a professional man. Mr. Glenny then went on to speak of the business conducted by the late Dr. Stewart. That business had been carried on by the deceased gentleman for many years, and amongst his servants was Mr. Davie, who managed several of his branch establishments.

Mr. Buchanan objected to Mr. Glenny leaving the question of relevancy.

Mr. Glenny said he was endeavouring to show that Mr. Davie was no quack.

Mr. Buchanan—That, my Lord, is a question for proof.

Proceeding, Mr. Glenny stated that after Dr. Stewart's death his widow continued to conduct the business with the aid of assistants. After a time she sold the business to Mr. Davie, and he entered into the premises as successor to Dr. Stewart in May, 1895. Dr. Stewart's old signs were then existing. Having been registered under the Act, Dr. Stewart displayed such signs as "surgeon dentist," "dentist," &c., and particularly he had engraved on his windows the words "surgeon dentist." That was the condition of matters when Mr. Davie took over the business. That was not the position of matters now, however, for Mr. Davie had had every objectionable sign removed, and his Lordship was asked to punish him for an offence which he had never committed. Disguise this complaint how the prosecution might, heap charges upon charges as they liked, the glaring fact remained that this was an attempt by the registered dentists to elicit a legal opinion on the question of whether an unregistered dentist was entitled to advertise. That was at the bottom of the whole complaint, and nothing else. Under their

regulations the registered dentists were prevented from advertising They got their diplomas upon the condition that they did not advertise, and they gave a guarantee that they would not do so. But they were feeling the pinch of those gentlemen who were equally capable, but who did not care to become registered under the Act. That was the position of affairs. They were brought face to face—disguise it as they might—with an attempt on the part of the Dental Association, with comparatively few members, to force upon people who were not subject to their jurisdiction an offence and penalty for advertising their business. Mr. Glenny then read the advertisements complained of, and pointed out that in none of these advertisements did a word about dentistry appear, and he submitted that in so far as they did not imply that Davie was a person "specially" qualified to practise dentistry he committed no offence. Proceeding, he said although there was a penalty against a man practising medicine there was no penalty against a man drawing teeth.

The Sheriff—Except an action for damages for pulling out the wrong one.

Mr. Glenny said he objected to the complaint on the ground not only that it must specify that he was not a person registered under the Act, but it must specifically state that he did not fall under one of the exceptions of the Act.

Mr. Buchanan said Mr. Glenny had missed the most important part of the complaint. He was charged with a specific breach of a statute, and the complaint mentioned eight different ways, in any one of which the prosecutor could prove that he had committed an offence. If the prosecutor proved one of these ways he was entitled to a conviction. Count number three of the complaint dealt with the signboard, in which it was stated that he was the successor to Dr. Stewart, who was a registered dentist. Mr. Davie was not in a position to carry on the practice that Dr. Stewart did, and in using the words "successor to Dr. Stewart" he was using words that fell within the terms of the Act of Parliament. If a man advertised himself as successor to Dr. Stewart, he thereby implied that he was a man in the same position and qualified to do the same business as the gentleman to whom he said he was successor. Mr. Buchanan then quoted a number of authorities in support of the relevancy of the counts of the complaint.

The Sheriff said he read the Act to mean that it was to be penal for any man to call himself a dentist or dental practitioner, or to use any such words as would have the effect of passing himself off as registered under this Act of Parliament and that he was *specially* qualified to practise dentistry. That was to say, that he was sufficiently qualified to practise dentistry as to entitle him to be registered. It was to stop a representation of that kind, unless where the person was registered. It was to provide that a man working among teeth, and professing to do what was necessary in the way of pulling and stuffing them, should be properly qualified, and that he should not pass himself off as a registered practitioner unless he was actually registered. The question here was whether in this complaint there was enough to set forth that Davie had violated the provision of the Act by passing himself off as a dentist, dental practioner, or a man so qualified as to be capable of being duly registered under the Act. He thought the complaint sufficiently set forth that Davie violated that provision of the Act of 1878. The objections to the relevancy of the libel had been stimulated and probably induced by the prosecutor giving rather too much information—more information than he was bound to give in the way of details—and in giving, in fact, a sort of synopsis of a precognition. All that required to be stated was that within a certain time—within six months—Davie used the term "dentist" and made other representations to the effect that he was a registered practitioner under the Act. Mr. Glenny had referred to the exception in the case of medical practitioners, but his Lordship thought the doctrine had been laid down and acted upon in England that where an exception was to be pleaded in defence it was for the accused to prove the exception, and that it was not necessary to negative the exception in the complaint or by the evidence adduced in support of the complaint. The result of legislation like this was to set aside certain professions for certain people. A man might be qualified to be a Professor of Chemistry, and yet be prosecuted if he were to sell goods upon the representation that he was a chemist. The word dentist was rendered sacred to this registered body, and no one was entitled to use it unless a member of that body. If a prize-fighter called himself a dentist he would be liable to prosecution under this Act of Parliament, although he had no instruments for extracting teeth except his fists. This legislation had for its purpose

the preservation of innocent and gullible members of the public from believing representations that were made, and from trusting themselves to the skill of persons who pretended to be doctors, chemists, and dentists, and who had no proper skill or qualification, and who might do a great amount of mischief to them ; and it was left to a private person sometimes, and in other cases to public authorities, to prosecute. In regard to the title to prosecute here, there could be no doubt whatever, except that the prosecutor seemed to be an Englishman. Any dentist in Dundee, so far as his Lordship could judge, could have prosecuted just as well. As to the objection that the date of the advertisements was not given, all that it was necessary to show was that the course of misrepresentation went on within six months. "Successor to Dr. Stewart" was an ambiguous term. It might mean successor to some part of his business, or to his house, but it did not prove much and certainly did not prove that Davie represented that he succeeded to Dr. Stewart because Dr. Stewart was a registered dentist, and that he also was the same. Some people might reason that way. There was a St. Andrews story his Lordship had heard that implied that kind of reasoning. A gentleman who used the title of Major was once golfing in St. Andrews, and some one asked his "caddie" to what regiment the Major belonged. The "caddie" said—"Weel, I dinna think he's a Major at a'. He married a Major's widow, and keeps up the title." That was the kind of successor it might have been. His Lordship concluded by remarking that he would have been glad to avoid proof in this case, but he did not see it was possible to do so.

After some conversation with the agents as to the nature of the plea to be tendered, the Sheriff said he did not think it was a serious case at all. It did not require a gentleman from London to protect the teeth of the people of Dundee, as the Small Debt Court could do it as well.

Mr. Davie finally denied the charge, and the case was continued till Monday for proof.

On the resumption of the case on January 20th—

Mr. Glenny stated that, following on what took place on Friday last, the agent for the prosecution and he had had several consultations regarding the matter. The result of these consultations was that they had adjusted a limited plea. The specific charges 3, 4, 5,

6, 7, and 8 were all withdrawn. Under 1 and 2 accused proposed giving a limited plea that during a portion of the time mentioned in the libel he contravened the Dentists Act, section 3, by having the words "Dr. Stewart, surgeon-dentist," upon the windows of the premises of which he was a tenant.

Mr. Buchanan, who intimated his acceptance of the plea, said, under the section of Act, the penalty was a fine not exceeding £20 and expenses.

The Sheriff—Where do you find expenses?

Mr. Buchanan—Under the Summary Jurisdiction Act.

Mr. Glenny said he was afraid he could not plead that a private prosecutor was not entitled to expenses, although a Public Prosecutor was not entitled to them unless the Act under which he prosecuted specially allowed them.

The Sheriff—What is to become of the fine if I impose it?

Mr. Buchanan replied that the Queen's Remembrancer had sent out a circular to the effect that the fine was to go to the Exchequer.

The Sheriff said he did not know the Queen's Remembrancer had power to supplement Acts of Parliament.

Mr. Buchanan—It would probably fall on a Treasury minute.

Mr. Glenny stated that his client had pleaded guilty to a very technical breach of the Act, and that being so, it was only a case for a nominal penalty. It was the first prosecution of the kind in Dundee, and it was not the aggravated offence of a person actually putting up the words complained against, but it was the simple infringement of allowing words which previously existed to remain for a longer time than perhaps should have been done. Mr. Davie became successor to Dr. Stewart on 28th May last, and at that time there were a large number of signs up, and, so far as practicable, Mr. Davie removed all those signs between the time of his entry and July. The words he had pleaded guilty to using were painted upon the windows, and they remained there till September. The reason why these signs were left so long was partly on account of the painters' strike, which lasted for six months, and only terminated some time in July. Following upon the settlement, there was a fortnight's holiday. He submitted that the sign was removed with all reasonable despatch. It was not there now, nor was there any sign which was objectionable to the Act. The word "dentist" on the carriage door step, which was cut out by Dr. Stewart, was

cemented up in July, and when it was picked out by boys it was again cemented up. Mr. Davie had done his best to prevent a contravention of the Act, and he had no intention whatever of contravening the Act in the future. Seeing that it was not a sign actively put up by him, but one that was passively allowed to remain, it was a case for a very modified penalty. Mr. Davie had incurred considerable expense in the case already, and the plea which had been accepted had been offered all along.

Mr. Buchanan said he wished to controvert the statement made by Mr. Glenny that this was a merely technical breach of the Act. Accused had pleaded guilty to using the words "surgeon-dentist" on the windows of his premises during a portion of the time between July and December.

The Sheriff—Is it not rather an encroachment of the freedom of English speech to set apart the word "dentist" for the use of 300 or 400 men?

Mr. Buchanan—There are some 3,000 or 4,000.

The Sheriff—The English language would become very scarce of words by and by if every 3,000 or 4,000 people were to claim one single word.

Mr. Buchanan—There is no getting behind the Act of Parliament. The same principle applies to veterinary surgeons and chemists.

The Sheriff—There is no Act of Parliament against using the word "Doctor," except in a certain sense.

Mr. Buchanan—There is an actual Act of Parliament here. I do not think we can go beyond that. Using the words "surgeon-dentist" does not form a merely technical breach of an Act which prohibits an unqualified person using the word "dentist" at all.

The Sheriff—He may have been in furnished apartments.

Mr. Buchanan—He has pleaded guilty to being a tenant of the premises.

The Sheriff—Lodgers cannot meddle with landladies' windows.

Mr. Buchanan—Even if he had been a lodger and used the words he would have been liable under the Act.

The Sheriff—If he used them; but if he merely looked at them.

Mr. Buchanan—If by the use of the words he induced people to enter his premises and operated on their teeth he would be liable.

The Sheriff—He is not charged with drawing teeth.

Mr. Buchanan—He is charged with representing himself as a dentist, and has pleaded guilty to that.

The Sheriff—It would be a far stronger case if it were proved that he said to some one that he was a registered dentist.

Mr. Buchanan—I am not bound to enter into that.

The Sheriff—That is the reason I did not sustain the plea of irrelevancy.

Mr. Buchanan referred to previous prosecutions in Cupar and Edinburgh, and stated the penalties imposed ranged from £2 10s. to £7, with expenses.

Mr. Glenny—There were several cases in England and Ireland where the expenses had been modified to £1 1s.

Mr. Buchanan—I never heard of them.

The Sheriff—Acts of Parliament ought have reason and justice at the back of them. Can you tell me what justification there is in reason for the imposition of a penalty on a man calling himself a dentist?

Mr. Buchanan—It is to protect the public.

The Sheriff—That is to say, to secure to the public that the man who does the work of a dentist shall be properly qualified?

Mr. Buchanan—Yes.

The Sheriff—The public generally can protect themselves against people improperly skilled.

Mr. Buchanan—Probably after experience.

Mr. Glenny—My information is that there is only one registered dental practitioner in Dundee who is qualified by University training for the practice of dentistry.

Mr. Buchanan—I am afraid I must contradict my friend.

The Sheriff—I do not see how it requires a University training to be a dentist any more than it requires such a training to be a cabinetmaker or a jeweller.

The Sheriff said it was his duty to administer the law—both statute and common—according to its fair meaning and intent. It was no part of his duty to scrutinise the principles of justice that underlay a statute, except in so far as to see that he did not carry its effects if he could help it beyond the confines of justice. Every penal Act required to be strictly construed, more especially an Act imposing penalties, which had the double purpose of protecting

a monopoly and protecting the public. The latter was a social necessity : the former was not, unless in so far as it contributed to the latter. No monopoly could be justified by the principles of any code of social philosophy except the principle that the special monopoly was upon a wide view of the interests of society for the greater advantage of the whole community. That alone in the field of right and wrong could justify interference with individual freedom—that was with the unfettered freedom of trade and of personal skill and labour. The professions of law and of medicine were strongly fenced in as monopolies because a special education and standard of attainment was expedient in the public interest to protect bodily health and organic structure and function from the experiments of rashness and of ignorance, and the property and freedom of individuals from the exhortations of persons with zeal without knowledge, and the irresponsible advices and devices of swindlers and beggars. The Church was not so well fenced in except as to manses and stipends and creeds established by statute, or settled by contract, because the religious advice of fanaticism and of ignorance sometimes did good even in the way of amusement—and beyond sending an occasional nervous weak-minded person to a lunatic asylum never did any harm. That dentistry—that branch of the medical and surgical art which related to the care of the teeth—should be constituted a monopoly in the interest of specially skilled qualified persons, but also in the interests of the public, he was very far from doubting. He thought no one should be induced to trust a single tooth, however ruinous, to an artist who pretended to have had a special dental education of the kind that was guaranteed by his being enrolled in a statutory register, when in point of fact he was not. On the other hand, he did not see why a joiner or a blacksmith, or a barber, or any one that could use the pinchers should not draw a tooth if the person upon whom he was to operate was not deceived as to the nature and extent of his dental skill ; or why a jeweller who worked in gold and precious stones should not make and do the necessary setting for false teeth, or of real teeth which had lost their natural foundations. When he looked anxiously for the only principle that could justify this prosecution, he ascertained that it was not to support a monopoly, though that might be a consequence of it, but to put a stop to the practice of deception (if the deception be without purpose) or of positive fraud (if the deception be set about with intent to

deceive). He had already decided that the use of the term dentist and dental practitioner was forbidden to all except regis tered dentists under the Act of 1878, and the Medical Acts providing for registration. He might think that the statutory consecration of a word like "dentist" to the exclusive use of the institute of registered dentists or any other trade union, however educated and genteel its membership, was an interference with the free use of the English language which had no proper justification ; but he had not been able to discover how he could help himself when he found that under a similar Act of Parliament Mr. Justice Hawkins, one of the most acute and accurate logicians in England and one of the most liberal minded and rationalistic occupants of the English Bench decided that it was penal for a tradesman so unscientific as a shoer of horses, which was to a greater and less extent the calling of every country blacksmith in Scotland, to describe on a signboard his establishment as a "veterinary forge," though the Sheriff fancied if he were like most English horse-shoers he would have described himself as a "veteran forger," or by any other flaunting epithet, with the serene indifference of ignorance. His Lordship had held the libel relevant, because he must, and might have had to determine whether it was proved, and, if proved, whether the deception was innocent and unconscious deception. The plea of guilty now tendered and accepted, rendered it unnecessary that proof should be led. The plea involved admission on the part of the accused, after taking possession of the premises occupied by the late Dr. Stewart, that he allowed the words surgeon-dentist, painted on the widows for Dr. Stewart, and correctly designating him, to remain from June to September, when they were removed, as he understood, voluntarily, and not under threat of this prosecution.

Mr. Buchanan—With all due deference, my Lord, yes.

Mr. Glenny—With all due deference, my Lord, no.

Mr. Buchanan—He was warned by the Association.

Mr. Glenny—The order to do this work was given long prior—immediately on Mr. Davie's entry.

The Sheriff said he took the deception caused by the allowing of these words to remain to be presumably—and was obliged to presume all that was possible in favour of innocence—to involve the minimum of guilt or fault in so far as the statute was concerned. It would

have been a very different thing if he had passed himself off to an individual as a registered practitioner. The criminality of failure to remove two painted words did not appear to his Lordship to be great when weighed in the scales of morality, and, if possible, still less when weighed in the scales of Mammon. He had no reason to believe that this unregistered dentist ever did any harm to the public or any member of it, considered merely as a member of the public. If he did, the law of reparation could be invoked against him. He believed accused had rendered cheap dental services to the poor. He doubted if he had deprived any dental registered monopolist of any lucrative part of his business. At all events, he did not feel bound to support any monopoly by the imposition of a vindictive punishment. The fine he imposed was the nominal one of 1s., and the expenses he allowed by way of enforcing and advertising the statute were £2 2s., the alternative being six days' imprisonment.—*The Dundee Advertiser.*

At the West Ham Court, on January 2nd, Ernest H. Richards, of Zingari Terrace, Gipsy Lane, Forest Gate, was summoned before Mr. Bagallay for taking and using the title of dentist without being registered as such under the Dentists Act. Mr. Frederick George appeared for the complainant, Mr. G. R. Matland, a registered dentist of Romford Road, Forest Gate. Mr. Pettifer defended. On December 31st, Mr. Matland, accompanied by a lad in his employment, went to the defendant's place at Gipsy Lane, and asked to see the dentist. He was told the dentist was engaged, but he afterwards saw the defendant. He told him his "teeth were shaky," and he wanted the assistance of a dentist, and the defendant, after examining his mouth, said he would do what was required for 10s. 6d. Mr. Matland said he would consider the matter, and after he had had the boy's teeth looked at and received the defendant's advice, Mr. Matland asked to have a cast of his mouth taken, and paid 2s. 6d. deposit. The defendant gave a receipt for the money, and also handed Mr. Matland a circular which read, "Mr. Richards, late with Mr. Goodman, surgeon-dentist." Mr. Pettifer admitted that the defendant was not registered as a dentist. He was a manufacturing dentist, and when persons called on him to have operations performed he took them to another dentist. Mr. Bagallay said the Act was

designed to pretect the public as well as dental practitioners. The defendant had clearly by his documents represented himself to be a surgeon-dentist, but he was admittedly not registered. He would be fined £5 and £1 10s. costs.

THREE NEW DRUGS.

Gaiacoleine. — Prepared by C. André, of Paris. Agents: The Dental Manufacturing Company.

The anæsthetic action of Guaiacol has been but recently observed. Gaiacoleine is a mixture of chemically pure Guaiacol with olive oil, which has been treated with chloride of zinc to precipitate the resins and colouring matters, washed with alcohol to remove the acids, and then heated for some time. It is claimed for Gaiacoleine : that it is an absolutely inoffensive medicament, producing neither general nor local complications ; that no local irritation will occur if the lotion of the Guaiacol is properly prepared. The anæsthesia with Guaiacol is said to be deeper and to last much longer than that with Cocaine.

Chinosol.—Prepared by Fritzsche & Co., of Hamburg. Agents: The Dental Manufacturing Company.

A product belonging to the Chinoline series, is a crystalline powder of a yellow colour possessing a slightly aromatic odour and an astringent taste. It is readily soluble in cold water and insoluble in ether or concentrated alcohol. It is a perfectly stable salt, keeping well in every climate and it is not hygroscopic. It is stated to be non-caustic, extremely diffusible, not to coagulate albumen, to be absolutely non-toxic, and to act as an efficient deodorizer.

Dr. Rapp, of the Munich University, in order to test the toxity of Chinosol, injected a rabbit subcutaneously with 20 centigrammes of Chinosol in 10 grammes of water, and during the three following days the animal was given by the mouth 85. grammes of the drug, that is to say about 130 grains. No ill effects of any kind were noticed at the end of the third day.

Professor Dr. Emmerich, of Munich, reports that Chinosol possesses the power of arresting the growth and of killing bacteria in a much greater degree than does carbolic acid. Even in as weak a solution as 1 : 40,000 Chinosol checks the development of the pus organism, and this fact explains the excellent results obtained from its use in the treatment of ulcers and septic wounds. It presents the further advantage that the alkaline reaction of the secretion sets free oxychinole in a state of very fine division by which the effects of the latter are markedly enhanced. He satisfied himself that even in concentrated solutions Chinosol has no caustic action and does not coagulate albumen at ordinary temperatures, thus conferring upon it great powers of penetration in respect of the tissues.

For the convenience of Physicians and Surgeons Chinosol is made up in tablets of one gramme=15 grains. Proportionate solutions can be made as follows—

1	tablet	in	5	fluid	ounces	of	water	=1 : 150.
1	,,	,,	10	,,	,,		,,	=1 : 300.
1	,,	,,	1	pint			,,	=1 : 600.
1	,,	,,	1	quart			,,	=1 : 1200.
1	,,	,,	½	gallon			,,	=1 : 2400.
1	,,	,,	1	,,			,,	=1 : 4800.

It is not advisable to use Chinosol for the disinfecting of instruments, because steel and iron in contact with Chinosol turn black in a like manner as when brought into contact with vinegar or fruit. It does not, however, attack the metal, and the stains produced by it can easily be removed by the aid of a little whitening.

Ferropyrin. Agents: The Dental Manufacturing Company.

Ferropyrin is a styptic. It is claimed that it acts quickly, does not stain the teeth and leaves no disagreeable taste in the mouth, that it also acts as a local analgesic. It forms with blood a black granulated surface which keeps for several days. After extraction of a lower tooth Ferropyrin is applied by placing the powder direct into the alveolus with a little spoon, or after an upper, a little moist wadding is dipped into the Ferropyrin, and the adhering powder is then wiped into the alveolus.

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NOTES ON THE TREATMENT AND FILLING OF TEETH.

By W. CASS GRAYSTON, L.D.S.

(*Continued from page* 56.)

Having opened the cavity, the next step is the removal of the decay. This is easily accomplished (unless very sensitive) by the use of sharp spoon and hatchet excavators of various curves and sizes. Now, with the exception of the labial walls of front teeth, break down all frail overhanging enamel at all parts, and be particularly thorough in this respect at cervical walls.* This can be easily done by placing a spoon excavator at the edge just outside the cavity, and breaking it down by inward pressure. The plug trimming files (Smith's discs and Rhein's trimmers) are also very useful for supplementing the spoons and for trimming edges generally. Use chisels, or sharp engine burrs, or both, for cutting away the overhanging enamel in crown cavities, and also for freeing and smoothing the lateral walls of approximal cavities. Scrape, cut, burr or file cervical walls, as is most convenient. Be careful to bevel cervical walls and all coronal walls, whether for crown cavities or the coronal part of approximal cavities. As a general rule, bevel all edges of cavities if gold is to be used, except the labial walls of front teeth when this edge is exposed, or the walls of labial cavities in general. It is easier to carry the gold over a bevelled edge and to correct any

* Cavities that are to be filled with gold are alluded to, not frail shells that can only be filled with soft plastics.

imperfections by subsequent surface condensation. If, however, the edge is left square and the access to all parts of it is easy a finer, cleaner edge will appear when the filling is finished. On coronal surfaces the force of mastication will tend to further condense and rivet the gold down if the edges are bevelled. Having removed decay and trimmed the edges, proceed to make the retainage (the final finishing of the edges should be done just before the insertion of the gold).

Retainage.—In a crown cavity of medium depth, it is only necessary to cut the floor fairly flat, and if the walls are at right angle to the floor, giving the cavity somewhat the shape of a box with the lid off, the filling will be retained without any undercutting. If the cavity is fairly deep and the orifice not very large, the walls may even diverge somewhat outwards, and the filling, if carefully packed, will still remain firmly in place. In shallow cavities with a large orifice a slight undercut groove may be made all round the bottom of the cavity with an inverted cone burr or suitable excavator if the cavity is round, and if it is oblong, a distinct pit or undercut may be made instead at each end. If there is any fear of weakening a crown cavity wall by undercutting, or even by cutting it at right angles to the floor, it may be left sloping outwards, and a counterbalancing undercut made at some strong part of the cavity. When cracks or fissures running from a crown cavity are to be cut out and filled, they should be deepened sufficiently to retain the gold, or an undercut pit may be made at the end of each fissure.

In making an undercut for purposes of retainage, it must be understood that the making of distinct pits or holes in the dentine is of very little value (except as starting points) unless the orifice of the pit is fairly broad. There is very little strength in a narrow neck of gold which unites the main body of the filling to that which is in the undercut, and if a filling is dislodged, it is a common occurrence to find the gold remaining in the pits, the filling itself having broken away at this connection. A general inward slope of one or more walls of the cavity forming a dovetail is the strongest kind of retainage, and next to this a groove or grooves, if possible, slightly dovetailed.

All retainage must be made in accessible places. It is no use making an accessible part of a cavity either inaccessible or difficult of access by undercutting, and it must not be forgotten that to

make an undercut takes up time and often causes pain, and that to fill the undercut also takes up time, it therefore may be laid down that it is distinctly advisable to make retainage in places that are readily reached and can be readily and accurately filled, and that no more undercutting should be done than is absolutely necessary. The methods of securing retainage in crown cavities will apply to all cavities surrounded by four walls and freely exposed, viz., on the labial, buccal and lingual surfaces, and sometimes on approximal surfaces, where the adjacent tooth has been extracted.

To secure retainage in mesial and distal cavities in the six upper front teeth a groove is generally made at the cervical wall, and an undercut pit near the cutting edge. These two opposing undercuts, if the cavity admits of their being satisfactorily made, are sufficient to hold the filling in place. The labial wall, in working from the lingual surface, will usually be at right angles to the floor on the removal of the decay, and if this wall is weak the removal of the decay and discoloured dentine is all that can with safety be effected here. If, however, this wall is strong, and well supported with dentine, it is well to make a slight groove in the angle formed by the juncture of this wall with the floor of the cavity. This groove is not necessary for retainage providing the cervical and cutting edge undercuts are satisfactorily made, but it greatly assists the packing of the gold, particularly if soft gold is used as a base. In many cases the decay has so encroached on the cutting edge that no undercutting can be here attempted with safety. If the wall at this part can be prepared at a right angle to the floor, it will still be of considerable value, but if, as often happens, it is advisable to avoid its breaking down after filling by sloping it outwards, extra retainage must be made at other parts.

The cervical undercut should then be made deeper than usual, and, if possible, a distinct pit should be made at each end of it. These pits, which in themselves would be of little value, form, in connection with the groove, a strong retainage. An undercut at the labial wall will be of great value now if it can be made with safety, but if not, and if the cervical undercut, together with what may be left of the lateral walls is not sufficient, the cavity must be boldly extended across the lingual surface, and a distinct undercut made at this part. Care must be taken in doing this, and the extension had better be

broad and shallow, rather than small and deep, so as to avoid cutting too near the pulp. (Fig. 4). Small cavities on the approximal

FIG. 4.

sides of the upper front teeth may be prepared in many cases somewhat after the manner of shallow crown cavities. A slight undercut may be made all round at the juncture of the floor and walls, or an undercut made at two opposing parts. Many of these small and also medium sized cavities can be freely exposed, and consequently, readily filled by making the old-fashioned V-space—(Fig. 5)—bevelling the approximal surfaces from the labial to the

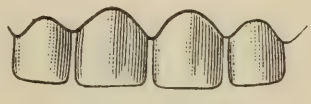

FIG. 5.
Lingual Surface.

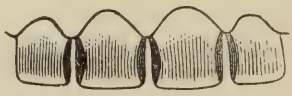

FIG. 5.
Labial Surface.

lingual side. This can be accomplished with chisels if the teeth are only slightly separated, or with a diamond disc if the space obtained by pressure is sufficiently large to admit of its use, and a Butler carborundum point is also very useful, the teeth being finally made smooth with emery paper discs. This manner of bevelling the approximal sides of upper front teeth can always be done with advantage, providing they are fairly regular. Practically, the same result is obtained with large gold fillings, on these surfaces by trimming away the gold in finishing the fillings. This method of shaping the teeth must be strictly confined to the incisors and the mesial surfaces of cuspids. Any cutting away of the bicuspids and molars that is not reproduced by the filling is distinctly bad. It causes food to become wedged between them, and induces instead of preventing decay.

In the molars and bicuspids the retainage in approximal cavities converted by opening into compound approximo-coronal cavities, is usually obtained by grooving the lateral walls. It is considered, as a rule, bad practice to undercut the cervical wall. There is very little dentine between the edge of the cavity and the pulp at this part, and there is a risk of either cutting too near the pulp or too near the enamel edge. In the latter case, this margin would probably be damaged by the packing of the gold, and extension of decay would soon take place. Personally, as a general rule, I prefer not to groove the lateral walls; in many cases it weakens them, and it is usually difficult and tedious to carefully and accurately work the gold into these grooves. It is preferable, in my opinion, to cut the cavity well across the crown ; to make this coronal cavity slightly dovetailed, and to make a distinct undercut at the end furthest removed from the approximal cavity. All the retainage is thus made where the tooth is strongest, where it can be most easily made, and where it can be accurately and solidly filled.* The lateral walls may be left at right angles to the floor, or very slightly sloping either inwards or outwards. In cases where the cavity is shallow at the cervical part, and it is difficult to start the filling there it may be commenced in the coronal undercut, and worked from there along the floor to the cervical edge, and then back again towards the crown in the usual way.

In approximal cavities in the molars and bicuspids, in which it is not considered advisable to open through the crown, many operators obtain access by cutting through either the buccal or palatal wall. In my own practice, if the decay is not sufficiently extensive to justify the coronal opening, I prefer to fill with a plastic material, usually guttapercha.

In preparing the edges of cavities, it is necessary to cut out all little cracks, chalky patches, or defects which may be found there. This is particularly the case with the cervical edges, where these defects seem to abound. In order to obtain a clean margin at this part, it is often necessary (particularly in molars and bicuspids) to extend the cutting to the cementum. This, in many cases, adds to the duration of the filling, for if the teeth are properly contoured the gum will cover and protect this part.

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* See Fig. 2.

The margins should be made as smooth as possible with chisels, spoon excavators, fine cut engine burrs, fine files, emery tape, and discs, &c., using of the above whatever is most suitable for the case in hand.

Preparation of the Gold.—Gold for filling teeth, after being carefully and peculiarly refined, is beaten into foil of varying thicknesses, or it is precipitated into a sponge-like form, known generally as crystal gold.

Foil is prepared either as cohesive or non-cohesive gold. Absolutely pure gold possesses the property of welding when cold, providing the surfaces to be united are perfectly clean and dry. The least deposit on the gold, either of moisture or any extraneous substance, interferes with this welding, and, consequently, it is always necessary to anneal it before use, in order to cleanse off anything that may happen to have collected on its surface. This welding property is made use of by the majority of dentists in making gold fillings. Pieces of foil are rolled, or folded into small masses or strips of a convenient form and size, and after the first few pieces are fixed in the cavity by being pressed or hammered into some pit or undercut, or by being tightly wedged between the walls, the other pieces are one by one pressed or hammered on to this foundation in such a manner that each piece sticks to the gold already in place, becoming solidly united with it, and the filling proceeds in this manner until it is completed, the gold being intimately united into one solid mass. Gold foil is prepared for introduction into a tooth in the following ways :—By simply tearing small pieces from the sheet with tweezers or foil carriers ; by rolling the sheet, or part of it, into a rope, and then cutting it into small pieces or pellets, as they are termed ; by folding the sheet flat upon itself several times, and then cutting it into strips of convenient length and width ; by further cutting these strips into small squares ; by cutting the sheet into strips and rolling them round a spindle into a cylinder-like form ; by tearing small pieces from the sheet and rolling them into little balls, and by cutting strips or squares from a sheet of very thick foil.

Different operators use one or more of the above mentioned methods of preparing the gold, as may seem best for them. The most intimate union of the molecules of the gold producing the most perfect weld is doubtless obtained by the use of small flat

squares, providing each one is packed as flat as possible without any curling up or doubling of the edges. This is, however, a very tedious and slow method of working, and although most satisfactory and beautiful fillings are produced by it, the majority of operators will find they obtain practically as good results by more rapid methods.

In using tape, some operators after attaching one end to the gold already in place, proceed to pack it by folding the strip backwards and forwards on itself, layer by layer, as flat as possible, taking care to weld each layer separately to the already condensed gold. This, while an excellent method, is also a slow one, unless the tape is very thick, and in this case it is difficult to obtain good adaptation to the walls of the cavity. The doubling or folding of the tape must generally take place against the walls, and this double thickness of an already thick strip is very difficult, if not impossible, to accurately adapt ; other operators use their tape and pack it down rapidly several layers at a time. The end of the strip is placed in the cavity and packed on to the gold already in place without any particular care being taken as to whether it is flat or not. The point of the plugger is then placed on a part of the projecting strip in such a manner that one, two, three, or more layers are simultaneously packed down and condensed, the gold being worked on the whole fairly flat. This is a rapid method, and if the strips do not contain more than about four thicknesses of No. 4 foil, the gold will work beautifully, easily and softly, and excellent adaptation and solidity will be obtained. Greater thickness than this makes the gold work harshly and stiffly. This method is particularly well adapted to the fast stamping mallets.

Irregular masses of gold, such as pellets cut from a rope or little balls, do not, as a rule, produce such evenly condensed fillings as the flatter forms. The welding does not appear to be perfect all through the filling, probably owing to the innumerable irregularities of these pieces, there are parts that never become thoroughly condensed. The cohesion that is produced is, however, very good. The slight imperfections in the condensation are shown by the surface of the filling becoming somewhat uneven where it is subjected to the force of mastication. This can be avoided by making the surface of flat gold, preferably cut from a sheet of heavy foil ; gold in the cylinder

form is usually purchased ready prepared. These ready made cylinders are for cohesive work, generally made from exceedingly thin gold, and do not appear, as far as my experience goes, to be so reliable in their working properties as foil. I have thoroughly tested in practice the foil of five different manufacturers, and from one of these firms I have used four varieties. Every one of the above worked easily and well on the cohesive principle. I also purchased three single books of foil from three other makers, and two of them were perfectly satisfactory. I have, therefore, although I have used many varieties, only come across one book of foil in more than ten years that did not work to my satisfaction. Cylinders I have found on several occasions refuse to cohere, although, on the other hand, I have often found them to work easily and well. It is very annoying to find a whole bottle of cylinders unworkable, no matter how carefully they may be annealed. Whether this is due to the thinness of the foil from which they are made, making it difficult to hit the happy medium between under and over annealing, or whether the gold had originally been annealed to the fullest extent, and would not bear any more to restore the cohesive properties that all gold loses in time, I do not know. Perhaps my experience has been unfortunate, and consequently limited. I can, however, do anything with foil that I could do with good ready made cylinders, and I therefore prefer to stick to what has, in my hands, proved the more reliable article.

Foil can be prepared in what is practically a cylinder form, and without the nuisance of the loose edge that exists in home made cylinders rolled round a spindle, by folding the sheet into a *loose* tape, and then gently rolling it until it is cylindrical. The cutting of short pieces from this long roll will flatten them somewhat and give them a block-like form, but this does not in any way interfere with their working properties.

Small pieces of foil torn from the sheet will usually be found useful for filling very fine grooves and pits and very small cavities, etc., while very heavy foil, such as No. 60, is principally used for large fillings.

Non-cohesive gold is so prepared that there is no possibility of one piece sticking to another. This is probably attained by subjecting the leaves of foil to some vapour which deposits something on

the surface. If this non-cohesive gold is annealed it will often be noticed that a vapour is given off, and then it becomes, as a rule, thoroughly cohesive. There are a few makes of non-cohesive gold which become so slightly cohesive on being annealed, that this does not prevent their being worked non-cohesively. These foils, the character of which is only slightly changed by annealing are often spoken of as "true non-cohesive gold." They *can* be worked cohesively, but it demands special care and manipulation. What it is that gives them this particular property is a trade secret. In some cases it is probably due to a very slight admixture of alloy, these true non-cohesive foils, however, seem also to have been subjected to the action of some vapour, for, as above mentioned, they are not so absolutely non-cohesive when annealed, and heating them causes a vapour to be given off just as with other makes of non-cohesive gold.

Non-cohesive gold is used by wedging masses of it tightly between the walls of cavities. It is important for each piece to project somewhat from the orifice, so that by surface condensation it may be pressed somewhat further into the cavity, and still sufficient gold be left to admit of proper finishing. In packing this gold lateral pressure is used, but surface external condensation is usually necessary in addition, in order that the surface of the finished filling may be as solid and dense as possible. This gold may be prepared in much the same form as the cohesive, except that if rope or pellets or cylinders are used, it is advisable for them to be more tightly rolled, and each piece must be sufficiently large to extend from the floor of the cavity to some little distance beyond its orifice.

The most generally useful method of using this gold is in the form of cylinders. If procured ready made, they should be tightly rolled—hard cylinders they are often termed. Very satisfactory cylinders can be made by folding one or more sheets of foil into as narrow a tape as possible, and then rolling or twisting the tape into a cylindrical form, and cutting off lengths of the desired size. Each piece will be somewhat flattened at the ends by the cutting, and should be restored to a cylinder by rolling between the thumb and finger. It is necessary for the cavity to be surrounded by walls, and although the majority of cavities can be so prepared,

it is usually very difficult to satisfactorily work non-cohesive gold, except in crown cavities. Broad, shallow cavities are particularly awkward to fill non-cohesively.

It is claimed that fillings are much more rapidly made with non-cohesive gold ; that the adaptation to the walls is better, and that by reason of this superior adaptation teeth are better saved than with cohesive gold. I was originally taught to use non-cohesive gold and to believe it was infinitely superior to cohesive as a preserver of tooth structure ; with the exception, however, of making a few experimental fillings in the mouth every now and then I have given up its use (except in connection with cohesive gold) for several years. Had I remained faithful I might have overcome some of the difficulties which caused me to fly to cohesive gold, and consequently I have considerable diffidence in expressing the following opinions, viz. : that in crown cavities very rapid and good fillings can be made that except in very simple cavities its use on the incisors and cuspids is very difficult, owing to the shallowness of these cavities ; that its use in approximal cavities in bicuspids and molars is also very difficult if contour fillings are to be made that will stand ; that in the majority of approximal cavities there is very little, if any, saving of time, when the preparation of the cavity, packing the gold and finishing the filling are all taken into consideration ; and that in any case exposed to mastication the filling will not remain so smooth nor will the edges stand as well as with cohesive gold. The carrying of gold over bevelled edges, often so valuable, can only be satisfactorily accomplished with cohesive gold.

Respecting the superiority of the adaptation I am satisfied this only exists in very favourable cases, and I am also convinced that as good an adaptation as is necessary to preserve a tooth can be made with cohesive gold, and that any superiority in this respect that may be procured by non-cohesive gold is of no practical value. Used in connection with cohesive gold it has in many cases undoubted value. In the olden days, when V-spaces were made between molars and bicuspids, and approximal cavities were filed flat and filled flat, non-cohesive gold could probably be used with very much more ease and satisfaction than is possible nowadays when the value of contour is realised.

Cases are often alluded to where non-cohesive fillings have preserved teeth for a great number of years, and the features of a good deal of the more modern cohesive work are compared with them. It is to my mind simply a case of survival of the fittest. Our own failures are always before us, while those of the past generations have been dead and buried and forgotten long ago—only their successes remain. I am sure that had these same teeth been well filled with cohesive gold they would have lasted quite as long. Some of the finest cohesive fillings I have ever seen have been saving the teeth for 30 years, and appear likely to save them as long as the patient lives. It is a case of excellent work and in first-class quality teeth in the mouth of a healthy individual.

Crystal Gold.

The crystal gold that is best known is the one that has stood the test of time longer than any other similar preparation "Watts' Crystal Gold." This is the only kind that I have had any lengthy experience with, and I must therefore confine my remarks to it. It is a cohesive gold, and must be used strictly as such. Anyone who can work cohesive foil successfully can use it satisfactorily, at first it may appear to present some difficulties of manipulation, but these soon disappear, and after a little experience an operator will wonder why its use ever seemed troublesome.

(*To be continued.*)

HONEYCOMBED AND SYPHILITIC TEETH.*

By Mr. Heath.

Mr. President and Gentlemen,

We heard last month a paper on a subject of much practical usefulness, which was followed by an interesting and animated discussion. Our subject to-night cannot be called exactly practical, and is hardly of such general interest, so that I must ask your pardon for having brought before you only dry bones, devoid of originality, hoping that all mistakes and blunders may be thoroughly laid bare, that a lively criticism may do something to

* A paper read before the Students' Society of the Dental Hospital of London.

peptonize, and render soluble, the undigested mass of facts and theories now about to unfold.

Teeth present numerous malformations, some congenital, others produced after birth. Of these malformations three are sometimes confused, which it is important to distinguish—those known as honeycombed, rickety, and syphilitic teeth, and it is on these three that I propose to touch this evening.

Under the head of honeycombed teeth we have a variety of irregular forms of tooth-structure. The commonest kind of so-called honeycombing is that in which the surface of the affected tooth presents numerous pits, with irregular yellowish enamel forming a large part of the crown. In the incisors the cutting-edge is sharp and irregular, with the pits sometimes penetrating to the dentine; while molars in a like case usually present instead of smooth rounded cusps, sharp spinous portions of enamel sticking out abruptly from an irregular honeycombed crown surface. Examined under the microscope the tissues are seen to be deficient in quality, as well as in quantity, the dentinal tubes near the affected surface being irregular, and the enamel porous, with the brown striæ of Retzius well marked. This malformation usually affects like teeth to nearly the same extent; more often than not half the crown of the centrals, about one-third of that of the laterals, the tip of the canines, and the major part of the first molars being the seat of the disease, the bicuspids in these cases escaping. This applies to both the upper and lower jaws. It may happen, however, that only the tips of the centrals are affected, in which case the laterals and canines escape, and the first molars suffer but little. Teeth are often seen with grooves and ridges alternating, sometimes one or two only, occasionally the whole crown presenting a furrowed surface. Also there occur all gradations between the typically honeycombed and the grooved teeth, any number of rocky, ridged, spinous, and pitted forms being found. This deformity is usually confined to the permanent dentition, though honeycombing of the temporary teeth now and then occurs. The cause appears to be one acting during the time the crowns are calcifying, that is to say during the first two or three years of life, and evidently also it is a cause that after a time ceases to act, as the later formed portions of enamel are often perfect.

Some diversity of opinion exists as to the cause of honeycombing.

The three best known views are the following :—

(1.) That it is due to the influence of mercury.

(2.) That it is caused by convulsions.

(3.) That it is the result of the various exanthematous fevers.

The first theory we owe to Mr. Jonathan Hutchinson. He found that lamellar cataract, a disease never present at birth, often attacked children who had suffered from convulsions. He further noticed that a large number of such children had honeycombed teeth, and at first considered the convulsions, cataract, and honeycombing were three results of the same obscure cause. But patients were often seen with lamellar cataract whose teeth were unaffected, and others with honeycombed teeth who had merely suffered from convulsions without lamellar cataract supervening. This seemed to complicate matters until it was noticed that in most of the cases mercury in some form had been administered to combat the convulsions. Here appeared to be a clue to the mystery, and after some careful observation Mr. Hutchinson declared his belief that honeycombing was due to disturbance in the nutrition of the teeth caused by mercury administered in infancy, this malnutrition being brought about either by a definite stomatitis, or simply by the effect of the prolonged presence and influence of mercury in the system. The test teeth for this condition he considered to be the first molars. The usual form in which the drug is exhibited is that of teething powders, the majority of which contain calomel and morphia. One of the chief reasons for the harmful effect of these powders is that, being primarily sedative, the morphia soon induces sleep, which lasts for some hours, during which period the mercury has time to be absorbed into the system, as it is only when the effect of the morphia has passed off, and the child wakes, that the calomel exercises its aperient action. In support of this theory it is noticed that many persons with honeycombing are unusually susceptible to the effects of mercury, which helps to explain why their teeth have been affected in infancy, when the teeth of others who have been similarly drugged may have escaped. Again it is extremely difficult in diagnosing a case of honeycombing, apparently idiopathic, to be sure that the child has

not had powders secretly administered by a nurse at some time or other to keep it quiet. Many, however, believe that this condition is not caused by mercury, but rather by the convulsions to prevent which the mercury was given ; and it is to be remembered that hundreds of those who take plenty of mercury in infancy escape with perfect teeth. While finally there is no doubt that measles, scarlet fever, and the other exanthemata often lead to a malformation of the teeth, especially to the grooved condition already referred to, this being similar to the groove occasionally left on a nail after a temporary illness, it is possible sometimes by careful inquiry to find out that an attack of one of the eruptive fevers took place at the time the part of the tooth affected must have been calcifying. In certain cases, where the health has been alternately decidedly good and bad, the many-grooved condition may result. Other causes of honeycombing are given, such as heredity, inflammation of the preceding temporary teeth, the wrong dieting of infants, disturbance in the circulation by such things as whooping-cough, and, finally, rickets.

Mr. Storer Bennett draws a distinction between honeycombed and mercurial teeth, holding that the former present an irregular worm-eaten appearance, while mercurial teeth have the tubercles of the incisors exaggerated, and the cusps of the molars pointed and standing distinctly out.

The *results* of honeycombing are a more than normal liability to caries, with a somewhat increased probability of the setting in of arrest of decay.

The *treatment* consists in smoothing down sharp projections, and filling hollows where possible, though in the case of the first molars a large number will be best treated by extraction, as the teeth cannot be relied upon to resist decay for long, and are of diminished use in mastication owing to their usually imperfect articulation with each other.

The second class of malformed teeth we mentioned are rickety teeth. In rickety children both permanent and temporary teeth erupt late, and are prone to decay quickly and be lost. They are bluish and smooth, and though the enamel is not apparently defective, it is probably of poor quality. In shape, typical rickety teeth are tapering, and often slightly notched.

Lastly, we have to take up the peculiar malformation produced on certain teeth by congenital syphilis.

The attention of the profession was first drawn to this subject by Mr. Jonathan Hutchinson. In studying cases of interstitial keratitis, a disease of the cornea, of syphilitic origin usually, Mr. Hutchinson frequently noticed peculiarly-shaped teeth which are now known as syphilitic, peg-shaped, or Hutchinson's teeth.

If these are found of quite typical shape they are an absolute mark of congenital syphilis, so that it is a matter of extreme importance that they should not be mistaken for other teeth of unusual form.

To begin with the upper central incisors, which are the test teeth: these are often but ill-developed, and are, therefore, seen at a glance to be small and stunted. The form is characteristic, being variously described as barrel or peg-shaped, the important point being that the cutting edge is narrower than the neck of the tooth. This causes gaps between the teeth, and has the effect of making them appear farther apart than they really are.

The colour is dirty grey in bad cases, but is not found if the enamel completely covers the crown, being caused by dentine showing through in places where enamel is absent. The teeth are soft and soon wear down. The central incisors are most often affected, the canines sometimes, and the laterals seldom being changed, while the first molars now and then are, presenting a characteristic dome shape, the cusps being represented by rings of enamel quite unlike the sharp spines on a honeycombed or mercurial tooth. The centrals often have their mesial borders inverted and are not always symmetrically affected—one may present the typical shape and its fellow be quite normal. Finally, there is, in the case of the incisors, a mark which often causes simple honeycombed teeth to be mistaken for syphilitic—I refer to a notch in the centre of the cutting edge which is not there when the tooth is erupted being replaced by several small serrated tubercles. Tartar is seldom found around these teeth, and the additional complication of honeycombing is unusual. Furthermore, the lower incisors are rarely notched or much affected.

I have here a typical syphilitic upper central and a model of the lower teeth of the same patient, the incisors of which seem somewhat

peg-shaped, though, unfortunately, the model is rather a poor one.

The temporary dentition rarely suffers from congenital syphilis, though a case is recorded by Mr. Oakley Coles of a child presenting well-marked syphilitic temporary incisors.

In diagnosing these teeth, especially in noticing the notched condition, care must be taken to distinguish between syphilitic notches and notches due to honeycombing and subsequent wearing away of the cutting edge, or notches due to breakages or the use of a pipe. The last two causes, however, usually produce so symmetrical an appearance that they present little danger. The honeycombed condition, however, may give rise to confusion if the notch is the only character relied upon in forming an opinion. I have a model here of a case in point, of a boy free from any syphilitic taint, with well-marked notches on the upper centrals, due to honeycombing of their tips and wearing down.

Confirmatory symptoms of syphilis should always be obtained in doubtful cases. These are scars radiating from the angle of the mouth, a dusky skin, prominent frontal eminences, and interstitial keratitis. Also ulcers of a distinctly syphilitic origin may help in the decision.

Syphilis usually hastens eruption of the teeth, the temporary incisors being occasionally erupted at birth destitute of roots, but only in a very small percentage of cases does it produce the characteristic malformation we are considering. It is a curious fact that when ulceration of the palate occurs as a result of congenital syphilis the teeth nearly always escape.

It will be well to consider for a moment how the form of the syphilitic incisor is produced. If a newly-erupted normal central be taken it will present three tubercles at its cutting edge, often emphasized by two grooves running longitudinally towards the neck. The crown thus appears to be made up of three denticles. If, during the development of the tooth the central denticle is stunted and imperfectly developed, especially its first-formed portion, we shall get a falling together of the two outer denticles, producing the typical peg-shaped tooth, while the rudimentary tip of the central denticle will quickly wear away, leaving a notch, and this appears to be a true explanation of the deformity. The reason the

whole tooth is below the normal in size is that syphilis acts upon the tooth continuously from its earliest germ, whereas mercury has a definite action for a defined space of time upon teeth perfect up to birth.

Syphilis acts by disturbing the vascular supply of the pulp, and shows its chief effect upon the dentine, while mercury expends its force on the enamel, and, in cases where syphilis is complicated with mercury, may prevent the formation of the typically syphilitic shape.

I have here models of mercurial teeth in the mouths of two children, sisters, afflicted with congenital syphilis. One, a child of nine, has ulcers of syphilitic origin on the l·gs, and a broad sunken bridge to the nose, while the other, aged fifteen, gives a history of trouble with her eyes. Finally, a still younger child in the same family has snuffles. In both these cases the teeth show very little of the typical Hutchinsonian shape, the mecurial (or possibly exanthematous) effects, being by far the most prominent, a lateral only in one case and two centrals in the other presenting any suspicious appearances.

Before sitting down I wish to express my thanks to Mr. Wallis, Mr. Turner and Mr. Freeman, who have kindly lent me both models and specimens. And, finally, Mr. President and gentlemen, I thank you for the attention with which you have been good enough to favour me this evening.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting was held on the 3rd ultimo, the President, Mr. David Hepburn, in the chair. The minutes of the previous meeting were read and confirmed.

Messrs. G. H. Bowden, L.D.S.Eng., Reigate, and T. Rubery Chambers, L.D.S.Eng., were proposed for membership.

Messrs. W. S. Nowell, M.A. (Cambridge), L.D.S.Eng., F. Lawson Dodd, L.R.C.P., M.R.C.S., L.D.S.Eng., Ernest Catt, L.D.S., D.D.S., W. F. Cornelius, L.D.S.Eng., and E. L. Dudley, L.D.S. Eng., were elected members of the Society.

The Librarian (Mr. W. A. Maggs), announced the usual exchanges.

The CURATOR (Mr. Storer Bennett), acknowledged the receipt from Mr. Morton Smale of the skull of a crab-eating raccoon. It was an interesting specimen, said the Curator, inasmuch as it showed a supernumerary premolar in the upper jaw on the right side—supernumerary teeth in the lower animals not being very common. He had also to announce that the Council had consented to the purchase of two skulls, one of an old dog showing a great deal of absorption of the alveolus with deposits, and the other that of a young baboon, a much more interesting specimen, of the period at which the first and second dentition were changing. It was a very ricketty skull indeed, the teeth in consequence had erupted rather late and very irregularly.

The PRESIDENT said he regretted to have to record the death of Mr. George Gregson, who had been a member of the Society since 1857, and many years ago filled the offices of Honorary Secretary and Treasurer. He had also been a member of the Council, and was in 1884 elected a Vice-President. He was well known, and his death would be a great sorrow to them all.

Mr. ARTHUR UNDERWOOD brought forward a case of an artificial nose, the patient was present. Mr. Underwood explained that this was his first attempt, and he thought he saw his way to improve upon it in one or two particulars. At present the nose was attached to a pair of spectacles. His plan had been to take a model of the face in plaster, and have the nose modelled in wax and vulcanized, then hollowed out considerably. Before vulcanizing, small points of gold were inserted on either side of the bridge. These were tapped, a screw was introduced and fastened on to the pair of spectacles, and so the whole apparatus was held in place. At present the nose was painted with oil paint, and when it was dry he destroyed the glaze by means of a powder, but he hoped later on to arrive at some kind of enamelling which would bear all the washing and wear without destroying the colour. Models of the nose were exhibited.

Mr. ROBERT H. WOODHOUSE showed a model of a case of fracture of the bicuspid region as a result of a blow on the chin. The patient was a boy, aged 14, who, in playing football, was violently struck on the chin by the head of another boy. The bicuspid on the right side of the mouth was fractured and the inner cusps knocked off, while the left bicuspid was completely fractured through the pulp chamber. The boy suffered a great deal of inconvenience

for a few days, and then the teeth were removed. The curious point was, that notwithstanding the severity of the blow, a week after the accident there was no trace of it on the face.

Mr. C. F. RILOT also narrated a case of football accident, the patient being a gentleman, aged 30, a member of the International Team. He had received a kick in the mouth while playing, and on examination the two upper central incisors were found to be loose, elongated, and leaning somewhat inwards. The teeth were extracted, the coronal portion coming away quite distinct from the apical portion. In each case distinct evidence of absorption could be traced in the fragments, the apical portion of the pulp being expanded into a large fleshy mass. The patient volunteered the remark that he had an exactly similar accident two years before The teeth had been painful for a time, but that passed off, and beyond a slight elongation they had been quite right until the second accident. It was evident from the specimens that the fracture must have occurred on the occasion of the first accident, and the interest of the case lay in the fact that the teeth should have been perfectly comfortable for two years under these conditions.

Mr. CHARLES S. TOMES in delivering his paper—"Notes upon Enamel and Dentine," referred very little to his MS., preferring to give its substance, somewhat in colloquial form, leaving the full paper to be studied from the "Transactions of the Odontological Society," in which it will appear. The following report adopts the form in which the paper was delivered, as far as possible :—

Some notes that are omitted in this paper have been more or less published elsewhere—not very fully. With respect to part of the subject, viz., that dealing in detail with the chemistry of enamel, as it has been contributed to the *Journal of Physiology*, it will first appear in that journal.

"What set me to work on the question of the chemical nature of enamel and dentine was reading the series of papers published in the *Dental Cosmos* by Dr. Black, to the experiments for which an enormous amount of trouble has been devoted by him. The results are most interesting, but they are open to criticism in some respects. I do not want to go here fully into the points in which I think his experiments might be improved.

"Whilst embarking on the chemical portion of his subject, Dr. Black had neglected some precautions, well known to chemists,

which somewhat invalidated his results But he not only has published results giving decimal places, which far transcend the possibility of any experimental accuracy, but has also built deductions upon these. Still I have the greatest admiration for the work he has done. Dr. Black has unfortunately overlooked the work of Dr. Galippe, who published a series of papers on this question, but dealing with it in a way not perfectly conclusive for our present purpose, as he used entire teeth instead of separated enamel and dentine.

"The principal points are these—we have all of us been familiar with the fact that there are bad teeth and good teeth. Some decay so that we are able to save them with some certainty, others are difficult to save. It has been thought that these bad teeth were, like ricketty bones, deficient in lime salts. Dr. Black's method was to cut thin slices taken from the necks of the teeth, which, therefore, contained but a small proportion of any other tissue than dentine, and to incinerate, or burn away, the organic matter. Dr. Black states that the poorest teeth he could get were not more deficient in lime salts than the good teeth. Now, these results seemed so remarkable, that I thought they wanted checking. Taking teeth from the same mouth and using jaws tolerably complete and tolerably free from caries, I drilled out all the dentine I could get without running the least risk of having any enamel or cementum in my turnings. These shavings of dentine were dried in a constant temperature oven for eight hours, afterwards they were weighed in a platina crucible, then burnt in a muffle, and then weighed again. The ash was then moistened with ammonium carbonate—in order to restore any carbonic acid which might have been driven off by ignition from the carbonates present—dried, and weighed again. The residue of course represented the lime salts. Taking a great number of experiments, I daresay over a hundred, the average of lime salts was 72·3 or thereabouts In these experiments the turnings remained from first to last in the crucible, so that there was no chance of loss, and the amount of dentine obtained from each tooth was about twice as much as the quantity experimented on by Dr. Black, this, of course, again tending to diminish error. Then taking teeth from the same mouth with the view of checking some of Dr. Black's results, I found in one denture that the percentages of lime salts in teeth of poor quality ranged somewhat lower than those of good quality, still the difference is not great, being only about one

per cent. Again, Dr. Black says that teeth on the opposite sides of the mouth differ, that is to say, the central incisor on one side of the mouth differs as to percentage of lime salts with the central incisor on the other side. I tried this, and though I did find differences, they were so very small that anyone knowing anything of quantitative analysis would not build any theory upon them. It is well established amongst chemists that small differences to decimal points in analysis can only be relied upon when they constantly appear in a large number of experiments.

"I should say that in Dr. Black's experiments he introduced a tremendous source of experimental error by removing his block of dentine from the vessel where it had been calcined. It should never have been touched from the time it was first weighed to when last weighed, but you may rely upon Dr. Black's figures so far as the integrals are concerned. Well, then, there is another point which I have found quite constant, viz., a higher percentage of lime salts in the dentine of molars and bicuspids than in that of the incisors and canines. That, you will see again, is not conducive to our believing that the amount of calcification determines whether there is to be caries or no caries—all these figures relate to dentine simply; they do not include the enamel nor the cementum. Finding this to be a constant thing I went back to Dr. Black's figures, and I found that, having separated out his molars and canines, the same difference was apparent. Then I was rather curious, having discovered this, to see if it extended to other examples. I have not had time to carry out much in this direction, but I thought I would take the elephant, the ivory of whose tusk we know contains only 57 per cent. of salts—a low percentage; but the dentine of the molar I discovered to come almost up to the usual mammalian proportion of 70 per cent. Well, I think that is as much detail as I need give on that point; it is set forth in greater detail in the paper, but that is roughly the main feature of it. Then the rest of my investigation into dentine had relation to something which does not appear in any of the ordinary published analyses, that is, water. If we get from a piece of dentine 72 per cent. of salts, chemists have been in the habit of setting down 28 per cent. as organic matter, but if you set about it the other way you find you come very far short of that 28 per cent. Taking a human tooth, decalcifying it, washing it till free from acid, and drying it, I find the organic residue left is, instead of 28, only

19 per cent., and the rest is mostly water, as you can very easily demonstrate. Of course all these experiments were performed on dried dentine, namely, that which has been kept in a temperature of 112 for several hours. Well then, we have in dentine 9 per cent. of water, 72 lime salts, and the remainder organic matter. As one knows pretty exactly what the amount of calcium phosphate is, so one knows what the amount of water in chemical combination with it ought to be, but it never is what it ought to be. In dentine we find this amount, 9 per cent. of water is rather more than two equivalents of water, so that the salt would be $Ca_3P_2O_8(2H_2O)$. You may take it as quite certain that the calcium phosphate contains at least 1 per cent. of water which it will not give up short of red heat. Having got so far, and it is a somewhat important matter—this presence of water in chemical combination—it seems quite possible that the difference between the bad and the good teeth may have to do with the combined water of crystallization—it may be so, on the other hand, it may having nothing to do with it. Then of course the difference between the bad and good teeth may lie in the enamel, it may have nothing to do with the dentine, but the one thing to which I wish chiefly to call your attention is that there is a large amount of water in dentine ; water which cannot be dried out ; water which is in chemical combination with the calcium phosphate."

Mr. Tomes, continuing, said he next turned his attention to the question of enamel, and carried out a series of experiments to ascertain what the nature of the organic matter in enamel is. He was exceedingly surprised to find that enamel is practically an inorganic tissue. The small percentage which has usually been set down as organic matter being in fact mainly water. The amount of organic matter was too small for quantitative estimation. Having arrived at this conclusion, Mr. Tomes was met with the problem—If enamel contains no organic matter, how does it come by its structure? and in this direction it occured to him to make comparison of enamel with the prismatic structure of pinna shells, which, after decalcification, though leaving a considerable mass of organic matter as to size, have only 1 per cent. of the weight of the fresh dried shell. The pinna shell consists, as to weight, of crystalline prisms of calcic carbonate, containing no organic matter in themselves, but deposited in a honeycomb of connective tissue. Mr. Tomes is of opinion that it is quite conceivable that the lime salts in enamel may be deposited

similarly in the interior of the enamel cells, their exceedingly delicate walls playing the same part as the connective tissue honeycomb in the pinna shell, and the comparative absence of organic matter in the finished product, he thinks, may be due to the exceeding tenuity of these walls, as well as to the absence of organic matter from the prisms themselves, which are purely crystalline. The incineration of enamel alters its structure but little; after being brought to a bright red heat the prisms, though they show a slight granularity, retain their form and size. Mr. Tomes, as will be noticed, in the course of his investigations, thus found himself at issue with Heitzman and Bödecker.

Mr. Tomes proposed to carry on his investigations and ascertain if there is greater difference between the enamel of good and bad teeth than between the dentine of good and bad teeth, and thinks it possible that the difference may lie principally to the former, though this is only conjecture.

The paper was illustrated by very beautiful lantern slides, some of them lent by Mr. Leon Williams, and others the work of Mr. Howard Mummery, to both of whom Mr. Tomes expressed his indebtedness.

Mr. Leon Williams, invited by the President, said he really did not expect to be called upon to say anything, and was hardly in the frame of mind to express a critical opinion. He believed Mr. Tomes's analyses of dentine and enamel were the most careful and critical that had ever been made. It was a great satisfaction to him to be able to say so, because it always gave a little tingle of delight to be able to say "I told you so," he believed he had been on record a number of times during the past fifteen years as confirming the position which Mr. Tomes was now able to take up. Some of the members would undoubtedly remember the controversy he (Mr. Williams) had in New York with Heitzmann and Bödecker on that point. For a long time he stood almost alone in criticising what he regarded as the very unwarrantable claims made by some with regard to organic matter in enamel. The result of the analyses before them opened up a very wide field for investigation, and it would certainly be necessary to modify very much the views that had been held with respect to the causes of decay in teeth, and these analyses were in line with the conclusions and observations of Dr. Miller, who said that they should look for these causes very much more to the environment of the teeth than to their inherent

structure. It would be regarded doubtless as a very heterodox statement, but, in his judgment, the worst formed teeth, as to inherent structure, in a perfectly healthy mouth would never decay, while in an unhealthy mouth the most perfectly formed teeth would never be able to resist decay ; and yet it seemed to him that that was the position they had to come to. If they might take that as the conclusion that had been reached, it had a very direct and practical bearing on the treatment of decay of the teeth.

Mr. GOADY had been very much interested in the paper, the more so as he had himself been working on the structure of dentine. The point of chief interest that he had arrived at in his investigations was that in caries the microorganisms were always in lines in front of the caries, and that elastin was capable of being broken up by micro-organisms into mylo-acetic acid ; so that they had from the micro-organisms, given elastin, an acid produced apart from the natural production of acid in the mouth. He had isolated a few micro-organisms from teeth and got a reaction, showing probably that there was mylo-acetic acid present.

Mr. J. HOWARD MUMMERY said the paper was one of great interest. As regards the structure of enamel, it possibly indicated that the enamel was formed by secretion and not formed in the cells. The secretion view which was held by many as to dentine, and Mr. Tomes' discovery, did not seem to quite upset the secretion view. Of course, the point about the molars being more fully calcified than the other teeth was a matter of great interest, and was very surprising considering all the conditions of the mouth.

Mr. C. S. TOMES in reply, said he was exceedingly interested to hear of the action of the bacteria upon elastin breaking it up into a mylo-acid, because, knowing how exceedingly resistant a substance elastin was to weak acid, it had always been difficult to understand exactly how it did get dissolved, and Dr. Miller accounted for it by a peptonizing action on the part of some of the bacteria.

He had omitted in his previous remarks to mention the bearing of his paper upon the formation of enamel which had been touched upon by Mr. Mummery, viz., as to whether it was a conversion or a secretion. Supposing his (Mr. Tomes') guess to be correct that the calcium phosphate was deposited inside the enamel cells, it still might be regarded either as a secretion or a conversion.

The usual vote of thanks terminated the meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING, held Monday, February 10th, the President, Mr. J. F. COLYER in the chair.

The minutes of the previous meeting were read and confirmed.

On casual communications being called for :—

Mr. DOUGLAS said : I have here an interesting specimen of some rarity, viz., a salivary calculus, about the size of a bean, which was removed from the mouth of a man aged 40, by Mr. Dolamore, in the extracting room a few days ago. From the size of the swelling before, and the flow of blood after the operation, it was somewhat difficult to determine whether the calculus was embedded in Wharton's duct leading from the sub-maxillary, or in Bartolin's duct, which is the continuation of the union of one or more of the small ducts of Ravinus, which lead from the sub-lingual gland and join Wharton's duct just before it opens on to the floor of the mouth, by the side of the fraenum linguae.

However, the patient returned two days later, and on again examining the wound, also after a further examination of the specimen, I am inclined to believe that the calculus lay in the junction of the two ducts (Wharton's and Bartolin's) just before they opened into the mouth, and had caused that opening to be enlarged, and have two divisions as it entered the mouth.

This I conclude from the peculiar shape of the interior of the wound, which showed a clear impression of the position of the calculus, also from the appearance of the calculus itself, which you will notice has a large bell like opening at each end, with a canal extending along its whole length from one to the other.

The swelling in the patient's mouth was hard and of an india-rubber like feel, with distinct circumscribed area, very red and inflamed, and situate about half-an-inch from the anterior edge of the fraenum and close up to the border of the tongue.

All the history we can get is that the patient had noticed the swelling some three months ago, but that except occasional twinges, had not until lately had any pain with it.

The condition of patient's health is good ; his occupation, I believe, a stableman ; age 40. His teeth are short, dark yellow in colour, and his lower teeth have deposits of tartar of the hard variety, deep under the gums, but little appearing above the gum

level. This tartar is much discoloured by the use of tobacco. Several of the teeth were loose.

Salivary calculus, or tartar, as found round the teeth, is said to consist of the triple phosphates of ammonia, lime and magnesia, along with epithelial scales, *débris* of food, and frequently the leptothrix buccalis. This, however, is deposited from saliva flowing from the parotid, and small glands of the mouth, as well as the sub-maxillary and sub-lingual.

In the specimen before us we have to exclude the saliva of the parotid and small glands, as in all probability they have nothing to do with its formation. Whilst the parotid is known as a serous gland, the sub-maxillary principally, and the sub-lingual to a lesser extent, are known as mixed glands, *i.e.*, partly mucous and partly serous.

The secretions of these glands differ according to their construction ; serous glands, as the parotid, secreting a thin watery fluid, which is very poor in solids (only about 0·3 to 0·5 per cent.) and no mucin, whereas the mixed or mucous glands, as the sub-maxillary and sub-lingual, secrete a thick ropy viscid fluid named mucous, which in the case of the sub-maxillary contains from 2·1 to 2·5 per cent. of solids, and in the sub-lingual as much as 2·75 per cent. The special uses of these glands are well illustrated in different animals. In herbivorous animals, such as the cow and horse, the parotid being the predominant partner, as these animals require a large quantity of a thin watery saliva to assist in the mastication and deglutition of their rather dry food, whereas amongst the carnivora, such as the dog and cat, the sub-maxillary and sub-lingual glands take a more important place, and when one studies the ant-eater, one finds scarcely any parotid at all, but large sub-maxillary and sub-lingual glands.

Of the different solid constituents of mixed saliva, we find by far the larger part is made up of the salts of lime and magnesia, and of these the greater in quantity are the lime salts, viz., calcium carbonate and phosphate, and these I have shown are chiefly found in the sub-maxillary and sub-lingual saliva.

If the saliva contain large quantities of such salts, and if the secretions be augmented, as in iodine or mercurial salivation, the tartar is deposited with greater rapidity.

In order to start a deposit a nucleus is required. In the teeth

and gums such a nucleus is readily found, especially in mouths where the tooth-brush or other cleanser is an infrequent visitor. In such a position as a duct, however, the case is slightly different, as from the shape and size of the orifice food cannot get into them. I am therefore inclined to believe that if we could find the actual nucleus of a calculus from a duct we might find a minute quantity of dead epithelium or some such substance which had been caught by the wall of the duct when the flow of saliva was small, and had remained there, gradually collecting round itself more and more of the calcareous deposit. Sections of these salivary calculi are so difficult to make, and one runs such a great risk of utterly destroying one's whole specimen when even cutting it in half, that we can only speculate as to the probable and possible nucleus round which it has formed.

Castle says that occasionally tartar is deposited in the foramen, which serves for the transmission of the dental nerves, causing severe neuralgia. How it may come to be deposited there it is difficult to say, unless it may be after the periosteum has been stripped from the tooth adjacent to the foramen.

All authorities seem to agree that with the exception of caries nothing is so pernicious to a healthy condition of the mouth as the presence of tartar.

Salivary calculus in the duct, if neglected, may give rise to a considerable amount of suppuration, and possibly fistula.

Stricture of the duct may follow its being opened to remove a calculus. According to Walsham, should this occur, the duct must be divided transversely.

Mr. WOODHOUSE said a patient, a young man aged 28, came to the hospital to have a tooth extracted. On looking at him he noticed symmetrical swellings under each masseter muscle, about the size of a small walnut, situate about one inch above and anterior to the angle; the swelling on the right side being the larger. The patient said they had been there all his life, and were not growing. In his (Mr. Woodhouse's) opinion, these swellings were compact osteomata, or the ivory exostoses of other pathologists. He mentioned that the usual situations for them was on the temporal and mandibular bones, and that they were almost always single and not multiple.

The PRESIDENT said, that although not mentioned in books upon

surgery, the most common situation for these compact osteomata is on the inner side of the mandible, between the canine and first bicuspid.

Messrs. NOWEL and MILLER each said that they had one in that situation.

The PRESIDENT then called upon Mr. Heath for his paper upon "Honeycombed and Syphilitic Teeth" (see p. 107).

In the discussion which followed—

Dr. AUSTEN, after thanking Mr. Heath for his paper, drew attention to the lack of accurate knowledge on the subject. He showed how unsatisfactory was the information that the majority of parents gave, for although they might be certain that the child had taken teething powders, yet they generally were uncertain whether they contained mercury or not. He also stated that from personal experience, children were able to take more mercury comparatively than adults, and that if, by chance, excess of the drug was administered, they generally got rid of it either by vomiting or by the bowel. He urged a more thorough investigation of cases at the Lock Hospital, where a more accurate history in the treatment of congenital syphilis might be obtained.

Mr. F. J. BENNETT thanked Mr. Heath for the comprehensive and accurate nature of his paper, and said that a few years ago it had been his fortune to obtain about half-a-dozen jaws of children who had died of exanthematous fevers under the age of three. He had gone into a most careful investigation of them, but what with the difficulty of preparing such specimens and the scarcity of the material, he was somewhat disappointed with his results, and although, at the present moment, he was not in a position to state his theories, yet one fact he would tell us, namely, that in all the cases examined by him the stellate reticulum was considerably atrophied. He, therefore, thought that he was justified in drawing the conclusion that the stellate reticulum played a greater part in the formation of enamel than has been previously taught.

The PRESIDENT, after expressing his deep interest in Mr. Bennett's investigations, proposed a vote of thanks to Mr. Heath and those gentlemen who had brought forward casual communications.

He then read an introductory address.

The proceedings then terminated.

The next General Meeting will be held on Monday, March 9th, when Dr. Miller will read a paper on "Should Women be Dentists."

THE DENTAL RECORD, LONDON: MAR. 2, 1896.

UNSATISFACTORY BALANCE-SHEETS.

THIS is the season of the annual general meetings of the Governors of Hospitals, and, from a financial point of view, the reports, given at these meetings, are melancholy reading enough. Disappointed hopes and even actual deficits seem the order of the day. Birmingham is disappointed at the result of a special appeal, and Liverpool, Manchester and Brighton are each in debt to their treasurer for current expenses. Nor can we honestly say that the metropolitan hospitals are more fortunate, for, though it is probable that the forthcoming report of the London Dental Hospital will show no deficit in its working expenses, yet it is an open secret that the appeal for funds for rebuilding has not met with as generous and ready a response from the general public as was very reasonably expected. There is, however, some consolation in the fact that general hospitals are, for the most part, quite as badly supported as are dental hospitals. But, in the case of the former, the enormous expenditure needed by their ever increasing size is a plausible excuse for an insufficiency in funds which is lacking in that of the latter, whose moderate outlay stands in striking contrast to the amount of suffering to which they dispense relief. Dental hospitals doubtless suffer from their youth. The public, as yet, have but recently opened their eyes to the need of such, and their fingers are probably far too engaged in rubbing away the scales of sleep to find leisure to write cheques or to pay out guineas. But it is most satisfactory to find that the municipal head of the provincial towns we have mentioned, each appreciates fully the claim these hospitals have on the public purse, and, at any rate at Liverpool, his disinterested action in coming to the

meetings to plead this cause has already been of direct value. We may honestly say that the dental profession has done its level best to support these charities, which, except as schools, are of no direct value to them. This is a point we would emphasize, though it is one often missed by speakers. The appointment of a general surgeon or physician to a general hospital, at which students attend, is an almost necessary step to the attainment of private practice, on it to a large extent his future living depends. But this is not so with the appointment of a dental surgeon to a dental hospital, which may bring him professional status, but is of little pecuniary benefit. How much greater, therefore, is the public indebted to him for his services and for the very large proportion of the expenses of these hospitals which he actually provides. It may be said that his direct object is not so much the benefit of the charity as to help the school, and this may be true, but it should be remembered that though it would not be possible to separate the dental hospital from the dental school, it would be quite feasible to separate the school from the charity. Indeed, the needs of the charity are often an impediment to the teaching in the school. There are thinkers who would gladly see this separation, believing it to be desirable on teaching grounds. But, whilst we admit a divergence of opinion, though we cannot now argue the matter, yet we would repeat that the very possibility of this step increases the obligation of the public to these charities. We could understand their denying the need of dental hospitals, though we might pity their ignorance, but this they do not do; no, the poor crowd the rooms of the hospitals, and the rich, on behalf of their needy dependants, importune subscribers for orders they should properly obtain by themselves becoming donors. Mr. Quinby rightly urged at Liverpool that the students' fees are not paid to support the charity, but to provide teachers and teaching material; for though, on the one hand, we might admit that it would be but fair for the school to pay rent for such rooms as are used

purely for school purposes, yet on the other we claim that this is more than covered by the gratuitous service rendered by the staff and students to the charity, to say nothing of the fact that the teachers and students, past and present, have *in every case* subscribed to the charity more than enough to cover both the building and the maintenance of these.

News and Notes.

LEWIS OSBORN, L.D.S., Eng., has been appointed Demonstrator of Operative Dental Surgery at the Liverpool Dental Hospital.

MR. F. GRAHAM YOUNG, L.D.S., has been appointed Dental Surgeon to the Bristol (old part) Lock Hospital.

MR. J. DENCER WHITTLES L.D.S, Eng., has been appointed Lecturer on Materia Medica and Practical Pharmacy to Mason College, Birmingham.

THE following gentlemen having passed the necessary examinations at the Royal College of Surgeons in Ireland have been admitted Licentiates in Dental Surgery of the College. Mr. William King Carew (Dublin), and Mr. John Alfred Pook (Norwich). The next examination is fixed to take place on Monday, May 11th, 1896.

THE Annual Meeting of British Dental Association will be held in London on the 12th, 13th, 14th and 15th of August next. It has been granted the use of the Examination Hall, Victoria Embankment, for the General Meeting. The Whitehall suite of rooms of the Hotel Métropôle have been secured as General Head quarters.

WE are glad to notice that the Liverpool Dental Hospital has received the following donations, Lord Derby (the Lord Mayor), £50; Mr. Alfred Booth, £25; and Mr. E. J. M. Phillips, £25, a welcome answer to the appeal published in another page.

At a meeting of the Southern Counties Branch of the British Dental Association, held at Beckenham, on January 26th, the Hon. Sec. read a letter he had received from the Hon. Sec. of the British Dental Association relating to the alteration of Bye-laws 15 and 18. After some discussion Mr. J. F. Colyer proposed, and *Mr. H. Beadnell-Gill* seconded, the following resolution, viz., "That this Branch *is satisfied with the Bye-laws as they now stand.*" Carried *nem. con.* At the Meeting of the Metropolitan Branch, held on January 30th, at Leicester Square, a discussion took place upon a communication received from the Representative Board inviting the opinion of the Branch as to Bye-laws 15 and 18 of the Association, and the following, proposed by *Mr. H. B. Gill*, seconded by Mr. J. N. Baxter, was carried :—"That in the opinion of this Branch *some alteration is necessary in Bye-law* 15, empowering each Branch to send up two representatives to the Board, not necessarily being the President and Secretary of the Branch for the time being." Are there two Mr. H. B. Gills, or is this a case of Dr. Jekyl and Mr. Hyde?

In the Report of the Brighton Dental Hospital, presented at the annual meeting on January 31st, the Committee of Managment said that at the end of 1887, when the Dental Hospital had been in existence a year and a half, over 2,000 patients had been received; whilst in 1895 the number of cases treated amounted to 3,053, the largest number yet admitted in any one year. A very large proportion of patients were children under 14 years of age, a class of patients who would derive the greatest future benefit. Last year they numbered 987. It was a matter of regret, however, that an appeal for increased subscriptions was necessary. The deficit now amounted to £26 5s. 5d., and the committee had to deplore that the Hospital Saturday Fund yielded last year only £20 to the Institution, or just half of what it did in 1894. The receipts had been £198 9s. 8d., including cash advances by the Treasurer and Secretary of £34 12s. 5d.; subscriptions, £69 15s. 3d.; Hospital Saturday Fund, £20; and Hospital Sunday Fund, £20 17s. 2d. The expenditure had been £190 2s. 8d., leaving a balance at the bank of £8 7s., which, deducted from the sum due to the Treasurer and Secretary, left a deficit of £26 5s. 5d The chair was occupied by the President of the Institution, Alderman Sir Joseph Ewart, M.D., J.P., who moved the adoption of the

report, and remarked with satisfaction upon the great increase in the usefulness of the Institution. In several of the institutions in the town there could, he thought, be no question that relief was, to a certain extent, abused. It was, however, satisfactory to know that no such abuse could take place at that Institution, where careful supervision as to the recipients was exercised. He regretted the presence of a deficit in the hospital accounts, considering it was the only Dental Hospital south of London, he thought the circumstance was not very creditable to those who should support them.

The twelfth annual meeting of the governors and patrons of the Victoria Dental Hospital, Manchester, was held at the Hospital, Devonshire Street, All Saints', on February 14th. Mr. W. A. Copinger was in the chair. The number of patients, although fluctuating slightly from year to year, continues to maintain its average; and the fact that 126,308 persons have been treated, and 158,581 operations performed, is a proof that the work of the Institution is held at its proper value. The committee appeal again most earnestly to the public for support. The hospital is largely in debt to the treasurer on its current account. The Chairman moved the adoption of the report, and expressed his regret that the hospital, which was doing most satisfactory work, did not receive more support from the public. Mr. W. Headridge seconded the motion, and the report was adopted unanimously.

It will interest old students of the Charing Cross Hospital to learn that the authorities do not propose to re-let Toole's Theatre, which is the property of the Hospital. Though desirable—on the ground of safety from fire—the Hospital can ill afford the loss of rent—£1,000 per annum—especially as during each of the last two years there has been a deficit, about £4,000. At the annual meeting, held on February 19th, the chairman stated they had practically realised all their available securities. With regard to the suggestion that the only remedy for its hopeless financial position was to remove the hospital to Camberwell, he said the associations of the Institution were so bound up with the neighbourhood that Charing Cross could not do without its hospital.

In the *Guy's Hospital Gazette* Mr. Newland-Pedley gives a case of a buried temporary molar. A lady, aged 29, consulted him about an acute alveolar abscess on the right side of her lower jaw, which, between the cheek and the first molar, discharged foul pus on pressure. The lower teeth were translucent, free from caries, and devoid of the discolouration which is likely to ensue upon death of the tooth-pulp. The second bicuspid was missing, and the crown of the first molar had tilted forward until it met the first bicuspid. It seems as if the crown of the missing bicuspid had been lost years ago, and that its root remained buried between the contiguous teeth. A similar abscess had formed in the same position six years previously, and had recurred two years ago. Palliative measures were tried, but on December 26th Mr. Pedley removed the first molar. The tooth had a living pulp, and the roots were free from visible pathological changes. Next day the crown of the second temporary molar was removed by the patient from the site of the operation. The crown of the tooth was well formed, but the roots had been entirely absorbed, leaving the eroded surface which is commonly found in the milk teeth during dentition. The abscess gradually subsided. Mr. Pedley thinks there is just a chance that the second bicuspid may even yet erupt and take its proper position in the arch, though he could not detect it on probing the socket.

M. S. Broussilowsy, writing in *L'Odontolgie*, says :—"I passed last season in Crimea, the population being composed of Tartars, Karaimes and Tziganes, whose manners and customs are in a primitive state. According to their religion, the Tartars must consult the doctors ; but, will admit as an exception exterior treatment such as massage, friction, &c. Naturally the dentist is unknown to them ; nevertheless I was astonished to see such fine teeth. Whilst collecting professional information, I observed a habit, especially among women, of chewing a white substance. This was an interesting fact. The substance was 'gum mastich' ; an addition of white wax gave it a slimy consistence. This fact is also observed in Siberia, but here, according to Faimenoff, the substance chewed is a kind of mastic and tar. All Siberian women, from the age of two years, indulge in the habit of using this mastic. The result of

masticating this substance will cause development of the teeth, and cleanse them as if by using a dentrifice. A proof of the effects of this chewing, is that dental caries is of rare occurrence in childhood and in youth, except in institutions, where the children of the wealthy people live, who are forbidden to use this mastic, it being considered a vulgar habit."

THE DENTAL MANUFACTURING COMPANY point out to us that the reference to them, in our last issue, as agents for the sale of Ferropyrine and Chinosol was open to a misinterpretation. They supply it *retail*, Mr. B. Kühn being the *sole wholesale* agent.

LIVERPOOL DENTAL HOSPITAL.

THE Annual Meeting of this Institution was held on January 31st, at the Town Hall, the Lord Mayor presiding.

The HONORARY SECRETARY read the 35th Annual Report, which stated that during the past year the number of patients treated at the Hospital had been 21,182, an increase as compared with the previous year. The patients' voluntary contributions had amounted to £85 2s. The Committee regretted that of the balance of £17 1s. 11d. remaining unprovided for in respect of the cost of the alterations and extensions, there remained £786 still to be provided. There was also a balance of £45 7s. 11d. due to the Honorary Treasurer on the working account, and the Institution was in urgent need of an increased subscription list. The Committee recorded with thanks donations to the general fund amounting to £3 10s. 6d., and to the alterations and extensions fund amounting to £61 4s., and they had further to thank the Liverpool Dramatic Company for the performance given in aid of the Hospital in April last, which resulted in the addition to its funds of £33 10s. The thanks of the Committee were due to the medical, surgical and dental staff for their valuable services during the past year, and to Mr. H. C. Quinby for his grant for school prizes.

The LORD MAYOR, in proposing the adoption of the report, remarked that he had constant evidence of the popularity of the Dental Hospital. People wrote to him for orders upon many

charitable institutions, and he did not think he was far from the mark in saying that those who applied for orders for the Dental Hospital were in number something like all the others put together. The individual ailments might not be serious, but collectively they represented a good deal. He looked with some anxiety to the adverse balance that seemed to attach to the Institution, but since last year the sum had been reduced, and, no doubt, there would be further reductions. In conclusion, his lordship said that he should be glad to contribute a sum of £50 to whatever fund the Committee might think well to apply it. (Applause.) He hoped that the Hospital would long continue its good work.

Mr. QUINBY, in seconding the proposition, said that when the many charitable people in Liverpool have learned more of what we do in philanthropic and educational work, we shall not have to appeal in vain to have our small debt paid off and our subscription list increased. Everyone who has suffered from bad teeth will be ready enough to admit that they are the cause of much misery and unhappiness; but only those who have made numan teeth and their functions a special study have realised how essential their preservation is to the health and vigour of body and mind. They play an extremely important part in the enjoyment of our food, as well as in the preparation of it for easy digestion and assimilation, so as to make it naturally and satisfactorily a part of ourselves. A dirty mouth gives nourishment and sustenance to every form of disease germs, because dirt and decay are what they thrive best upon; and what can be so dirty as a mouthful of decayed and dying teeth, with putrescent pulps and suppurating gums? How can any healthy function of body or mind be co-existent with such a state of things at the starting-point of nutrition? To nurse up and preserve a healthy set of teeth we must begin with the mothers, and teach them how to look after their children's first as well as their second, teeth; that the temporary teeth are intended to do service as masticators until the child is ten or eleven years old, and that there is no time in human life when good digestion is more important than to the growing child, who needs not only a constant supply of food, but every care to keep the teeth in condition to masticate it properly to meet the necessities of development. The great majority of mothers never teach cleanliness in the mouth, never practise it themselves, and the result is that the children's teeth very soon

reach that condition of decay and death which poisons the food before it reaches the stomach. This is far too often the case among the better classes in life, who have the means of learning better; and what can be expected of the very poor? All the work in the hospital is done in accordance with the advice of members of the staff or of the house surgeon. But the school greatly needs two or three demonstrators, with a small salary, to assist in the teaching, and the students' fees would amply suffice for their stipends if they were justly appropriated. The working of the hospital is wonderfully economical, and well it may be, for the honorary staff give their services, and the fees paid by the students for their teaching, instead of being, as the students naturally expect, entirely devoted to educational purposes, are equally divided between school expenses and the general expenses of the hospital, amounting in the last year to nearly one-quarter of the whole income of the latter. This is very unfair to the students, and should not be permitted by the people of this great city, whose struggling but respectable poor are treated at our hospital with a skill and care which are scarcely more than equalled in private practice. We earnestly commend the work of the hospital to the employers of young people, male and female, who are apprentices, learning to be the future artisans and tradesmen and women. Every one of these should be a liberal subscriber or a life governor to an institution like ours. Our school stands very high for the work it is doing, while its debt and expenses are very small compared to what is asked for and obtained in other large cities. We could clear ourselves from debt with £1,200, and an increase of £200 to our subscription list would make us quite happy. While one dental hospital in London is asking for £40,000 for new buiidings on a new site, and is earnestly begging for an increase to its subscription list, which is nearly eight times as much as ours already, another dental hospital in London has received a free gift from one generous donor of buildings specially erected for its purposes at a cost of £10,000; and a new dental hospital has recently been erected, in connection with one of the oldest general hospitals of London, at a very considerable expense, of which they do not give details. Manchester is asking for £10,000 for a new dental hospital, and Edinburgh is expending about £6,000 for a similar purpose. Our alterations and extension, which have given us one of the best equipped and most comfortable dental hospitals I

have ever seen, were completed at a cost of £1,250; and our whole income from all sources for the year 1894, which is the last report available at the time of writing, amounted to £364 6s. 5d.

The resolution was carried with applause.

The Rev. R. CUFFE proposed a vote of thanks to the president, chairman, committee, honorary treasurer, honorary auditor, and honorary secretary, for their services during the past year.

Mr. BRAKELE seconded the motion, which was duly carried.

Mr. W. L. JACKSON proposed that the Earl of Derby be elected president of the Institution for the coming year, that the committee be re-appointed, and that the hospital staff be re-appointed, with certain alterations.

Mr. G. WYNNE seconded the resolution.

The resolution having been carried, Sir JAMES POOLE asked the meeting to thank the Lord Mayor for presiding.

Lieutenant-Colonel NICHOLSON seconded the proposition, and remarked that many of the recruits that it was his duty to examine at Seaforth Barracks suffered greatly from the decay of the teeth and the Dental Hospital was a very useful institution to which to send them.

The proposition was carried with applause, and the Lord Mayor was further thanked for his generous donation, on the proposition of Mr. C. Birchall.

OPENING OF THE NEW DENTAL HOSPITAL OF IRELAND.

THE New Dental Hospital of Ireland was formally opened on February 17th at a public meeting held in the Conservation Room of the new building, Lincoln place. There was a large and fashionable attendance. The Right Hon. the Lord Mayor, accompanied by the Lady Mayoress, presided. On his right sat her Grace the Duchess of Abercorn, who has taken the deepest interest in the hospital. Of this her Grace has given many tokens, and that day she attended for the purpose of laying the corner-stone of the second block of the new building. The block now completed has cost nearly £4,000, and the second block is estimated to cost a similar sum.

The Right Hon. the Lord Mayor having taken the chair,

Dr. R. THEODORE STACK gave a short sketch of the movement

for a dental hospital in Dublin. The first dental hospital established in the United Kingdom was opened about the year 1858, in London, when it at once became apparent how useful to the poorer people this valuable institution was capable of becoming. In London now there are two large dental hospitals, and all the large hospitals in London have large and useful dental departments. Outside London no special dental hospital was started for about twenty years subsequent to the opening of the London Dental Hospital. Yet it was always in the minds of the dentists in each of the larger cities, that the moment they found the public ready to support them by building such a hospital they would feel it their duty to give their voluntary services to such an institution on behalf of the poor. It may be truly said, then, that the delay in starting a properly organised hospital has not been due to any unwillingness on the part of the dentists to give their charitable services to such an institution, but that it has been due to the slowness of the public mind in seeing the necessity for such an institution. The first great function of a dental hospital is to try and prevent decay of the teeth by taking it in the very earliest stage. The poorer classes, badly housed, and living on insufficient food, suffer terribly from the effects of badly decayed teeth. It is a matter of serious reflection among dentists in all the large cities—"Could we not in the first instance do away with this trouble altogether by careful attention to the teeth of children, or, at all events, if we could not do away with it altogether, could we not by an organised effort do something, and something very considerable, to eliminate at least this one item of hardship from the lives of the children of the poor?" When people have come to years of discretion it must lie with themselves how they have their teeth treated, or whether they will run the risk—the very serious risk — of some of those untoward results of neglect of teeth. But the young children have not this power of choice. If mothers could be brought to understand that an institution has been built by the charitable public for the arrest of decay in their children's teeth, they would welcome it as bringing within their reach very material advantage for their children. The conservation room is the only one of the apartments in this block of buildings that is at all of the proper, comfortable size for operating in, and it is impossible to develop the charitable work satisfactorily until the

block of buildings, of which the foundation stone is to be laid to-day, is completed. Between £5,000 and £6,000 more is wanted to take full advantage of the site. The public, seeing this organised effort of dentists to give their aid in the cause of charity, will not leave them without suitable buildings. If these buildings are once erected, the question of charitable dentistry for the poor will be practically solved, because once sufficient buildings have been erected, with numerous, properly-lighted operating rooms, the maintainence of such a hospital as this is a very small matter. In this city, where differences of religion often interfere with harmonious work, the members of this staff, Catholic and Protestant, work most harmoniously together. This union and cohesion is not a matter of a day or a year, but gradual growth and development during the past sixteen or seventeen years. This matured organisation is now offered to the public to take advantage of as one of the greatest factors of the capital resources of this institution. Dr. Stack concluded by saying :—"You, dear madam, our gracious duchess, have done your part nobly. You spared neither time nor energy in promoting our cause to the Venetian Fête, and here we have this building brought so far from the fund then realised—close on £3,000. That this money has been judiciously laid out, that the hospital has been solidly built, and built of good materials, you have the best evidence we can give, for it not only has been subject to the approval of our own architect, but also every portion of it has been superintended by our landlord's architect, so that the building has been put up in a solid and substantial manner. Apart from the great interest which your Grace gave to our Venetian Fête, you were able to hand over to the hospital, as a solid result of your exertions, a sum of £300. May we hope that some others of our wealthy people may follow this noble example. Truly, madam, after all this we can surely say that it is you who have laid the foundation stone of our hospital buildings. Without your great assistance we feel the that we should hardly have made any progress yet, and we feel now, with this building so far advanced, in a very different position from that which we occupied when we had no rallying spot worthy of our charitable cause. We are honoured, and it gives us the greatest pleasure to think that it is your hand which will lay the corner stone of our further building, thereby advancing in a most necessary way our charitable aims, and as long

as that stone shall endure engraven with your name, may all Irishmen remember with keen and vivid affection the enlightened interest and sympathy you have taken in our charitable work."

The annual report, which gave an account of the progress of the hospital from its foundation to the present time, and pointed out the necessity for its extension and development, was submitted.

THE PRESIDENT OF THE COLLEGE OF PHYSICIANS moved that the report be adopted. He said he could heartily congratulate Dr. Stack on the admirable address he had delivered on the advance of the institution. It was pleasant to be able to congratulate the friends, managers, and administrators of the institution on the advances which had been made in the construction of the new building, and, above all, in the advance that had taken place in dental surgery. Dental surgery had been placed in a more substantial and more useful position in the city of Dublin than it had hitherto occupied, and he (Dr. Grimshaw) felt especially pleased at this. They might permit him to say that in his early youth he had intended to make dental surgery his profession. He should like to notice that in the development—in nearly the final completion of that institution—they had completed the circle of medical charities in Dublin. It was the only link, he thought, that was wanting. He was glad to know that lady visitors to the poor could have there an opportunity of learning sufficient to enable them to see the serious consequences likely to arise to children in after, and even in early, life from bad teeth and to enable them to teach these people how to avoid the evils, which, no doubt, were very numerous indeed, from the early disease of the teeth. He believed himself that Dr. Stack had not in the least exaggerated—he thought he had rather under-estimated—the evils that arose from diseased teeth. He himself was pretty well satisfied that life might be very materially prolonged if everyone was brought through the period of youth with a sound set of teeth. An old friend of his used to say that dental surgeons, by artificial teeth alone, had tended to prolong life more than any other branch of the profession. He would not go so far as that. As Registrar-General he had learned that the average of life had been raised by the increased expectancy of life in the earlier half of life and not in the latter. Now, he thought that dental surgeons might claim a little of this. How much he did not venture to estimate, but he thought they might claim a share of it. That institution afforded many

educational advantages to the medical profession It was advantageous to have the work connected with dental surgery concentrated in one centre, where pupils might attend and learn the treatment of diseases of the teeth and matters connected therewith. This was a subject that had been very much neglected—the teaching of dental surgery—in the early days of medicine and surgery, although it was mentioned very long ago, but to have a systematic method of teaching was a matter of great importance, and that could only be provided at such an institution as they were now assembled in. His father was the first regularly constituted lecturer in this city on this subject, and he could not help congratulating them on the progress they had made in recent times.

Dr. JAMES LITTLE, in seconding the resolution, said he was not naturally enthusiastic, but he must say that anyone who had come in contact with Dr. Stack, and had seen the self-denying enthusiasm with which he had approached the subject of this hospital, and the perseverance with which he had contended against all difficulties, could hardly fail to have caught up some of the enthusiasm with which he had worked up the establishment of this dental hospital. A great number of nervous ailments from which young people suffered were connected with the teeth. He was quite sure that headaches and an incapacity for study were very often dependent upon troubles which the dental surgeon could remove. It was stated in a novel by Sir George Cornewall Lewis that the first necessity of every being was that he should be a good animal. Certainly the sufferings resulting from neuralgia and other ailments of that sort placed them in a bad position for fighting the battle of life. Want of teeth injured the digestive organs. Whatever might be said of the want of nobility in the man who lives to eat, it was absolutely necessary that they should all eat to live. It had been said that the happiness of life depended not so much upon the great things as upon the small, and although he could not speak with any personal knowledge of the misery of a toothache yet he was sure that it took much from the pleasures of life. Those who knew what suffering was, knew that ill-health spoils the temper, disappoints engagements, and goes a long way to destroy the happiness of life. The staff of that hospital would in his opinion, deserve well of the public if they assisted in lessening what were sometimes spoken of as small miseries.

The resolution was adopted.

Sir THORNLEY STOKER (President of the College of Surgeons) moved "That the Dental Hospital is worthy of support." As the present representative of surgery in Ireland, he could say that this hospital was not only doing a great and humane service among the poor, but it was forwarding the cause of dental education in a way that was particularly necessary in this country. Until this hospital was founded there was no systematic instruction in dentistry possible except what students obtained at the hands of private practitioners. It was of the utmost importance that the public should interest themselves in a work of this kind, which should not be left to private enterprise. He could say that it had been of great service to a class of persons above the extreme poor—he referred to the poorer shopkeeping class, clerks with small incomes, and seamstresses, &c. Further, he was aware that in many cases it had supplied appliances at small cost, and in some cases at no cost at all, where the recipients were unable to pay for them. The fact that it had so many friends was in itself satisfactory evidence that the public thought it worthy of support, and that they would always be forthcoming when support of a practical character was wanted.

Count NOBLE PLUNKETT seconded the resolution in the absence of Alderman Dillon. He performed that duty very heartily, and as the first layman that had spoken he might be allowed to express the strong feeling of the public, both as to the need of the hospital and the admirable manner in which the work had been carried on under trying circumstances for many years. He joined in the hope that the public would contribute such means as the new building and the maintainance of the whole institution, as an institution, called for.

The resolution was unanimously adopted.

Mr. W. BOOTH PEARSALL moved "That the best thanks of the meeting be given to her Grace the Duchess of Abercorn for her attendance that day."

Dr. FITZGIBBON seconded the vote of thanks. He said it was about eight years since he had the honour of being on the same platform with her Grace at a meeting on behalf of the Dublin Dental Hospital. At that period the institution was in its infancy. It had no place of its own in which to hold that meeting, and he, as President of the College of Surgeons that year, had the privilege of being able to place a room in the College of Surgeons at the disposal

of the Committee of the Dental Hospital in which to hold the meeting. Her Grace very kindly presided, and that meeting was, he believed, the first impulse which was given to the public of joining in raising money, which had developed into the establishment of this new and promising hospital. He knew from his connection with the Post Office that the employees there received great benefit from that institution. The Post Office sorters, postmen, telegraphists, and telegraph messengers were included in that statement. No one that was not connected with such a department could realise the trials that men had to go through in delivering the citizens' letters in the early morning and late at night, and if they added to the hardship of the work the fact that they often had to go out suffering from toothache, they would hardly be surprised that their letters would sometimes be late.

The resolution was put and carried amid applause, and the Lord Mayor conveyed its terms to her Grace.

The second chair having been taken by Mr. Pollock,

On the motion of Dr. Baker, seconded by Mr. Corbett, jun., a cordial vote of thanks was passed to the Lord Mayor for presiding.

The Lord Mayor, in acknowledging the compliment, tendered to her Grace the Duchess of Abercorn on behalf of the citizens of Dublin, their sincere thanks for the continuous and substantial patronage which she had bestowed on the hospital. The necessity for a hospital of the kind was unfortunately too long unrecognised, and now that they had got it they should see that its effectiveness would not be limited or restricted by apathy or neglect.

The meeting then terminated.

Subsequently the Duchess of Abercorn laid the corner-stone of the additional new wing in the presence of a large assembly. The silver trowel which she used on the occasion was presented by the contractor, Mr. Good, and it bore the following inscription—"With this trowel the corner-stone of the Dental Hospital was laid by Mary, Duchess of Abercorn, February 17th, 1896."

The following is the inscription on the corner-stone :—"This stone was here placed by Mary, Duchess of Abercorn, on the 17th day of February, 1896 ; on which occasion also this Dental Hospital was declared open by the Right Hon. R. F. M'Coy, Lord Mayor of Dublin."

Abstracts and Selections.

THE ACTION OF ANÆSTHETICS ON ISOLATED NERVE.

By Dr. A. D. Waller, F.R.S.

The paper read by Dr. Waller, at the Meeting of the St. Mary's Hospital Medical Society, on November 6th, was, as he explained, a resumé of some results obtained in one branch of the wide subject upon which he is working, viz., the influence of reagents upon isolated nerve; nerve being here considered chiefly as excitable living matter, as a strand of protoplasm easily modifiable by the action of reagents, whether in the form of gas or liquid, and capable of expressing the most delicate of those modifications by a corresponding change of electrical state. These electrical changes are demonstrated by means of Thomson's reflecting galvanometer, the deflections of which are photographed on a slowly moving sensitive plate. A word must be said as to the choice of nerve as the test tissue. There is first, immunity from fatigue effects; as the researches of Wedensky, Bowditch, and Waller have shown, nerve is practically inexhaustible. Then as to responsiveness. Chemical and thermic evidence of metabolism in nerve is entirely wanting, the one objective sign and measure of activity, obtainable on stimulating a nerve by an induction shock, is that electrical change, called by Du Bois Reymond the negative variation of the current of rest. How direct and simple an expression of nerve change the negative variation is Dr. Waller had already learnt in previous researches. He has shown (*Brain*, 1895) that in nerve, contrary to what obtains in muscle, stimulus and response, cause and effect are proportional, the curve expressing their relation to one another being a straight line. In the use of reagents, the extreme sensibility of nerve to even very small quantities of, for instance, such a gas as carbon dioxide, and the regularity of the effects produced, would be barely credible without the evidence of the galvanographic records.

The greater number of plates shown were records of the effect upon nerve of carbon dioxide, ether, and chloroform respectively, and in some cases of combinations of these anæsthetics. The chief facts may be thus summarised :—

Carbon dioxide in small amount produces primary augmentation (expired air produces primary augmentation.)

Carbon dioxide in large amount produces primary abolition secondary augmentation.

A moderate amount of CO_2 gives rise to primary augmentation in conflict with diminution, followed by secondary augmentation.

Ether produces similar results; much ether gives primary and temporary abolition; the subsequent recovery is less prompt and complete, and secondary augmentation less regular and pronounced than in the case of CO_2.

Chloroform produces similar results as regards its primary effects; little chloroform gives augmentation, much chloroform gives abolition, and under the conditions of experiment adopted (vapour in full stream for one minute), there is little or no recovery, the abolition being final and absolute.

After a moderate amount of chloroform recovery occurs, but always less perfectly than after ether under similar conditions.

Using the term "anæsthetic" to characterise temporary abolition followed by perfect recovery, "toxic" to characterise perfect abolition of excitability, we have: carbon dioxide most anæsthetic and least toxic, ether more anæsthetic than toxic, chloroform more toxic than anæsthetic. An isolated nerve is most certainly and safely anæsthetised by CO_2, less certainly and safely by ether, least certainly and safely by chloroform. It is most easily killed by chloroform, less easily by ether, less easily by CO_2.

The striking facts brought out by these experiments is the superiority of ether over chloroform where recovery of the nerve excitability is desired. Records of the mixture of chloroform and CO_2 show that CO_2 diminishes the toxic action of chloroform, giving an effect very similar to that of ether. Results of experiments with other ethereal substances were also shown.

Not the least interesting of the records was that of an experiment demonstrative of the production of carbon dioxide in the nerve itself in consequence of its action. Long observation of the effect of carbon dioxide in augmenting nerve excitability had given the clue to a curious puzzle with regard to the nerves. In the earlier experiments, when a frog was killed, one sciatic was removed for use while the other was left intact until required. It was noticed that the second nerve was usually more excitable that the first, and when, as

sometimes happened, a nerve was left in the body all night, the negative variation was often an extremely large though a declining one. The explanation suggested itself that this phenomenon must be due to the action of carbon dioxide produced by the tissues surrounding the nerve, and this led on to the question whether there was evolution of carbon dioxide in the nerve tissue itself, and if so, whether by prolonged action its presence would not be manifested by an augmented negative variation.

Before trying the experiment a drawing was made upon the blackboard showing what the galvano-graphic tracing should be, supposing that the surmise proved correct. Five or six normal deflections were to be registered, and the tetanising current was then to be kept on for five minutes; at the end of this long stimulation the deflections ought to show a rise above the normal followed by a gradual decline. The two plates which Dr. Waller showed in the lantern, the one of his own forecast and the other of the galvano-graphic record of the experiment itself, were most striking in their close resemblance.—*St. Mary's Gazette.*

Obituary.

From the February issue of the *Dominion Dental Journal* we learn that Mr. Charles James Fox died on the 4th of January, from an overdose of chloroform, in Gravenhurst, Ont., in his 66th year. "Owing to some trouble in England," says this journal, "he gave up a lucrative practice in the West-end of London and came to Canada with his son and took up a free grant of land in the township of Wood, trying his hand at farming; but his skill as a dentist becoming known, his services were sought after by a large number of people in the town, which ultimately necessitated his removal to Gravenhurst. Only a short time ago he bought a property which he named after the old family residence in London, 'Holland House.' It was largely by his efforts that the profession became a corporate body in England. He received a testimonial signed by all the leading dentists in Great Britain, accompanied with a purse of one hundred guineas. As editor of the *British Journal of Dental Science*, his name was associated with the contest against quack advertising, as well as many various reforms. Last winter his wife

died from an overdose of chloroform which she took to relieve severe neuralgic pain." Mr. Fox was one of those most actively engaged in battle for reform of the dental profession some thirty or forty years ago. He came of a family of medical practitioners, and although he did not himself take a medical qualification till some years after he had been in practice, yet he was one of the first to take the L.D.S. diploma in the year of its inauguration, 1860. Mr. Fox was a man of independent mind; one taking a strong view of questions, and striving earnestly for that end. Such ideas almost necessarily brought him into controversy with some of his professional brethren, but all readily concede that their difference were those of means not of the ends they had in view. Mr. Fox was a member and official of the now defunct College of Dentists, but he joined the Odontological Society on its formation, and was secretary for some years. He was for many years editor, and for some time proprietor, of the *British Journal of Dental Science*. When Assistant Dental Surgeons were added to the staff of the Dental Hospital of London, Mr. Fox was appointed, becoming full Dental Surgeon in due course. He was also Dental Surgeon to the Great Northern Hospital from its foundation in 1856. We cannot but regret the death of Mr. Fox, removing, as it does, another of those links which connect us with the past, and one who was foremost in the battle of reform.

We regret to announce that John Turner, L.D.S., one of Edinburgh's most promising practitioners, died at his residence on Thursday, February 13th, aged 35, after a lingering illness. Mr. Turner was one of the founders of the Edinburgh Dental Students' Society, being early elected on the Council. He was Secretary in 1889-90, then Vice-President, and finally President during 1890-91. He was also an Assistant Surgeon to the Dental Hospital, where his thorough practical knowledge, and his conscientious work, found recognition by all who had the pleasure of his acquaintance. Mr. Turner was earnest in his convictions, and faithful to his friends, and the profession mourns one who faithfully worked in its best interests. The Students' Society, by the hand of its President, placed a wreath on his last resting place as a tribute to his great worth, and as a mark of their esteem.

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Original Communications.

NOTES ON THE TREATMENT AND FILLING OF TEETH.

By W. CASS GRAYSTON, L.D.S.

(*Continued from page* 107.)

It is sold to the dentist in cakes of $\frac{1}{8}$ oz. each, and of 3 degrees of density. No. 1 being the lightest in regard to its bulk, No. 3 the densest, and No. 2 intermediate. No. 1 is the form generally preferred, and which I have found the most satisfactory. It works softer and more easily than the other two numbers. It is best prepared for use by holding the cake lightly with one hand (protecting it if desired from actual contact with the fingers by holding it with the thin paper in which it is wrapped) while with the other small pieces are torn or dragged from the cake with foil carriers. By this means, if the foil carriers are handled lightly, there is practically no compression of the particles of gold, and it is in the best condition to work satisfactorily. Some operators pin the cake to a piece of wood by running needles through it, and tease out pieces with two other needles set in handles; others cut up the cake with a razor into suitable blocks or pellets. A rotary knife in the engine has also been employed. Small or large pieces may be used, but each piece must be small enough to place in the desired position without any squeezing through the orifice of the cavity, or any compression that will in any way condense it before it receives the direct impact of the plugger point. Direct force is very important in working this gold. If it is necessary to use an instrument, the point of which is not in a line, or nearly in a line with its shaft, it is advisable to use hand pressure. A sliding blow, which may often be employed with advantage in working foil, is

inadmissible with crystal gold. It is a fascinating preparation to use ; it can in many cases be gradually worked into solidity by commencing with light pressure, almost patting it to place, and then gradually increasing the force until it is solid. Each piece must, however, be carefully and accurately solidified, with even more care than is necessary with foil. After using crystal gold exclusively for three years, and having also made numbers of experiments with it out of the mouth, I have come to the conclusion that in order to obtain the best results it is necessary to use a plugger with a small condensing surface. What is known as a retaining point plugger is about the size. This gold will pack down apparently satisfactorily if larger points are used, or if foot pluggers of moderate size are employed, but the filling will be wanting somewhat in solidity and adaptation, and the greatest possible solidity is necessary with this gold if it is desired to make what are known as fine fillings. When all the gold is packed as solidly as possib'e with fine points, the projecting gold of approximal cavities may with advantage be flattened and condensed down with foot pluggers, but their use in the interior of cavities is with this gold best avoided. No preparation of gold demands greater care, and conscientious and long continued application of condensing force, and this takes up a great deal of time. With foil, foot pluggers of moderate size may be used with advantage, and, if the gold is not too thick, excellent cohesion and solidity will result, while if a fine point is used (particularly with hand pressure) a greater weight of foil may be condensed at once than is possible with crystal gold, if equal results are to be obtained. Some operators claim that more rapid work can be done with crystal gold than with foil, and the directions in some of the books favour this idea. My experience is that all attempts to do rapid work by using either very large pieces or broad points result in imperfect work, and also that the directions often given to use a broad point at first and follow it with a fine one are misleading. Start with a fine flat point, either very finely serrated or smooth if a mallet is used, and finely serrated (to prevent slipping) if employing hand pressure, and never change it for a larger one until all the gold is packed. Use a mallet wherever a straight or nearly straight point can be used, and hand pressure in all other cases. The results obtained with this gold are excellent, providing it is worked in the above manner with great care.

Annealing Gold.—All gold that is to be used cohesively, whether foil or crystal gold, should be annealed before use. It can be heated just to a dull red without injury, and, in fact, if the greatest cohesion is desired, it is necessary to heat it to this point. The gold will, however, in many cases work more softly and easily if not so highly annealed (particularly if in the pellet form), and as something less than extreme cohesion is often desirable in order to secure ease of working and ready adaptability to the walls of cavities, many operators find it useful to anneal each piece of gold by passing it over or through the flame just before placing it in the cavity, and by this means to vary the cohesiveness as desired. Others, again, will anneal all the gold necessary for an operation before commencing it. Personally, if I am using thin tape, I prefer to anneal a considerable quantity at a time, and it can be made just red without in any way injuring its working qualities, while, when I am using pellets, particularly if dense, I prefer to anneal, and often to vary the heating as the work progresses.

Annealing can be done either with the naked flame of a spirit lamp or by placing the gold on a thin sheet of mica or platinum, and holding it over the flame. Either method gives good results. The balling up of cohesive gold so often alluded to is simply caused by its refusing to cohere. This may be due either to insufficient or excessive annealing (usually the latter) ; to the use of pluggers or pliers, the points of which are not clean ; to the use of a dirty spirit lamp ; to failure to thoroughly prevent moisture from getting to the filling ; or to want of skill on the part of the operator. Given a good make of gold and an operator of some experience who is careful in little things, it is rarely that a piece of gold will ball up. On the other hand, given a careless dentist, whose foil carriers are smeared with dried mastic varnish or chloropercha, the serrations of whose instruments are rusty or dirty, and who anneals his gold in the naked flame of a spirit lamp, the wick of which is thoroughly charred, or contaminated with the fumes of the matches in lighting it, &c., it is not to be wondered at if he finds the working of cohesive gold particularly difficult.

If tape is heated directly in the flame there is a risk of the part held by the foil carriers being imperfectly annealed. It is therefore always advisable to reanneal this part, holding the tape in another place. If thin tape is to be annealed in the flame, it is well to

prepare broad pieces about half an inch wide and from about one to two inches long, as may be convenient, and then after heating to cut these pieces into strips as narrow as desired. It is very difficult to pass a thin narrow strip through a flame with any certainty of its being evenly heated. When a sheet of mica or platinum is used, of course there is no difficulty. It is thought by some that cutting the tape into narrower strips after annealing will harden the edges and interfere with the proper working of the gold. I have never noticed that it makes any difference, and I usually anneal thin strips in this manner. The only trouble is, that the gold has a tendency to stick to the cutting edges of the scissors, but this is a very little matter. Some dentists, to avoid it, place the gold between sheets of thin paper, and cut through both paper and gold.

Combination of Non-cohesive and Cohesive Gold.—It is necessary in using cohesive gold to fix the first pieces in one or more pits or undercuts that have been made for this purpose in the dentine. It is not always easy to do this just in the most convenient place, and sometimes the dentine is sensitive, and as little cutting as possible is desired. A few pellets of non-cohesive gold can generally in these cases be wedged to place between the cavity walls, and a foundation easily made that with cohesive gold would have been difficult. In molars and bicuspids if there is any difficulty in making the non-cohesive gold stay in place, tin foil may be substituted with—as previously explained—very happy results. Cohesive gold will not cohere with non-cohesive—the film that has been deposited on the foil to make it non-cohesive prevents this. It is therefore necessary to make the union by forcing the one well into the other, using pluggers with very sharp and fairly long serrations, or by pressing pits or undercuts in the non-cohesive to hold the first pieces of the cohesive gold. Unless, however, the cohesive is thoroughly locked into the non-cohesive by means of undercuts, the union is not to be depended on solely for the retainage of the cohesive portion. This is not of much importance where the non-cohesive is only used to facilitate the starting of a filling, but many operators will fill from half to two-thirds of a cavity with non-cohesive and complete with cohesive, and here the importance of a good mechanical union is manifest. To drive cohesive gold into non-cohesive or to make pits and under-cuts in it is troublesome, and takes up time. I prefer therefore to use true non-cohesive foil annealed, or to make a

foundation of unannealed or very slightly annealed cohesive gold. With a little practice it is not difficult to wedge either of these golds to place, and the annealed cohesive (particularly if thin pieces are used) will at once stick to the foundation thus made, and the work proceeds "straight away" without any trouble. I would not, however, build out much and trust solely to this union if any great strain is likely to come on the filling. Using it as I do, principally to *start* fillings, I find it very convenient. If tin foil is used as a foundation it is desirable, and saves trouble, to use a gold that will at once readily *cohere* with it. Leslie's crystalline gold will do this. When the tin is covered with this gold, the filling can be completed with any form of cohesive gold that the operator prefers.*

Manipulating Cohesive Gold. Cohesive gold is packed to place and made solid by hand pressure or by mallet force, or by a combination of both.

When the cavity is accessible and a fairly straight plugger can be used, the necessary solidity can be better and more readily attained by a mallet. If thin tape is used the work can be fairly rapidly accomplished without any risk of jarring or injuring the tooth in any way, or causing the patient either pain or inconvenience. Occasionally a patient is met with who cannot endure the lightest tap of any mallet, but it is rarely a complaint will be made. I have frequently asked patients if the mallet was causing them any inconvenience, and the usual reply is "not the slightest." Whenever the cavity will admit of it, a *small* foot plugger will be found the most convenient mallet-instrument to use with foil (particularly if thin tape is used). If rather dense pellets or blocks are used, it is well to tack them to place with hand pluggers with sharp, deep serrations, and then to complete the condensation of each one with a mallet. Loosely rolled pellets can be packed entirely with mallet force if desired and the access will admit of it. Cavities that cannot be readily reached with a straight plugger should be filled with hand pressure, and in many cases the more difficult parts may be filled with the hand plugger and the filling then completed with the mallet. A denser filling will be made with a mallet than by hand pressure alone, unless a very long time is taken. It is, however, often unnecessary to obtain the greatest possible solidity all through the

* Solila gold also coheres with tin.

filling, and a hand-made filling with the last few layers condensed with a mallet can in many cases be made quite as rapidly, and in some more rapidly, and the appearance and wearing of the gold will be quite as satisfactory as if entirely made by mallet force. In using a mallet, either very finely serrated or smooth pluggers should be used (the latter being preferable with a fast striking mallet), with hand pressure, the instruments may be finely or deeply serrated or smooth. Deep serrations seem quite to have gone out of fashion, but rapid and good work can often be done with them, particularly if somewhat tightly rolled or dense pellets are used, and although the resulting condensation will be somewhat uneven, the cohesion produced is very strong, and the adaptation to the cavity walls is good. The surface of the filling, however, no matter how carefully it is smoothed and burnished, will, under the force of mastication, soon assume a pitted appearance. It is therefore advisable to use finely serrated or smooth points, as the surface is approached—preferably with a mallet. Very fine fillings can be made with smooth points used with hand-pressure, providing the condensing surface is not too large, and in addition to direct force a rubbing or burnishing of the gold to place can be satisfactorily accomplished. In the hands of the inexperienced, however, there is a risk of the instrument slipping and wounding the mouth. The happy medium between deep serrations and smooth points is arrived at by the use of finely serrated pluggers, and these are the most generally used and popular instruments, Non-cohesive gold should be placed in position with foil carriers, and pressed to place with either the side or the point of the plugger. It is generally important to press the whole of the cylinder or pellet well up against the wall at once. Foot pluggers are also useful in this connection. When two or more cylinders are firmly locked in place, they may, if desired, be further condensed laterally with fine points. The last pieces should be driven down between the layers of gold already in place, like a rivet, so as to key them in position.

To explain methods of packing gold into teeth a few typical cases will be mentioned. It does not come within the scope of this work to minutely describe the filling of numbers of cavities in all sorts of positions, each of which may present instructive peculiarities. It is intended merely to allude to the filling of certain cavities the general principles of which will apply with slight modifications

to the vast majority of cases, for it is presumed that an operator who has once grasped these principles will be able to modify them as circumstances may demand.

To fill a very small crown cavity or a very small cavity in any exposed position, take a small pellet of cohesive gold and simply press or hammer it in. A cavity of this size may be considered as a retaining pit, and filled accordingly. Pack in other very small pellets one by one, attaching them to the previously condensed gold until the cavity is full. If non-cohesive gold is used, take a very tightly rolled cylinder that can just be placed in the hole so that one end will rest on the floor and the other project slightly, place a fine instrument in the centre of the protruding gold, and press down with considerable force. If this makes a hole of any depth in the first cylinder, place in it in like manner an even smaller cylinder rolled to an almost wire-like consistence, head this down like a rivet, condense the overlap and finish. Sometimes the first cylinder can be headed down and the filling made with only one piece of gold. To fill a cavity a little larger than this with cohesive gold, press in a larger pellet unannealed, and hold it down with an instrument held in the left hand while it is condensed down. If this does not make it stay in place, press in to one side, or, better still, remove it, and press a fresh pellet on to the floor and to one side, and in the space thus made wedge other pellets until they can be condensed down without any rolling. By the use of the two instruments, one to hold the gold and the other to condense it, there is usually no difficulty in making the foundation, and the filling is then completed with pellets or tapes as desired. To fill with non-cohesive gold, insert a cylinder as before, press it to one side, press another one against the opposite wall, and head down a third between these two. If the cavity is deep, press the third cylinder well down on to the floor, so that it extends only half way up to

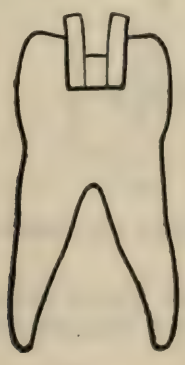


Fig. 6.

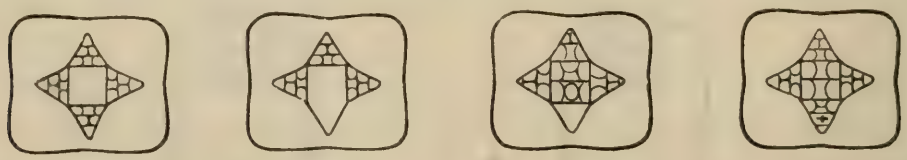
Fig. 7.

the crown, and then on to this cylinder head down another one, which completes the filling. (Figs. 6 & 7). Medium and large sized cavities are filled on somewhat similar lines. If the cavity is box-like in shape there is no difficulty in wedging the foundation for cohesive gold, while if it is awkwardly shaped, a pit or undercut must be made sufficiently deep to hold the first pieces of gold, and the filling gradually worked from this foundation across the floor and then built up to the orifice. It is usually inadvisable to use non-cohesive gold in these cases.

To fill a large box-like cavity with non-cohesive gold, place the first cylinder against the posterior wall, and if the hole is fairly round, place them in succession against the walls, condensing with lateral pressure, and head down one or more keying cylinders in the centre as previously described.

If the cavity is oblong, commence at the posterior, and work from this to the anterior wall; when this is nearly approached place one or more cylinders against it and rivet the last pieces into the intervening space.

To fill a star-like cavity consisting of a central cavity with fissure like extensions, wedge unannealed pellets towards the ends of each arm until the centre is reached then wedge more pellets in the centre, condense down and build up with cohesive pellets or strips. If the extension arms and the centre cavity are too shallow to admit of wedging a foundation, drill a retaining pit at the end of each extension and work the gold from these pits carefully over the whole of the floor and then up to the surface. With non-cohesive gold, providing the cavity and extensions are cut deep enough to admit of its use, press the cylinders to the end of each extension until the centre is reached, and then treat the centre as an ordinary cavity, or fill the posterior arm first, then the two at right angles to it, then place cylinders in the posterior part of the centre cavity and condense by



FIGS. 8 9 10 11.

FIG. 8.—The extensions are filled first, leaving the centre to be filled as a simple cavity.

FIGS. 9, 10 & 11 shew the posterior and two lateral extensions filled first, then the centre; then the anterior extension, the + being the final keying piece.

pressure in this direction ; then, when the centre is filled, condensing still with posterior pressure, proceed to place the cylinders in the anterior extension, pressing them towards the gold already in the the centre. Continue in this manner until the end of the extension is nearly reached, place a cylinder at the end of this arm, and the keying cylinders between the gold at the end of the arm and the rest of the filling. (Figs. 8 to 11).

Filling Upper Incisors and Cuspids.—In working from the lingual surface, place a pellet of unannealed, or, if preferred, non-cohesive foil against the cervical wall, pressing it into the undercut, but not thoroughly condensing it, place one or more pellets against the labial wall, pressing them somewhat cervicalwards until the cutting edge is nearly reached, then place a pellet against this wall and into the undercut at this part. Now thoroughly condense the gold, working it with very fine pluggers into the grooves and undercuts. Condense it generally by surface pressure with a broad plugger, pressing it down on to the floor, applying the pressure principally towards the labial wall. Be very careful to see that the labial wall is well covered, and turn the gold over it with a broad-faced condenser and a flat burnisher. Now proceed to pack annealed gold on to this foundation, work it well up to and over the labial wall, turn it over the edge with a flat burnisher. Be also very careful to work the gold over the cervical edge. It is almost impossible to afterwards add any gold at these parts should defects be found there on trimming the filling. Proceed in this manner, and keep on turning the gold over in the direction of these edges until it is built sufficiently from between the teeth to admit of the remainder of the filling being packed by direct pressure in all directions—when in fact the part that is between the teeth is completed, the lingual surface is readily built up with right angle or corkscrew pluggers, and the surface in general flattened with a broad faced condenser. Where the space between the teeth is narrow and the turning down and condensing of the gold in the direction of the labial and cervical walls has not sufficiently built up the gold between the teeth, small squares of No. 60 foil or of No. 4 foil folded up to No. 64, or 128 may be conveniently placed between the teeth on to the filling in the desired position, and by pressure of flat condensers and by rubbing with thin flat burnishers made to satisfactorily cohere. If it is difficult or impossible to start the filling by wedging, a starting point must be drilled in the dentine at one end

of the cervical groove, usually in working from the back, at the cervico labial angle. The gold is annealed, worked into this pit, carried across the cervical wall, and then worked down the labial wall, packing it well into the angle formed by this wall and the floor, working the gold at first with upward pressure so as not to drag it away from the cervical wall. It must be packed up to and over the labial and cervical borders, in fact, the manner of working is precisely the same as has just been described, except that instead of wedging a few pellets of annealed gold to place as a foundation for the more cohesive portion, the whole filling is absolutely cohesive and is gradually worked from a starting point, using at the commencement smaller pieces of gold. It is necessary to carefully work the gold over all edges, but the labial and cervical are particularly mentioned because they present the greatest difficulties. If it is desired to introduce the filling from the front, the method of procedure is very similar, except that no grooving of the labial wall is, as a rule, admissible ; on the contrary, it is distinctly advisable to slope this wall outwards. This makes the accurate packing of the gold at this part easy and certain ; the lingual wall is not cut away beyond trimming the border, and if the dentine will admit of it, it may be slightly grooved or undercut—it becomes, in fact, what the labial is in working from the back. The cervical and cutting edge undercutting is the same as in the other case, with the exception that if a starting point is made, it must be drilled at the cervico-palatal angle. The procedure is the same as in the former case, with the exception that the lingual wall is to be treated as was the labial in filling from the back, the careful turning over of the gold being done at the lingual instead of the labial wall. In introducing the filling from the labial surface, a mallet can generally be used for the bulk of the filling, while in working from the back its use is often difficult and sometimes impossible. If the cavity is on the distal surface, the cutting and filling from the front can generally be done without spoiling the appearance of the teeth to any great extent. In many of these cases the gold is hardly noticeable if carefully finished, while on mesial surfaces the result from an æsthetic point of view usually leaves much to be desired. It is better, therefore, to get into the habit of filling all these cavities from the back whenever it is possible to do so, although it takes up more time.

(*To be continued.*)

"SHOULD WOMEN BE DENTISTS?"

By F. Miller, M.B.

Mr. President and Gentlemen,—During the past few years, since the New Woman blossomed forth in our midst, I have often wondered when it would fall to my lot to hear a discussion on the subject of our debate to-night. I never thought I should be the one to open the discussion, but on Mr. Stanley Colyer asking me to undertake it, I promised to do what I could, and I beg that you will excuse the light manner in which I am afraid I have gone into the subject. We do not find in the history of the attempts of women to gain admission to the examination for the L.D.S. any thrilling tale of difficulties only met to be overcome, such as we find in the record of the endeavours of ladies to become medical practitioners, and we have no Sophia Jex-Blake nor Elizabeth Garrett Anderson champions of the Dental Women. At the present time women are admitted as candidates for the L.D.S. Edinburgh, for which they have to pass two examinations the first in general medical subjects, and the second in purely dental work. Their hospital course is, as with us, two years, and I might mention that this includes a course in anæsthetics, *i.e.*, administration of CH Cl_3 and N_2O. Lady students are not, as we are all aware, admitted at the London Dental Hospital, but they are at the National, Great Portland Street, where they take out the same course of study as the men. In gathering information on the subject of our debate I wrote to the Dean of the National Dental Hospital, and in reply received the following note :—

> "Dear Sir,—In reply to your enquiry about lady dental students, they are also admitted at the Edinburgh Dental School. We have also from time to time allowed lady medical missionaries to come and take a course of extraction, &c."

As far as I can ascertain there is only at present one lady with an Edinburgh Dental qualification, the young lady in question being Miss Murray, who obtained her L.D.S. in May last year. There are a number of women on the Dental Register as being in practice before 1878, but many of these do not practice at all, and most of those who have a practice entrust it to an assistant or have it carried on by their children in their name. We may, I think, conveniently and profitably look at the subject of our discussion to-night, firstly, from the general aspect and then go into the details of the question.

Firstly—We of the latter part of the nineteenth century are becoming used to the creation which has sprung up mushroom-like in our midst, and goes by the—what I consider appropriate—name of the "New Woman." Whereas our grandparents were only accustomed to see women carrying on business in a small way as retailers of linen or drapery, or as village school and post-mistresses, we of the "latter day" are used to lady doctors, female teachers of every branch of science and art, clerks, typewriters, female assistants in every branch of business, but such I do not in my mind class under the head of the "New Woman." This, as I said before, appropriate name I reserve for those females (generally women of leisure) whom one meets occasionally, and who have several diagnostic or pathognomonic features. One easily recognises the tall, large-boned, muscular woman, with prominent cheek and massive jaw-bones, who wears *pince-nez*, tailor made dresses (often badly fitting) and hair closely cropped; we hear she lectures on "Women's Rights" (and are not in the least surprised), and if she has so far descended from her own pedestal as to marry, her husband is more often than not a little puny individual, whose only attempt at originality is to wear different trousers occasionally, and we feel involuntarily that there has been some mistake and that those necessary articles of attire ought to have been allotted to his better half.

On the 13th of last month I had the pleasure to hear a paper read at St. Bartholomew's Hospital, before the Abernethian Society, on "The Sexual Branch of the Connati Instincts." Dr. Clay-Shaw, the author, entered very fully into the questions of Hetero and Homo-sexualism, and discussed the extreme examples which have recently come before the public. It is not in place to enter into this subject here, so I shall in my following remarks only touch lightly on the question. As far as my experience goes, one does not meet with the ordinary feeling of jolly-good-fellowship so often among women as one does among men; but, on the other hand, I think it is more common to meet with examples of "Hero-Worship" in women than in men. By this I do not mean that men do not make constant and devoted friends, but in an unwritten compact such as exists in the latter case the two parties are on an equal footing, while in what I call "Hero-Worship" in the opposite sex the bond of equality is lost, and one becomes the willing slave almost of the other. This I consider to be a minor form of Homo-sexualism

or perverted sexual instinct, just as I look upon the case of the "Women's Rights" lady above referred to. I think it is almost as common, if not more so, to meet with this perverted sexual instinct in a small degree in young men than it is to meet it in women. One classes as such effeminate men the youths one meets strutting about as if their sole object in life was to act as a walking advertisement for their tailor, their individuality being displayed only in their choice of the exotic which they daily wear in their button-hole. We are all familiar with the monsters of muscle and the monsters of intellect who move in our midst, and, though it is a little harder to understand such, we no doubt have monsters of sexual instinct living with us. Many are inclined to think that these attempts of women to enter the various professions are but part of the movement which has developed of recent years, and which is thought by those who have made a special study of psychology to be due to a perverted sexual instinct; on the other hand I should be inclined to argue that women have to live as well as men, and if they are to earn their own daily bread, why should they not, if they are able to satisfy the boards of examiners, enter the learned professions. Dr. Clay-Shaw, in his paper which I mentioned above, quoted what he called the greatest tribute he ever heard given to Hetero-sexualism. A female patient was leaving a lunatic asylum cured: he asked her what she thought of lady doctors. With a look of great contempt she answered "Who attended Eve?" This same patient said, "Ladies will never succeed as doctors amongst ladies because they can't sympathize with us like men can." I think this is one great disadvantage that women labour under as dentists. Almost all the ladies I have known to have had their opinion asked on the question of whether they preferred to have a lady or man dentist decided without hesitation in favour of the latter.

A friend of mine, who lives in New York, went to her dentist one day, and, as he was not able to attend to her, his assistant (who was a female Philadelphian D.D.S.) was about to take his place, but the patient absolutely refused to be treated by her. I think personally that women have more than a fair share in deciding the question of whether a movement like the one we are about to discuss shall succeed or not, and as lady dentists are almost tabooed by ladies (who form the bulk of dental patients I think), I don't imagine the

future of lady dentists is, at any rate at present, as bright as I may say I should like it to be. Up to 1894, with the chivalrous enthusiasm which I think is innate in us all, much as some of us may have allowed it to degenerate, I would have given my humble vote, indiscriminately, in favour of anything women chose to undertake. I am afraid I was more romantic then than I am now ; a course such as all here more or less have to go through takes a little of the upper crust of gilt off, and shows the subaureate stratum. In the summer of 1894 I went over to Dublin to the Rotunda Hospital to take out my midwifery and obstetric work, it was there my lot to make my first acquaintance with the lady medical. At first (before I saw them) I was biassed in their favour, and thought they deserved more encouragement than they got from the members of a liberal profession, but in a very short time my ideas underwent an extreme change. There were some nine or ten lady students taking out their midwifery course at the Rotunda, and with the exception that they lived out of the hospital, while we were "Intern Students," they were treated just as we were, taking their cases in turn in the labour wards and outside, and coming round the wards every morning with the Master or Assistant Master.

As far as the extern patients were concerned I have known these lady students sent back time after time from labour cases, the Irish women refusing to be attended by them at any price. In the winter of 1894, I heard a paper read before The Owens College Medical Students' Debating Society, on the subject of "Lady Doctors," and after some very heated discussion (in which I well remember the amusing expression "they're not *real* ladies," was used) a vote on the subject was taken. As the result of the division, a resolution very similar to the following was carried by a large majority. "That in the opinion of this meeting, ladies, provided they can satisfy the Board of Examiners, have every right to become medical practitioners." I may say that I voted in favour of the motion. In the discussion following the paper by Dr. Clay-Shaw that I alluded to above, I remember one gentleman saying that "the time will come when women will, in every profession, try to rob us of our daily bread." I did not think it was very polite of the gentleman, and would have liked to advise him in that event to make love to one of the most accomplished robbers. I have heard several men express their idea that a reaction will come which will be too powerful for

the new woman to resist, and then lady dentists, new woman and rational costume will alike become things of the past. I think in these cases, however, the "wish was father of the thought."

Secondly—It is in this, the second part of our paper, that we must look for the practical pros and cons of the question, on which it will eventually be decided whether women are able, physically and mentally, to become dentists, and whether, having taken this first fence successfully, they can make their profession profitable to themselves.

On asking Mr. Patterson where I should be likely to get some information on the subject of lady dentists, he advised me to write to Miss Murray. I accordingly did so, and received in answer to my letter the following reply :—

"DEAR SIR,—I will endeavour to do my best to give you some details concerning the question of the advisability, fitness, or otherwise of women as dental practitioners as far as I know them. I have only known one woman besides myself who has been in practice, hence it is somewhat difficult for me to make a statement concerning women generally. As there are some men who could never be dentists, so it is the case with women. Women have practised dentistry with success—this is a great argument in their favour. Of course, generally speaking, women have not the physical strength and sustaining powers requisite for a practitioner who attends to all branches without assistance, but as an operator in the conservative department there can be no doubt that a woman is eminently fitted for the work. A woman should always turn her attention specially to the treatment of children's teeth, for her tact and tenderness will always succeed with them, and they will go to her more readily, and be less in fear of her than the ordinary man. As an extractor, a woman, if she has the necessary skill, will succeed quite as well as a man with the same qualification. Even every man cannot extract. I once heard an eminent dentist remark that 'an extractor is born, not made, though much comes by practice.' It is in the mechanical department that a woman is least successful, as the work is often rough and needs strength as well as skill, and more mechanical brain power than the ordinary woman is blessed with. A cool head and clear brain are indispensable adjuncts; this, as a rule, women fail in at the

critical moment, in other words, they are liable to lose their heads under excitement. Their natural tenderness and sympathy are against them in carrying out their work with that thoroughness which is so necessary to a successful filling. For instance, when in gold filling it is necessary to drill retaining points in sensitive dentine, which defies all efforts to obtund it, it requires a great struggle against the natural antipathy to giving pain in order to drill on while the patient's tears flow freely. From a business point of view too, she is, as a rule, not competent. For one rarely meets qualities requisite for a skilled dentist and good business capacities combined in one woman. Here again a woman's sympathy stands in her way, for she gives way before the pitiful tales that are poured into her ears—as likely as not from an impostor who works upon her easily moved feelings. The sentimental nonsense that is so often uttered whenever the subject of medical and dental women arises, about woman losing her finer sensitive feelings and becoming masculine, is very absurd. No one can realise the amount of suffering and sorrow in the world unless brought into actual contact with it, and the best way to show how sensitive one's feelings are and express one's true sympathy lies in alleviating these pains and sorrows to the best of one's ability, and the true way to do this is to learn to study properly the most scientific, the best and the kindest methods. You cannot remove pain or relieve it by weeping over the sufferer, and often only make it worse by losing time in useless wringing of hands. It has given me much pleasure to write this, and this pleasure will be increased if I have been of any use.

" Yours faithfully,

" LILIAN MURRAY."

I think Miss Murray, in her letter, for which I am greatly indebted to her, has touched upon and ably discussed most of the practical points in connection with this question ; if anything, she has, in my opinion, rather underrated the points in favour of women and overstated those which might be adduced as reasons why women should not become dentists.

For instance, strength does not come into play very much in the routine work of a dental practice, except now and again in extracting some troublesome stump and occasionally in the work-

room—that is unless the feats of strength and wielding of hammers which one occasionally sees downstairs may be said to form part of a dentist's education. As for brain power I think that even the most bigoted opponent of women entering the professions will allow (remembering their successes at Cambridge and elsewhere) that in this respect the average women comes up to, if she does not surpass, the average man, and in gentleness and sympathy, when these qualities are needed in a dentist, she certainly has no rival in a man. Everyone will agree that patience is almost as indispensable to a dentist as patients are, and according to the old saying, "Patience is a virtue seldom found in women, and never in a man," so women here would seem to have the advantage over the opposite sex. Still, I think the patience which is so necessary for the dentist has to be combined with a power to keep one's head in a difficulty, and this, I think, would be where the majority of women would fail as not possessing the combined qualities of patience and level headedness. Another quality, which if not absolutely necessary is still very desirable, at any rate in an operating room, is neatness, and here women, I think we will admit, would show themselves superior to men. As Miss Murray said in her letter, young children would naturally be more amenable to treatment at the hands of a woman than of a man, and it would be with them that a woman would succeed better than the latter. On the other hand, as I have said before, women patients would almost unanimously prefer a man as their dentist. As regards men patients I can't say. Many, I daresay, would perhaps, for the novelty of the situation, like to have a tooth filled by a lady dentist, but I don't think an athletic, powerful man, if he had been tortured by toothache would think about going to a lady dentist to have his tooth extracted.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting took place on the second ultimo, Mr. David Hepburn, the President, in the Chair.

The minutes of the previous meeting having been read and confirmed, Mr. Harold D. Matthews, L.D.S., was elected a member of the Society, and the following gentlemen signed either the

obligation forms or the obligation book and were admitted to membership :—Mr. Walter S. Nowell, M.A.Cantab., L.D.S Eng. ; Mr. Ernest Catt ; Mr. Cornelius W. Fryer and Mr. E. L. Dudley.

The LIBRARIAN (Mr. W. A. Maggs) reported the usual exchanges.

The CURATOR (Mr. Storer Bennett) announced that Mr. Beadnell Gill had sent to the museum a model showing three upper temporary laterals which were very interesting from the fact that irregularities amongst the temporary teeth are more rare than among the permanent ones. He had also received six specimens of bone work. These specimens unfortunately arrived during his illness, and he was not aware who the donor was. Dr. Wallace has kindly presented a portion of the mandible of a female tapir, and he had in addition to acknowledge a specimen comprising a portion of the mandible containing a lower molar from a cave bear. This specimen was found under fifty feet of limestone rock in the Riviera, at the same spot were three human skeleltons were some time previously discovered. These specimens undoubtedly dated back to a time to be reckoned in thousands of years.

Mr. STORER BENNETT then brought forward a casual communication with the object of illustrating the damage sometimes attending the injudicious use of elastic bands in attempting to regulate the natural teeth. The case was one of superior protrusion in a young lady aged thirteen years. Her health being bad, her parents took her to the seaside, where she was left for three or four months. Mr. Bennett thought it would be useless to send her away with an appliance needing constant attention and adjustment, and decided to put two collars on the first molars on each side and on the canines, and to attach elastic bands. The parents were given some elastic bands of various sizes to be attached to small hooks, the smaller bands to be substituted as the teeth yielded to treatment. Unfortunately, the bands which should have been attached on the inner side of the palate were entirely neglected, with the result that traction was only made on the outer side. On examination it was found that the canines had been rotated outwards very seriously, while the first molars were tilted very much forward. Mr. Bennett also exhibited models from the mouth of a lady, aged thirty-three, showing the absence of permanent teeth in the upper jaw. There were only two central incisors, the stump of a very bad canine

and some temporary teeth. In the lower jaw there was the root of a temporary molar, a lower canine and some temporary teeth. The case was the more interesting from the fact that the patient's sister was said to present a very similar appearance. The two foregoing cases, as also the following, were illustrated on lantern slides. The skull of a white nosed monkey, nearly adult. The canines were nearly erupted, but there were no temporary central or lateral incisors. There were also two teeth, which he took to be temporary laterals. The alveolar ridge was remarkably thin, and there was no trace of either permanent centrals or laterals.

A further model was exhibited on the screen representing the skull of a monkey in which there was only one central incisor. That incisor had been deflected very considerably to the left. This also was probably a case of suppression. Mr. Bennett brought forward these instances as interesting in connection with the paper on Evolution about to be read.

Mr. J. F. COLYER asked why Mr. Bennett extracted the molars in the second case referred to.

Mr. STORER BENNETT said that there was absolutely no possibility of getting the front teeth back sufficiently without doing this.

Mr. SYDNEY SPOKES asked with respect to the case of the lady whether there were any other signs of suppression. Was the hair luxurious, and were the nails perfect?

Mr. REINHARDT mentioned the case of a lady aged twenty-eight who had but five teeth, only two of which were permanent. She had a luxurious crop of hair and the nails were quite normal.

Mr. STORER BENNETT said in the case he had brought forward there was nothing abnormal excepting the teeth.

Mr. CHARTERS WHITE reminded the Society that some years ago a case was brought forward of similar suppresion of the teeth associated with a profusion of hair all over the face.

The PRESIDENT well remembered the instance, and remarked that Mr. Oakley Coles also brought before their notice a Russian family known as "the hairy people" whose faces were entirely covered with hair. One of the family, a child aged seven, had some three or four central incisors, while the father had never erupted more than some four or five rudimentart sort of teeth in the front of the mouth. There were other instances on record where this peculiarity had been associated with an abnormal development of hair.

Mr. Blain exhibited and briefly described appliances as used by Dr. Martin in his system *(prothèse immédiate)*.

Mr. J. F. Colyer remarked that on four or five occasions he had endeavoured to make similar appliances. As specimens of ingenuity and workmanship these instruments were very beautiful, but he was not quite so sure of their practical utility. Would they not interfere with the healing of the jaw? and would not the action of the muscles on each side pull the two halves towards the median line and thus have a very prejudicial effect? He recollected a case where Mr. Boyd removed half a lower jaw for myeloid sarcoma. A plate was put in the lower jaw with a spring to counteract the tendency of the right side of the jaw to be displaced. Theoretically the appliance was perfect, and at first it worked very beautifully, but within three days absorption rapidly set in on the free margin of the portions remaining where the plates came. In the case of malignant growths also he thought that the appliance would set up a large amount of irritation.

Mr. C. D. Davis showed an artificial nose made by a Mr. Bond. The patient some years previously was operated upon in Glasgow by Dr. Heron Watson, of Edinburgh, who removed the whole of the external and internal parts of the nose and also a large perforation of the palate. Until quite recently the patient had worn the nose attached to a pair of spectacles. In the present apparatus there was a gold tube passing from the centre of the plate to the opening. The nose had a strong gold pin with a short belt on it which ran into the slot in the tube. It was put on slightly sideways and then being twisted straight the fit against the plate held it tightly.

Dr. M. Tims then read a paper on

"The Origin of Mammalian Teeth."

Among the elasmobranch fishes the surface of the skin of the body is covered with dermal denticles, structures having the characters of ordinary teeth. They were formerly of considerable size and served for protection. In other fishes they have become modified into the ordinary fish scales. Similarly teeth develop from the lining membrane of the mouth, which is derived from the same embryonic layer as the epidermis.

In the teleostean fishes all the bones of the mouth, as well as

those of the hyoidean and branchial arches, may bear teeth. Among the higher vertebrates, position becomes more limited and ultimately they are confined to the pre-maxilla, the maxilla and the mandible. In these situations they are found upon the inner side as well as upon the free edges of the bones, and as the latter become worn down, fresh ones take their place, thus giving rise to the so-called polyphyodont condition.

Among the reptilia, the teeth of the lower jaw are in some cases fused to a kind of ledge on its inner side, a condition known as pleurodont ; in others they are situated at the free edge of the jaw, when they are said to be acrodont. In the crocodilia, the thecodont condition obtains, that is, the teeth are imbedded in alveoli, thus adding to their firmness.

As a rule the dentition of the reptilia is homodont, but in hatteria and some extinct forms of the American trias a heterodont condition is found, that is, the teeth are differentiated into incisiform caniniform and molariform. This differentiation attains its maximum only among the mammalia, in which also another very important structure is added to the teeth, the cingulum. Owen introduced the terms monophyodont, that is animals with a single set of teeth, diphyodont or those with two sets. Among the former were placed the marsupials, the edentates and the cetacea. A difficulty at once arose in connection with the marsupials. It is generally believed that the ancestors of the mammalia were reptiles, and these are known to have been polyphyodont. The marsupials are regarded by many as being among the lowest in the mammalian series and in the direct line of ancestry. The anomaly at once becomes apparent, the polyphyodont reptilia giving rise to the monophyodont marsupials, and these in turn succeeded by the diphyodont mammalia. In 1869 Sir William Flower showed that in the nine-banded armadillo and in one or two other edentates, of the eight teeth habitually present on each side of the jaw, all except the most posterior are preceded by milk teeth, which are shed at the time of almost full development. Thus the edentates can no longer be classed as monophyodont.

Evidence has been brought forward in support of views that two other dentitions are represented amongst the mammalia, a pre-milk and a post-permanent dentition. The evidence in favour of the existence of the latter is, I think, now beyond doubt. Lecke and

Kükenthal have observed such traces in the seal, Röse in man, M. F. Woodward in erinaceus, and I have noted its existence in the dog. The evidence in favour of the pre-milk dentition seems insufficient. It rests upon the discovery by Lecke of tooth rudiments on the labial side of the functional teeth in certain marsupials. The existence of these rudiments is not disputed ; they have been verified by M. F. Woodward in myrmecobius, phascologale and dasyurus, but Lecke's interpretation of these rudiments depends entirely upon the question as to whether the single functional set of teeth in marsupials is in reality the milk set. It is well known that in these animals only one tooth is replaced, the deciduous tooth being molariform in character. Kükenthal discovered tooth rudiments on the lingual side of the functional teeth in certain marsupials, which he regarded as representing the successional teeth, and the functional set as corresponding with those known as the milk teeth ; consequently Lecke has regarded the rudiments on the labial side of these as representing a pre-milk dentition. There is no instance of four dentitions being present in any one part of the jaw of any animal, and there is undoubted evidence of the existence of the representative of a post-permanent dentition. Consequently, the three dentitions of the marsupials may be regarded as homologous with the three dentitions of the hedgehog, dog and man. If this be so, then Lecke's pre-milk dentition no longer exists, but what he interprets as such are the vestigial remains of the milk dentition, and the functional set as homologous with the permanent dentition. Thus the marsupials are no longer to be regarded as truly monophyodont, though the term is sometimes still used, but as indicating that one set of teeth alone is *functional*. In the odontoceti, Kükenthal has proved the existence of tooth rudiments on the lingual side of the single functional set of teeth, and regards these whales as having a persistent milk dentition. It would be better to regard these as representing the permanent set with the post-permanent representatives, the milk teeth having disappeared. Lecke has expressed this opinion with regard to the dentition of the whales, noting that in other cases of monophyodontism it is the first dentition which disappears. Thus :—

1. That there is not sufficient evidence to warrant the belief in the existence of a pre-milk dentition.

2. That the dentitions are tending to disappear from without

inwards. This is in agreement with a conclusion of Wiedersheim, who adduces facts which indicate that a "gradual reduction of the milk dentition is taking place."

3. That there is ample evidence in favour of the existence of three dentitions, the deciduous, successional and post-permanent; thus bringing the mammalia more into line with their polyphyodont reptilian ancestors, and doing away with the former difficulty as to whether the milk or the permanent is the super-added dentition, since both are of equal antiquity handed down from our reptilian progenitors.

Turning next to the molars and first pre-molar, which, as a rule, are represented in one dentition only, the question arises to which dentition do they belong? Beginning with pm_1, which is replaced in a few animals only, such as the Indian tapir, hyrax, in some cases the rhinoceros and pig and the extinct palæotherium. In the dog it is not replaced, and is occasionally absent altogether. In a section through this region in the dog, three down-growths of the dental lamina are to be seen, and it is from the central one of these that this tooth develops. Now, it has been said that the deciduous, permanent and post-permanent dentitions are represented in this animal, consequently I think that the single pm of the dog is to be regarded as belonging to the permanent series. The molar teeth are to be regarded as belonging to the same series. The sectorial tooth replaces a molariform tooth. For the same reasons as given above in connection with pm_1, this may be regarded as belonging to the so-called permanent series; its successor developing on the lingual side and quite independently of the tooth which it replaces.

According to this view (see *Dental Record*, August, 1895), the protocone and protoconid represent the primitive reptilian cone. Such being so, we should expect them to develop first in the embryonic history of any tooth, if protogeny does recapitulate phylogeny.

In the paper above referred to, Professor Osborne admits that it does, for he says, "we should expect in the embryonic jaw that the calcification of the tooth germ would be very significant, because we know that the embryonic structures in their development follow the order of addition or evolution." Now, this development has already been worked out by Röse in the marsupials and primates, and by Tæcker in the ungulates, with these results: In the lower jaw the

protoconid does develop first. With regard to the paraconid and metaconid, which should be of equal importance, and secondary only to the protoconid, the paraconid develops second in the marsupials only, while in the primates and ungulates it is absent altogether, and the metaconid in the marsupials does not develop until after the hypoconid and entoconid. Taking these three orders together, even the lower jaw does not lend much support to this view. But in this paper Professor Osborne says, "in the lower molar teeth" (he is dealing with the primates only) "the order of calcification is precisely the order of evolution."

It is, however, in the upper jaw that still stronger evidence against this theory is to be found, for in not one of the three orders does the all-important protocone develop first. It is the paracone in every instance, while in the ungulates the metacone also develops before the protocone. Professor Osborne goes on to say, in speaking of the lower jaw, "so we find the order of embryonic development exactly repeats the order of historical development, and in every way presents the strongest kind of confirmation of the theory of cusp formation." The upper jaw, which presents the most damaging evidence, he dismisses with the single sentence—"but this, you see, is not exactly the case in the upper molars."

There is one other theory that must be referred to—the multituberculate theory. According to this view, the early mammalia were thought to have had teeth possessing many cusps, and that by a gradual suppression of some of these, the teeth of existing mammals have been derived. Two pieces of evidence are in favour of this theory: (1) Quite early fossil forms, such as tritylodon, have been found with multi-cuspidate teeth; and (2) that the montremes, among the most primitive of existing mammals, have teeth of the same description.

With regard to the fossil forms, it should be borne in mind that their dental formulæ tend to show, by the absence of the canines and the reduction in the number of incisor teeth, that they were probably highly-specialised forms. That some of the mammalia may have been derived from the multituberculata is possible, but that they have all been is highly improbable.

With regard to the origin of the multituberculata from the reptilia, a possible explanation is to be found in Kükenthal's concresence theory. By this a fusion of several teeth of the same

dentition and of different dentitions is supposed to have taken place, causing a reduction in the number of teeth; the nine cusps in the teeth of tritylodon being due to the fusion of three teeth and of three dentitions.

Mr. F. J. Bennett said, as far as he understood the paper, what the author would like chiefly was for them to say how far their own experience would bear out the views he had enunciated. In a short paper he (Mr. Bennett) read before the British Dental Association some time previously, he endeavoured to prove that there were traces of teeth under what they called the first, second, and third permanent molars. He then ventured to express the opinion that those observers who said that those three molars belonged to the temporary series had substantial grounds for believing so, owing to the strong similarity between the first and second temporary, and the first, second and third permanent molars. There was good evidence of epithelial structures surrounding the first permanent molar, pointing to their being enamel germs. Mr. Eve had dealt with this evidence in a paper, and a foreign observer had also discovered epithelial structures in the substance of the periosteum. He (Mr. Bennett) fancied that these enamel modules afforded almost as good evidence as could be obtained, as showing that there are really germs of a later series underneath these three teeth. At the same time, he was quite aware that there were a few what might be called staggering objections.

Mr. Arthur Smith Woodward had listened with great interest to the paper, but regretted he could only speak of the latter part from personal knowledge. For several years he had the privilege of studying vertebrate fossils in the British Museum, and the facts of palæontology suggested some interesting points in connection with the problem which Dr. Tims had brought forward. In solving these very broad questions it seemed necessary to turn first to those cusps of organisms in which they found their simplest expression; accordingly, he had been much interested in examining the teeth of extinct fishes, whose skeletons naturally occurred in great abundance in almost all water-formed rocks from the date of their earliest appearance up to the present day. The study of the earliest sharks revealed most distinctly that the complicated teeth of these fishes are often due to the fusion of originally separate cusps, each little cusp having been formed round its own pulp, and primitively free from

all surrounding cusps. One family of upper palæozoic sharks exhibits the fusion into plates, not only of adjoining teeth of one series, but also of successional teeth of several series. It was thus clear that tooth complication does naturally take place among the lower vertebrates by the fusion of cusps belonging to more than one series. On the other hand, there was equally clear proof among fossil sharks that tooth complication sometimes happens by another method, viz., multiplication of cusps by some organic process which is not yet understood. With reference to the gradual acquisition of a regular arrangement of the dental armature, one of the families of the mesozoic ganoid fishes have a pavement of grinding teeth, and this pavement, though very irregular in the earlier members of the family, is reduced to a few comparatively regular longitudinal series of teeth in the latest members. These being the facts in regard to fishes, there would be no improbability in any of the theories of tooth complication pointed out by embryologists who have studied the mammalian dentition. Palæontology, however, had not yet thrown any certain light on the subject. It did not even afford any information concerning the supplementary successional teeth, of which rudiments are stated to occur in several existing mammals. Even the tritubercular theory to which Dr. Tims had referred with some well merited criticism had a much more insecure palæontological basis than most of its supporters and exponents claimed for it.

Mr. W. A. Maggs was of opinion that the multituberculate theory had some prima facie evidence to support it, that is to say, in the earliest mammalian fossil teeth, represented by the mesozoic or secondary period, the types correspond with the diprotodont or polyprotodont marsupials, either with tuberculate molars or with triconodont molars. It was quite possible that these animals, if they were not protothesian, had not progressed in the zoological scale at all, and that they were the marsupials, or would be the marsupials, if they existed, of the present time. Then, as Mr. Woodward had mentioned, there was a gap in the geological records, and an absence of any new teeth forms until the tertiary period in which the tritubercular molar was found to predominate, and they had a form of molar like that seen in some of the carnivora and insectivora of the present day. The homology of the upper cusps was rather doubtful in all orders of mammals. It was difficult to say how the

multicuspid teeth were formed, whether by fusion of separate conical teeth, owing to a more limited succession, or by what other means. Dr. Tims got rid of the pre-milk dentition, which was satisfactory in one way, in that it simplified the ground a little, but he (Mr. Maggs) was not at all sure about the correct interpretation of the tooth change of marsupials. When a dentition like that of the opossum or the macropodidæ, or any of those animals with a large number of teeth was said to belong to the milk set, it was giving a formula for the milk dentition to which there was nothing at all comparable in euthesian mammals. He did not know whether that was a sound argument against it, but it was going from one extreme to the other—the other extreme being to say that those marsupials which had no milk dentition had simply one molar on each side above and below. Dr. Tims did not mention the development of the deciduous teeth from the epithelial band before the permanent teeth, but there was a reason for supposing that if one set of teeth was developed only it should belong to the deciduous dentition. It had been shown that all mammals had a diphyodont dentition, but it was not always the same dentition which persisted. Dr. Tims showed on the screen some teeth germ in the premaxillary region of a dog, but Mr. Maggs would like to know whether he had seen this epithelial lamina—which he believed to indicate a third dentition—going all round the jaws, because it was quite possible that it might be an abnormality—an abortive tooth germ in this situation, or the origin of a supernumerary tooth. The so-called first premolar of the pig was interesting. This tooth was erupted early, had no predecessor, was lost early, and it had always been a debatable point whether it belonged to the deciduous or permanent set. Owen and Flower placed it in the former category.

The discussion having been further contributed to by Mr. W. B. Paterson and Mr. H. Baldwin, Dr. Tims replied, and the usual votes of thanks concluded the meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

An Ordinary General Meeting was held on Monday, March 9th, the President, J. F. Colyer, Esq., in the chair.

The Librarian, Mr. J. C. Douglas, said that since last meeting

he had received a gift of books from Mr. F. J. Bennett, the late president. He proposed a vote of thanks to the donor, which was seconded by Mr. Strand, and carried unanimously.

On Casual Communications being called for :—Mr. J. C. Douglas showed a pair of pliers, made by the Dental Manufacturing Company after his own pattern, which, he said, were specially designed for turning up gridiron springs and bands. He stated that he was able to turn up a gridiron spring with them within half a minute. The essential portions of the pliers were the beaks, which were long, oval on section, and tapering towards the extremity. The inner side of each beak was grooved in three places, to receive and hold the wire in position when bending it.

Dr. MILLER said, I have here three sections of a piece of bone removed from the lower jaw of a woman, aged 40, by Mr. H. Lloyd Williams. The patient had her second and third right lower molars removed some eight years ago, and since had worn a plate. Six weeks ago the patient's gum and face, corresponding to the position of these teeth, began to swell and be painful. Her dentist painted the gum with iodine, and her doctor treated her constitutionally. The swelling subsided slightly, but the patient was still in pain and consequently came to the hospital. On examination, there was an indefinite and fairly hard swelling in the position above mentioned and on pressure pus exuded from four or five sinuses; on exploring with a probe a solid body, either a stump or piece of bone, was discovered loosely imbedded. An incision was made and the wound packed with wool and carbolic (1 in 20). Two days afterwards the loose body was removed, and on the sections being cut and examined, it was seen to be a bit of very dense bone. Microscopically one sees the bone is very vascular, the lacunæ being numerous, and the lamellæ arranged irregularly with only a feeble attempt at formation of Haversian systems. The irregular arrangement of the lamellæ and the structure of the specimen give one the idea that there has been chronic inflammation; the inflammatory material being subsequently calcified, since a fibrous appearance is still visible in some parts of the specimen.

Mr. STANLEY COLYER said he had come across a case which seemed to him to throw some light on some of the unexplained cases of alveolar abscesses, in connection with live pulps, which had been reported lately. A patient came to him to have a cement filling

restored, and on examining the tooth he found that it was considerably darkened in colour, and that there was a little chronic abscess at the apex which the patient said discharged itself occasionally, but gave her no pain whatsoever. Assuming that the tooth was dead he drilled into the pulp, and to his surprise got quite an extensive hæmorrhage, but caused the patient little or no pain. He applied a fibre and the patient returned in a week's time, when, instead of finding a pulp in the usual leathery condition, he found a thin cheesy looking liquid—resembling thick pus—occupying the pulp canal. When he came to fill the roots with gutta percha points he found that one disappeared through what was evidently an enlarged apex into the abscess sac. After that he filled the root loosely and completed the tooth with osteo. The patient has since been quite comfortable. In his opinion it was a case in which the pulp had died and was only sufficiently septic to set up a slight irritation and that granulation tissue had absorbed the apex of the tooth and grown into the pulp canal, absorbing and replacing the dead pulp.

Mr. DOUGLAS showed a specimen of exostosis on the roots of a lower twelve year old molar, and said that it was not often you came across exostosed lower molars ; that they were much less frequently attacked than bicuspids, wisdoms, or upper molars. He also pointed out that the apical foramina were almost if not entirely closed in the specimen.

The PRESIDENT said that he was unaware that lower molars were said to be less frequently attacked than certain other teeth, he had come across several cases.

The PRESIDENT then called upon Dr. Miller for his paper on "Should Women be Dentists?" (see page 155).

In the discussion which followed

Mr. DODD, who spoke in favour of the women, said that in his opinion women were quite as fitted to be dentists as men. That it was scarcely fair for us to say that they were incapable, if we never gave them a chance of proving whether they were incapable or not. He did not understand what Dr. Miller meant by perverted sexual instinct. If a woman extracted a tooth, was that to be called perverted sexual instinct? In days gone by, and in certain other countries still, women did and still do the work of men; is that to be called perverted sexual instinct? No, he thought not. He considered that Dr. Miller had given a caricature of the new woman.

No one, he said, could cut and dry what men should do, or what women should do; any one who did simply stood in the way of progress.

Mr. STRAND said that the majority of the objections raised were those which seemed inharmonious with customs. If it were only in the struggle for existence women ought to be allowed to enter dentistry, and thus be enabled to earn a fair income. The majority of men, he pointed out, were incapable of supporting a wife, so that women must live somehow.

Mr. MYERS said that his chief objections were the possibility of maternity, which would either lead to her neglecting her household duties or her professions—he could not do both. He did not think that men would go to women dentists except out of curiosity.

Mr. ROSS-POOLE considered that Mr. Dodd had upheld the women too much, and that it was a typical new woman craze.

Mr. HEATH said that although he was among those who considered that woman was always at her best in her home, yet he did not see why she should not have full chance of proving her capacity.

Mr. DENSHAM said that although he agreed with the general consensus of opinion, yet there was no denying the fact that uterine troubles were much more frequent among women who stood for long times together than among those who did not. This was proved distinctly by factory statistics. He considered if women did marry they should leave the profession, but he thought also that women who desired to become dentists as a rule did not wish to marry. It were better for them to be dentists than they should add to the army of old maids having nothing to do; a class of woman, as a rule, narrow-minded and unsympathetic; a type difficult to look up to.

Mr. COYSH saw no reason why women should not enter dentistry. He did not doubt their capacity, but thought, as with men, some would be good and some would be bad. He laid stress upon their lack of originality, pointing out, by way of illustration, that although they had taken extremely high honours, both in arts and science, they never seemed to get the "forrader."

Mr. MAY showed how little midwifery progressed until it was taken up by men, and thought that it would probably be the case in dentistry. With regard to standing for long hours together, he thought that that could be easily remedied, for they could choose their own time.

Mr. J. C. Douglas said it had been urged that women were more sympathetic, and that their touch was more delicate, but he had found that they were only tender towards men. In the same way he argued they were only neat when they expected men.

Mr. Breese said the discussion had been extremely onesided. He felt that they ought to have had ladies present to defend themselves. He saw no reason why women should not be dentists.

The President said that maternity was absolutely out of the question in women-dentists ; it was quite impossible for them to attend to both at once. Mr. Densham had distinctly shown the effect that standing had upon the health of women, and looking at the matter from a national point, was it right that such women should marry. He himself knew five women doctors, two of whom had gone to France for their health, while the other three were far from healthy. He considered that the clerical and legal professions were far more suitable than the dental.

Dr. Miller then briefly replied to the various speakers.

The President then proposed a vote of thanks to Dr. Miller, and to those gentlemen who had brought forward Casual Communications, and announced that the next General Meeting would be held on Monday, May 11th, when Dr. Austen would read a paper on "Some Effects of the Acute Exanthematous Fevers on the Mouth."

The proceedings then terminated.

Dr. Hearder, Assistant Medical Officer to the West Riding Asylum, Wakefield, sends the following short note to the *Lancet*:— "Several cases of subluxation of the jaw occurring during epileptic fits have been recorded in the *Lancet* and elsewhere, but, so far as I am aware, never as occurring during a seizure in the course of general paralysis. A man, aged thirty-eight years, was admitted into the West Riding Asylum, Wakefield, in May, 1893, suffering from general paralysis. In May, 1895, being then in the second stage, he had a series of slight epileptiform seizures, during one of which he sustained double dislocation of the jaw forwards. It was reduced with considerable difficulty, an anæsthetic being necessary to overcome the spasm of the muscles, which were above normal. His jaw also is massive. Since then he has several times dislocated the jaw and the reduction has been comparatively easy."

THE DENTAL RECORD, LONDON: APRIL 1, 1896.

TWO DEATHS FROM CHLOROFORM ADMINISTRATION.

THE fact that in the current issue it is our duty to note two deaths during anæsthesia, induced for dental operations, and that in both instances the drug used was chloroform, should give rise to very earnest reflection. Whether the deaths were due to the drug being badly administered or not, whether the choice was that of the dentist or the doctor, is beside the mark. Whatever be the cause, the fact remains that fatal accidents are more common when chloroform is administered than when some other agent is used. That sometimes, though certainly not often, a longer period of anæsthesia is needed for some dental operations than can be induced by the use of nitrous oxide we may readily admit; but even then we are not bound down to the use of chloroform, we have to hand that much safer drug, ether. Surely the greater safety of the latter drug was most clearly brought out by the paper Dr. Hewitt read on the subject at the Edinburgh meeting of the British Dental Association, a paper which should still be fresh in the minds of all, for all should have read it. Let it be clearly understood the blame for such accidents rests with the administrator: it is the medical man who legitimately should be called to account for accidents like these. But if he does not appear conscious of the increased danger of the use of chloroform then the dentist should, and not for the first time, play the part of teacher. This is why we refer to the matter. We honestly believe that in the greater number of cases the real reason why medical men now use chloroform is that they neither possess the apparatus required for giving ether, nor understand its method of administration. But although we venture to suggest to our confrères that they should point out to their medical friends the opinion of those competent to judge on the dangers coincident to the

use of chloroform, we cannot understand the remark of the *Lancet* that "It is a matter of regret that dental practitioners should not be better informed upon these matters than to permit the employment of chloroform upon their premises as an anæsthetic." We, certainly, did not think it was precisely etiquette for a dentist to dictate to the anæthetist whether he should administer chloroform or ether; nor do we see what the state of information of the dentist has to do with the matter if he calls in a medical man We wish him to have the fullest information, but he is surely not expected to instruct the medical man on the subject, for, if that be so, what becomes of the contention, which we believe the *Lancet* to have aforetimes made, that no dentist should give an anæsthetic unless he also possesses a medical qualification? Nor do we think any judge will be so unjust as to follow Mr. Sewell's suggestion, in the *Lancet* of March 28th, and pass a verdict of "manslaughter against the operator" if by operator Mr. Sewell means the dentist and not the administrator, who, in both the above quoted cases, was a medical man. Neither the *Lancet* nor Mr. Sewell seem to be very well acquainted with the range of movement of a *modern* dental chair. Thus, the *Lancet* says:—"The posture of the patient is not mentioned; probably the boy was in a dentist's chair—a position of body unsuited for the administration of chloroform," whilst Mr. Sewell remarks: " . . . . administration of chloroform for tooth extraction in a dentist's chair—the most dangerous of positions." Possibly both the *Lancet* and Mr. Sewell's idea of a dental chair coincides with that depicted by Mr. du Maurier in his noted Punch Picture. We may assure them that the *modern* dentist has a chair in which the patient can be placed in almost any position from the prone to the vertical. And, indeed, to infer because the administration was at a dentist's, therefore the patient was in a chair, is, in the absence of other confirmation, a by no means certain deduction.

DENTAL HOSPITAL OF LONDON.

THE thirty-eighth annual meeting of the governors of this Hospital was held on Thursday, March 12th, at the Institution, Leicester Square. Mr. F. A. Bevan, a trustee, presided.

The report, which was taken as read, stated that the benefits the Charity was able to bestow upon the suffering poor were due to the liberality of the general public and the medical and dental professions who subscribed towards its maintenance, and the committee expressed both surprise and regret that the Hospital did not receive much greater public sympathy and support. As a reason it had been suggested that the charitable public failed from lack of knowledge to comprehend the benefits conferred by the Institution upon the necessitous poor. On an average, 200 operations—some of them extending over long periods of time—were performed within the building every working day, all of them were either preventive, palliative, or conservative in character. If that single fact be considered some idea might be grasped of the amount of work done in the Hospital, and of its utility to all classes of the community. The total amount received for the general fund during the year was £2,226, as against £2,248 in 1894. The annual subscriptions amounted to £1,121, as against £1,102 in 1894. The total amount received or promised for the building fund at the end of the year was £12,412. In expressing the warmest thanks for the support already given to the Hospital, the committee venture to urgently appeal on behalf of the building fund. The necessity for a new building had been more than once described, and it was still a growing necessity, and the chosen site was such as could not be found elsewhere in London. It was so central that the patients, many of whom came and went many times while being treated, could do so at the smallest possible sacrifice of time and money. It was entirely and permanently open to a northern light, and that gave opportunities for a large number of windows and a proportionate number of chairs, each of which were as essential to a dental as beds were to a general hospital. An increased number of chairs meant more work being done at one time, and that in turn meant a lessening in the time spent in weary waiting by the patients. The freehold of No. 37, Leicester Square has been purchased for £4,000, and £400 has been paid as deposit for the purchase of No. 38,

Leicester Square, both of which would form part of the site of the new Hospital. The property now held by the trustees for the Hospital consisted of the undermentioned freeholds, viz. :—Long's Court, Nos. 1 to 5 ; Green Street, Nos. 22 and 23 ; Leicester Square, Nos. 35, 35a, 36, 37 and 38 ; St. Martin's Street, No. 37 ; together with the site of the existing Hospital buildings, with the exception of one moiety of the Tower House, for the purchase of which negotiations were in progress. To enable the committee to make the above purchases, money had had to be borrowed from the bankers, and to them was owing £18,000, as against £19,650 owing at the end of 1894. There was also owing to the City Bank £3,600, which had been temporarily advanced on the guarantee of the treasurer. In conclusion, the committee acknowledged the obligation they were under to the medical staff, whose untiring labours alone enabled them to carry on the great philanthrophic and educational work of the Hospital ; and to the Secretary, Mr. J. F. Pink.

The CHAIRMAN, in proposing the adoption of the report and accounts, said: Ladies and gentlemen, it gives me very great pleasure to be here this afternoon and to move the resolution I have just read. Though this is the first time I have had the honour of presiding at the annual meeting, I have for a long time taken a great interest in the Hospital, and as perhaps some of you are aware my father was for a long time treasurer of the Hospital and took a very great interest in it, and, I believe, on several occasions he took the chair at the annual meeting. He was also a tolerably large subscriber, and, therefore, it is from him that I inherit a love of the Institution. I have also been acquainted with several gentlemen who have taken a very active part in it, notably Mr. T. A. Rogers, one of my earliest friends. To come to the Hospital itself and its working, I am sure all you who know the Institution must feel more and more that the premises we now occupy are totally inadequate for the work being carried on here. Whether we look at the entrance, or the staircase, or the rooms in which the work is carried on, it is perfectly evident we have completely outgrown ourselves, and it is essential for the good of the patients and for the work of the Hospital itself that we should as quickly as possible get into better and more commodious premises. I rejoice to know that considerable progress has been made with a view to this change. We have now bought nearly the whole block on the same side of

the Square, arrangements have been made for taking up a large mortgage upon it, and at no distant date I hope we shall really begin to build a new Hospital. I think it only right to say that we feel all very much indebted to my friend the treasurer, Dr. Joseph Walker, for the part he has taken in the matter, for his unfailing zeal and pertinacity, and I trust that at no distant date he may see the work crowned with success for which he has so assiduously laboured for some time past. We do get support, but we do not get sufficient support. I have just had a very pleasing letter put into my hands from the Goldsmiths' Company, making a donation of £100 to the funds. Now if we could get all the City Companies to give in that sort of way it would be a very great help to us. And when we consider the number of persons who derive benefit from this Hospital, I really am surprised that the donations and subscriptions are not much larger than they are. Speaking for myself I know scarcely a day passes that I have not an application from somebody for a letter for the Dental Hospital, and very often I have two or three or more in a day. If I have these applications no doubt it is the same with other subscribers, and that at least shows how thoroughly the Hospital is appreciated and how many must know about it; and if all who have benefited by it would only make it known to their friends, I believe we should soon have the funds sufficient for building this new Hospital and carrying on the work under much better circumstances. One would think, as everybody must, I suppose, have more or less suffered with their teeth, that everybody would have sympathy with a work of this kind. It must appeal, I should have thought, to a larger number even than General Hospitals, but I suppose it is thought that the whole thing costs very little, and that there is not much need of help. If only we could get persons to understand the situation in which we are placed, and if those who are interested in the Hospital would come to it and see what a crowded condition we are in, I do believe they would at once say "well, we will take care that the work shall be carried on more efficiently." Of course, the principal object of our meeting is for the sake of the public at large, and all I can say is that the more I know the work the more I shall take an interest in it. I shall hope to give my friend, Dr. Walker, something more later on towards the carrying out of his grand scheme.

Mr. Hepburn, in seconding the motion, said that while thankful

for the support accorded the Hospital, they could not but feel that the sympathy of the public might be with them a little more than it was. It was rather difficult to understand why subscriptions did not fall in more readily to the Institution, but he trusted that when the public knew of the efforts being made to rebuild the Hospital they would come forward with liberal support.

The report was then unanimously adopted.

Certain retiring members of the committee having been re-elected, on the motion of Mr. Hutchinson,

Mr. W. H. Ash proposed, Mr. Storer Bennett seconded, and it was agreed, to add the names of Dr. F. W. Hewett and Capt. H. B. Murray to the committee.

Mr. A. Marsh had great pleasure in proposing the re-election of their treasurer, Dr. Joseph Walker, and remarked that they could not sufficiently thank him for his past services.

Mr. Ash, seconded the proposition, which was carried.

The auditors having been re-elected,

Mr. Hepburn proposed a vote of thanks to the treasurer, the chairman, deputy-chairman, the committee of management, the finance and election committees, and the medical staff. This was seconded by Mr. E. Lloyd-Williams and carried.

A vote of thanks to the Chairman terminated the proceedings.

News and Notes.

THE first annual general meeting of the governors of the Newcastle Dental Hospital was held on February 28th, in the Board Room of the Institution, 37, Nelson Street. The Mayor (Mr. Riley Lord) presided. The Hon. Secretary (Mr. Frank Marshall) read the report of the Provisional Committee, which stated :—"The continuous and steady increase in the number of patients availing themselves of the benefits of the hospital, notwithstanding that its existence is as yet by no means widely known, has already amply demonstrated the necessity for its establishment. Between March 25th and December 31st, 1895, 1,107 patients were treated. The work of the hospital has indeed become so large and important that it is felt an earnest endeavour

should be made to bring its claims before the attention of the public, so that it may be thoroughly equipped and a sufficient annual income secured. It is hoped that in the course of the present year the hospital may be added to the list of Institutions participating in the benefits of the Hospital Sunday Fund. From the audited statement of accounts presented herewith, it will be observed that at the end of 1895 the hospital had a balance to credit of £22 6s. 1d. Against this, however, there were outstanding accounts amounting to £28 17s. 2d., exclusive of current liabilities, such as rent, rates, taxes, &c., so that there was really a deficiency on the nine months' working. It is worthy of note that the voluntary contributions of patients up to the end of 1895 amounted to £7 8s. 5d." On the motion of the Mayor, seconded by Mr. G. R. Brewis, the report and financial statement were adopted. The meeting concluded with votes of thanks to the members of the honorary dental staff for their services during the past year, and to the Mayor for his services in the chair.

THE annual meeting of the Glasgow Dental Hospital was held in the Religious Institution Rooms on February 28th, Sir John Neilson Cuthbertson in the chair. The secretary's eleventh report showed that the cases treated during last year numbered 7,068, and of these no fewer than 3,115 were preservative operations. The increase in the number of patients and students has overgrown the accommodation, so that it has been found absolutely necessary, to enable the work of the hospital to go on, that larger premises should be secured. The directors felt that they would not be justified in proceeding with the building of a hospital meantime until they had a more substantial nucleus of a building fund. They had not been able to conclude negotiations for suitable premises in time for this report. While the treasurer's accounts showed an apparent falling off in the income, as compared with last year, the result of the year, financially, was satisfactory, there being a balance in bank at the close of the account of £167 5s. The public subscriptions and donations amounted to £98, being practically the same as last year. The Chairman, in moving the adoption of the report, said he had heard it attributed to the late Lord Brougham, when his teeth proved rather rebellious at a public meeting, that he said one's

teeth were the cause of discomfort from the cradle to the grave. He (Sir John) believed that that was strictly so. In keeping with the remark, he could not help saying that there was always a sort of feature of the ludicrous in anyone's being afflicted with toothache. It was very difficult to get up much sympathy for a person suffering from toothache. At the same time it was a very real and distressing state of things. He was quite sure that that hospital was doing a great public good in ministering to the wants of those persons who were unable to obtain at their own charges the assistance of a competent dentist. Mr. Harvey seconded, and the report was adopted.

Dr. MILLER narrates that he fed two puppies, of the same litter, the one on food stuff poor in calcareous matter, and the other on an ordinary diet. After six weeks the bones of the latter were quite normally developed, but the tubular bones of the latter were extraordinarily thin and soft, the epiphyses being like little sponges, which could be crushed between the fingers. But he did not notice that the teeth of this animal had developed more slowly or less perfectly than those of the dog fed in a normal way.

DURING the past month the price of cocaine hydrochlorate fell to 12s. 10d. per ounce, which is the lowest figure ever known for the anodyne drug. Soon after the article was introduced in 1884 it was sold at over £32 per ounce. This figure was so profitable that the production rapidly increased, with a consequent great reduction in the market value. Even at the beginning of 1892, however, the price stood at 23s. 6d. per ounce. It is understood that this decrease in price is due to competition by a new manufacturer.

ON the 4th ult. Dr. Walton held an inquest touching the death of Rose de la Mare (13), the eldest of two daughters of the Rev. S. T. de la Mare, superintendent minister of the Wesleyan Circuit, Northallerton. As far as can be gathered, Dr. Tweedy had been attending deceased for the last six or seven weeks for a complication of diseases. She had been suffering excessively from neuralgia, which had rendered her nights sleepless. One side of her mouth was ulcerated with the bad teeth, and it was deemed necessary to

extract a number of them to give relief. Accordingly the doctor called in Mr. Sugden, dentist, and taking into consideration her condition, it was thought necessary to administer chloroform. Deceased was cheerful, and her pulse was beating strongly. One drachm of chloroform was given. After one tooth had been extracted deceased gave a little start and shout, indicating evidently that the chloroform had not taken sufficient effect. The dentist was then proceeding to extract the second tooth, when the patient changed colour, becoming a death-like hue. The pulse giving cause for apprehension Dr. Walton was called in, and the battery and other restorative measures used, but without avail. Dr. Walton said he should not give evidence in his own court, but he could corroborate the evidence of Dr. Tweedy as to doing all they could to revive deceased. In answer to Mr. W. Reed, a juryman, Dr. Tweedy said that he did not consider in this case it would have been better to have administered ether, and he was of opinion that deceased was more than equal to the small dose of chloroform. The jury returned a verdict that deceased died owing to the failure of of the heart's action under the administration of chloroform.

On February 21st an inquest was held on Ernest Henry Tinsley (15), son of Mr. W. H. Tinsley, solicitor, Dudley, who died whilst under the influence of chloroform. The mother of deceased said that the lad desired to join the navy, in order to do which it was requisite that he should submit himself to dental treatment. She took him to see Mr. Morris, Castle Street, who advised him to have eleven teeth extracted. Dr. Bellingham said he carefully examined deceased's heart and chest, and came to the conclusion that he was justified in administering chloroform. Insensibility having been produced, one tooth was extracted, when deceased showed signs of recovery, and witness again administered the chloroform. When the operation was completed, Tinsley appeared to be in a condition usual with chloroform patients, but soon after his pulse ceased, and he expired. Dr. Messiter, who had made a post-mortem, said he should have been prepared if the case had been under his treatment to have administered chloroform. He considered that the anæsthetic was properly administered. The jury, in returning a verdict of "Death from misadventure," expressed the opinion that no blame could be attached either to the doctor or the dentist.

THE *Medical and Dental Registers* for 1896, which are of such great importance to the medical profession, are just published. The tables given at the beginning of the *Dental Register* we turn to with interest. These, however, show but little variation compared with those of last year; such as there is, however, is in the same direction as in previous years; an increase of those registered in virtue of the possession of a diploma and a diminution in those in practice before 1878. The figures must, however, be taken as only approximately accurate, for, in the first place, many of those having the right to be registered have apparently not done so, and on the other hand the Register contains the names of many who cannot be found at the address given, and of not a few who are dead. During the year one name less has been registered than in 1895. For the first time for three years the Dental Committee held during 1895 two meetings, the average being 1.3. In 1894 the Committee did not meet. We notice that the President's period of office terminates in May of this year, but he is eligible for re-election. With reference to the balance-sheet of the Dental Registration Fund, we certainly cannot blame the Council for overestimating the value of the £8,000 $2\frac{3}{4}$ Consols, when they put them down at about £$96\frac{1}{2}$ per cent.

THE Home Office Committee on the causes of the explosion of gas cylinders and on the precautions to be observed during the manufacture of gases has issued their report. The members of the committee were Professor Unwin, F.R.S., Professor Boys, F.R.S., Professor H. B. Dixon, F.R.S., Dr. Dupré, F.R.S., and the Rev. F. J. Smith, F.R.S. They state "that the manufacture of compressed liquefied gases is carried on on a large scale and by many different manufacturers in different places, and so far as can be judged the manufacture is likely to increase still more, and the compressed gases are tending to become indispensable auxiliaries in various important industries." That the risks of explosion of cylinders of compressed gases are due (1) to negligence in the manufacture, annealing and testing of the cylinders; and (2) to neglect of precautions in filling the cylinders. "Looking to the magnitude of the trade, the risk to the public and to users of the gases, and the partial and imperfect regulation attempted by the action of the railway

companies," the Committee think "that some control of the trade by official inspection is required." They suggest that this inspection should be under the direction of the Factory Department of the Home Office, or a Department of the Board of Trade, and that it should be directed to all matters referred to in the report as important in securing safety. The description and manner of testing to which cylinders should be submitted are detailed with care and at some length, many of the conclusions being based on experimental evidence conducted at Woolwich Arsenal and elsewhere.

Abstracts and Selections.

PROSTHETIC DENTISTRY.

By L. P. Haskell, Chicago, Ill.

When I commenced work in a dental laboratory, fifty years ago, wax was the material used for impressions, my preceptor having first commenced the use of plaster. At that time tin was used for dies, and of course the counter die had first to be made by drying the plaster model, and holding it in the lead, and then casting the tin into that. A few years later, after having used zinc, type-metal, and even brass castings, I ventured to try Babbitt-metal, then just introduced for machinery bearings. I have found it the only alloy suitable for dental dies, the necessary qualities for which are non-shrinkage, sufficiently hard not to batter; sufficiently tough not to break, and making a smooth die. Nothing has so simplified the fitting of plates as the use of this metal. The proper formula is: one part copper, two parts antimony, eight parts tin. As pure lead cannot be pounded upon this without danger of adhering, the melting temperature is reduced by the addition of tin: five parts lead, one part tin.

In the preparation of the model for the die one thing is largely overlooked, viz., that the centre of the palate is hard, and the only portion of the upper jaw that never changes, while the alveolar ridge gives way from absorption caused by undue pressure, and more especially from the retention of undue heat of rubber plates. Unless provision is made for it, the plate sooner or later rests and rocks over the hard centre. This is remedied by a "relief," a film of wax with the edges champened thin. No air-chambers are needed in full

upper plates ; in many cases they are positively detrimental to a successful use of the plate.

Since the introduction of a *pure* aluminium there is no reason why a patient should wear rubber for *permanent* work. It makes a rigid plate, and I never have been able to discover that it is affected by the secretions ; have worn a plate in my own mouth for more than a year to test it. In attaching the rubber the use of the "loop-punch" removes the difficulty of securing close adhesion of rubber to the plate. In thickness it should range from guage 24 to 22. In swaging aluminium, if there are deep undercuts, cut away the portion of *counter-die* which fills the undercut, as otherwise the plate may tear ; then, when swaging is finished, burnish or hammer the plate into the undercut. For annealing, hold the plate over a Bunsen burner till a match chars over it.

In case of heavy under cut make a core of plaster and asbestos, as it has a fibre to hold together. Dry thoroughly, mould and replace core in the mould and cast.

Too much attention cannot be given to the correct articulation of dentures. More failures result from faulty articulation than from any other cause. None of the six anterior teeth should meet ; the pressure should be upon the bicuspids and first molars : exact pressure on both sides. If there be a second or third molar that has assumed an angle of 45 degrees, or thereabouts, the upper molar should not meet its face, for thereby the plate is crowded forward.

Dr. Bonwill, some thirty years ago, made an exhaustive study of the subject of the principles involved in nature's arrangement of the teeth, and discovered certain great underlying principles. He ascertained that the six anterior teeth form the arc of a circle, the radius of which is determined by the combined width of the central, lateral and cuspid teeth. A circle of brass, or other metal, of which this is the radius, if applied to the cutting edges of the incisors leaves the cusp of the cuspids a trifle outside, and the first bicuspids right on the margin, same as incisors, leaving about one-third of the second bicuspid outside the circle, and including the anterior lingual corner of the first molar. A line drawn through the centre of this circle will always pass through the centre of the second bicuspid, and a line across the posterior periphery of the circle passes across the posterior margin of the second molar, thus showing the relation of the different classes of teeth to each other as regards width.

This is easily demonstrated by applying it to the natural teeth when they are not displaced. This rule is of great aid in the arrangement of artificial teeth.

Dr. Bonwill also discovered that the lower jaw forms an equilateral triangle, varying not more than a quarter of an inch from four inches from top to top of condyle, and four inches from condyle to median line of alveola. There is no doubt that his method of arranging teeth by the use of his articulator is the correct one, if artificial teeth were made like nature's in all respects. Unfortunately the combinations of teeth—the posterior to the anterior—are usually much out of the way. Often large anterior have small posterior, and vice versâ. Then again, as a rule, bicuspids and molars have generally too small masticating surface. While the lingual cusp of the upper should always be shorter than the buccal, they are usually made as long. A very serious fault with bicuspids and molars (in rubber teeth) is placing the pins so near the crown as to leave but little cusp above it, so that in articulating it is often ground off, or nearly so ; not only this but it brings the artificial gum too near the crown. This is often the case in the longest of teeth, when it is totally unnecessary. Justi's teeth are freer from these faults than any that are made. In arranging an upper set to lower natural teeth, it must be remembered that whatever the position of the lower anterior teeth the uppers must be arranged symmetrically, as they give expression to the mouth more than the lower ones. In arranging a lower set, begin with the bicuspids, so as to insure correct articulation ; then, if necessary, crowd or lap the anterior teeth. Avoid too close closure of the jaws, as it not only gives a bad expression to the mouth, but renders it more difficult for the patient to use them. However, in old people the jaw is thrown forward by shortening of the ramus, and the lower teeth had better not be made as long as they should otherwise be.

Select *plate* teeth with straight or perpendicular pins, as the teeth are stronger and less liable to break in soldering and in wear than the cross-pins. There is no difficulty in soldering if all the conditions are right. Close up any spaces under the backings, which should be of thicker gold than the plate, gauge twenty-four. Do not rivet the pins, but split, and then the solder will flow down the sides of the pins. Apply the borax and solder, cut in small pieces. Heat up

over large burner, hot as possible, and with the blow-pipe apply the heat at first to the *centre* of the plate, as the backings are so exposed they heat first, and the tendency of the solder is to flow when it is hottest. A large-flame gas-soldering burner in a horizontal position, such as manufactured by H. D. Justi, at my suggestion, will be found better than anything heretofore used. The mouth blow-pipes sold at the dental depots are simply jewellers', who use low carat solders, and have no investment to contend with. The dentist needs a much larger one, the mouth-piece of which is pressed against the lips so the muscles are not fatigued, and he can blow a larger blast. The dental supply companies now furnish such a one, made at my suggestion.—*Pacific Stomotological Gazette.*

TREATMENT OF PYORRHŒA ALVEOLARIS.

As regards the constitutional treatment of this disease, Dr. Pierce and Dr. E. C. Kirk, two firm believers in the efficacy of constitutional treatment, and equally firm in the belief that uric acid troubles in the mouth cannot be cured or even benefited permanently without such treatment, Dr. Pierce has had and is having absolute cures from his form of treatment, which is as follows. Almost invariably patients suffering from pyorrhœa alveolaris will, upon inquiry, be found to be large feeders, and above all large meat-eaters, taking little or no exercise, frequently addicted more or less to the use of alcoholic liquors. In the first place all butcher's meat—such as beef, mutton, veal, &c.—is forbidden, in its place is substituted a diet of fish, the white meat of fowls, oysters, soft-boiled eggs, and milk; alcohol in every form is forbidden, and the patient is given the following treatment: fifteen minutes or half-an-hour before breakfast a glass of hot water with a five-grain tablet of tartarlithine dissolved therein, before luncheon another five-grain tablet in a glass of hot water, and after dinner the same dose is repeated, then at bedtime a glass of hot water without the tartarlithine is taken; so that the patient receives fifteen grains of tartarlithine and at least two quarts of hot water during the day. The tartarlithine dissolves the urates, and the hot water washes them out and aids their excretion in the urine. This treatment is kept up for several weeks, when the dose is gradually decreased, until but five grains of the tartarlithine are taken per day, but the hot water is kept up as before. Locally, any deposit there may be is carefully removed and

the pockets treated with peroxide of hydrogen to remove any trace of pus there may be present, then washed out with a solution of hydronaphtol—one drachm to two ounces of water.

The patient is then given a prescription of hydronaphtol, ten grains; alcohol, one ounce; glycerin, one ounce; and water two ounces, and told to take a few drops and rinse the mouth several times a day. Under this treatment Dr. Peirce has had in every case marked and rapid improvement, and in several cases absolute recovery. Dr. Kirk's treatment is very similar to the above, except that he gives larger doses of the tartarlithine, in some cases as high as forty grains being given in the twenty-four hours; he also recommends in some cases the use of salicylate of ammonia, one drachm divided into six powders, taken three times a day; also tartarlithine and cascara in combination, and reports equally gratifying results as those treated by Dr. Pierce. It must be remembered that, as this is a constitutional disease, at least I firmly believe it to be, if the patient goes back to the former mode of living, with the use of butcher's meat, alcoholic drinks, lack of exercise, etc., the blood will again become charged with an excess of uric acid, the deposit will, in all probability, be again formed upon the teeth, with the subsequent formation of pus, etc., and all the symptoms of hæmatogenic calcic pericementitis be again present.

In this connection of uric acid in relation to dental disease, I believe, and I think those who have had more experience in its study and treatment than I, will bear me out in the statement, that in many cases of pyorrhœa erosion is also present, to a greater or less degree, and from the same constitutional causes. In those cases where there is extreme wasting away of tooth-structure and perhaps no symptoms of pyorrhœa present, if the general health of the patient is inquired into, and his mode of living, it will be found that the symptoms are almost identical with those resulting from pyorrhœa, and that sooner or later the individual will be found to be a sufferer from rheumatism or gout, which are closely allied in the uric acid diathesis.—George Darby, in *International.*

COCAINE.

When Peru was taken by the Spaniards, the inhabitants were observed to be particularly fond of a certain shrub; in fact, quite dependent upon it. They regarded it as the heavenly tree which

satisfied the hungry, strengthened the weak, made man forget his misfortunes, and they consequently almost worshipped it. The rude invaders forbade its use, claiming that it was a weak people who demanded artificial support. The discontinuance of its use by law caused an alarming amount of sickness and other infirmities, with so many deaths, that the cultivation of the shrub was again ordered.

The alkaloid is obtained from erythroxylin coca, which grows to a height of six to eight feet, having numerous branches. It is raised in deep, warm valleys of Peru, Bolivia, Colombia, Brazil and the Argentine Republic, at an altitude of 5,000 to 6,000 feet. Three times a year the leaves are collected with the greatest of care, so as not to injure them. After being carefully dried in the sun, the leaves are packed in certoes of 30 pounds each, and are exported to London, the wholesale drug market of the world. It has been estimated that 40,000,000 pounds are shipped annually. In 1853 the coca leaf was investigated, but nothing save the coca tannin determined. In 1855 Guedeke found a crystalline principle, and called it erythroxylin, which Losson, in 1865, affirmed, but changed the name to cocaine.—E. J. Hausle, D.D.S., in *Dental Practitioner*.

ANCHORING LARGE CONTOUR FILLINGS IN INCISORS.

Let us suppose we have a large mesial cavity on a left npper central incisor. There is little penetration of the decay toward the pulp, but the entire mesio-occlusal angle of the tooth is gone. This form of cavity apparently presents greater difficulties to the average operator than where the decay has penetrated deeper. In the present method of preparation the cervical half of the cavity is shaped in the usual way, being liberally extended cervico-labially and cervico-lingually. To obtain anchorage at the occlusal portion of the filling instead of drilling into the axial wall in the ordinary manner a groove is cut along the occlusal surface leading from the cavity distally to near the disto-occlusal angle. This groove must be made sufficiently wide and deep to admit of a large enough mass of gold being packed into it to insure strength, and in order to accomplish this in teeth with thin occlusal surfaces it is often necessary to cut away the lingual plate of enamel somewhat freely. This may be done with safety provided the enamel margins are properly bevelled and gold built over them in the insertion of the filling. The distal end of the groove may be deepened somewhat

to assist in retention. The philosophy of this form of anchorage consists in two things :—First, it will prevent absolutely the tipping of the filling previously alluded to, and second, it increases materially the seating capacity of the filling. With the form of anchorage just outlined it becomes impossible for a filling to get out of a cavity short of a breakage, and if the mass of gold is made thick enough it will not break. Some operators may feel a hesitancy about drilling into sound tissue in this way for anchorage, but it must be remembered that in the preparation of any cavity sound tissue is often sacrificed for this purpose. In this instance I am convinced that it is sacrificed to good account, and I feel sure that when the operation has once been done in this manner the operator will to a large degree find his hesitancy gone. There is a feeling of security when the gold has been built well over and anchored into the occlusal surface that does not obtain in any other kind of cavity formation for this class of fillings. Another objection might seem to rise in the apparently unprotected labial plate of enamel. The labial plate is always left standing for appearance, even when the lingual must be cut away for strength, and if not properly protected might prove an element of weakness. But by carefully bevelling the enamel margin and building gold over the bevel, it is so perfectly protected that in all my experience with this method I cannot recall a single instance where this wall has failed. The acute corner at the mesio-occlusal angle should be rounded slightly, and the same corner on the lingual plate should be cut freely away so that the outline of the filling is a gentle curve from the proximate to the occlusal surface.

This form of filling provides an adequate protection for the end of the tooth, and does away with what is ordinarily a vulnerable point in most fillings of this class when coustructed in the usual way, viz., the junction between gold and enamel at the occlusal surface. The slightest chipping away of the enamel at this point is often disastrous, and results in final destruction of the filling. Again, there is opportunity for deeper and firmer anchorage without danger of approaching the pulp than where an undercut is drilled into the axial wall. The cavity is rendered free of access for the insertion of the filling, and while more gold is used, it is more readily inserted and is hidden from anterior view by the labial plate of enamel. A filling of this form therefore looks no more conspicuous in front than where the occlusal surface is left intact.—C. N. Johnson, in *Dental Review.*

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Original Communications.

NOTES ON THE TREATMENT AND FILLING OF TEETH.

By W. CASS GRAYSTON, L.D.S.

(*Continued from page* 154.)

Small round or oblong cavities that are surrounded by walls and are freely exposed by bevelling away the approximal surfaces can be filled as if they were crown cavities, using, of course, instruments sufficiently curved to reach them easily. If they are not freely exposed, the cavity must be extended in the direction of either the lingual or labial wall, and filled as above described, with the exception that it is usually more convenient to pack the first pellets against either the labial or lingual wall, depending on the opening. Where both the lingual and labial walls are badly broken down, there is usually plenty of room to work the gold partly from the front and partly from the back. It is impossible to prevent the gold from showing, and cutting for access can usually be freely done. In these cases the gold must first be very solidly packed into as deep retainage as can with safety be made at the cervical edge, and carefully carried over this border, and a thick layer of gold made at this part. It is then carried downwards over the floor and to the cutting edge, and then the contour built up by working directly on to this mass of gold. It is very important for all the gold in a case of this kind to be thoroughly cohesive, and worked with great care into whatever grooves or undercuts can with safety be made at the sides and cutting edge. In filling cavities cut from the back, it is frequently necessary and often a great convenience to work by reflection in the mouth mirror. This should present no difficulty to any one who has had a little experience in its use. To fill these cavities with non-cohesive gold from the back use as large a pellet as can be conveniently introduced, and press it well up to the cervical wall, place another against the labial wall and press it up to the cervical, taking care that the side of the pellet in contact with the labial wall is well condensed. Proceed in this manner until the cutting edge is reached, then firmly press a pellet between the gold

already packed and the cutting edge, and work it well into the undercut at this part. If preferred, a pellet may be placed at the cutting edge so that a little space is left between it and the rest of the gold, and the keying piece introduced between the gold thus placed in the cutting edge and the rest of the filling. Take care also that the gold projects beyond the orifice of the cavity at the cervical, labial and cutting edges. Now press all the gold in the direction of the labial wall, and condense it with lateral pressure as much as possible. This will usually leave an oblong trench like space still to be filled at the lingual wall (in using non-cohesive gold the cavity should always be so prepared that it is surrounded by walls). Personally, I think it is much better to fill this space with cohesive gold, but if it is desired to use only non-cohesive, a pellet of suitable size should be introduced and pressed towards the cervical part of this space, and the cavity in this manner filled about half way down. Then commence at the cutting edge and in like manner work upwards until the centre is nearly reached, one or two pellets then wedged between these two masses of gold will key them in place. All the gold at this part must be very carefully condensed down with fine points, and if any holes can be made in it they must be filled up by driving small pellets into them.

Be careful to work the protruding gold over the cervical and labial edges as previously described. In filling from the front the method is the same, treating the lingual wall as if it were the labial. The labial wall must not be sloped outwards, as for cohesive gold, but any undercutting here into which the gold cannot be pressed with

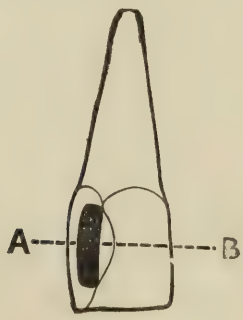

FIG. 12.

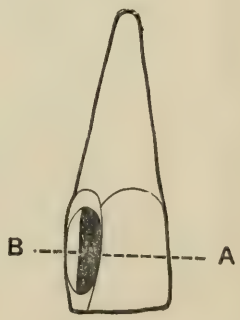

FIG. 13.

FIG. 12.—A. Gold packed from the back. B. The space at the lingual surface to be finally filled.

FIG. 13.—A. Gold packed from the front. B. Space at labial surface to be finally filled.

ease and certainty is best avoided. The trench-like space will in this case be at the labial wall and filled as above described. If, however, there is room, a layer of gold may be first packed against this wall and the filling completed by wedging pellets between this layer and the rest of the filling. (Figs. 12 & 13.)

In filling the incisors and cuspids, as well as all shallow cavities with non-cohesive gold, the pellets and cylinders must not be too dense, or it will be difficult to make them stay in place while they are being packed.

The above descriptions, in addition to those given for the filling of crown cavities, will render unnecessary any detailed explanation of the filling of smaller cavities between these teeth.

Molars and Bicuspids.—To fill an approximal cavity in a molar or bicuspid, opened through the crown as already described, a pellet of unannealed, or soft foil may be placed in the angle formed by the juncture of the cervical and one of the lateral walls, first making a little undercut to deepen this angle if necessary. Another one may be placed in the opposite angle and a third wedged between them, or a large pellet may be placed directly against the cervical wall and held in place with an instrument in the left hand, while smaller ones are wedged between it and the lateral walls and into the angles on both sides. This gold is then condensed and made solid at all parts, working it principally towards the angle formed by the cervical wall and the floor. (Fig. 14.) It is important for the gold to be worked

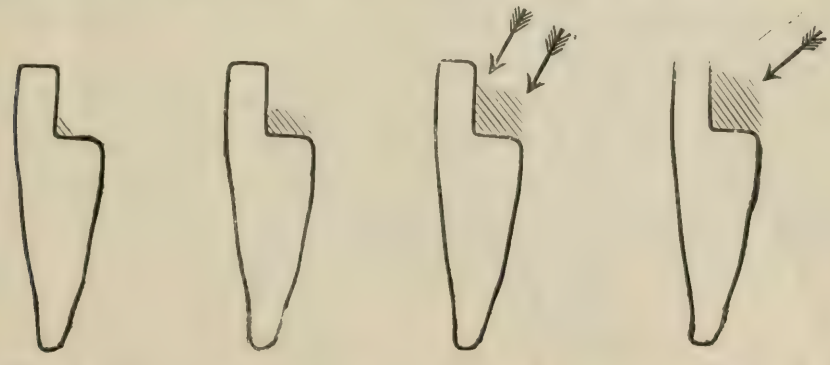

FIG. 14. FIG. 15. FIG. 16. FIG. 17.*

in this manner, for if it should extend in a thin layer over the margin it will be apt to curl up or be drawn away during the

* The above sketches are not intended, nor are many of the others, to be actual representations of teeth during the process of filling. They are merely diagrams to illustrate the text. The arrows show the directions of force in building the old.

subsequent manipulation, and either a slight space or a depression left at this part, causing in all probability rapid failure of the filling. On to this foundation cohesive gold is packed, being careful to work it in the same direction until the cervical wall is thickly covered and the gold well wrapped over it. (Fig. 15.) Now build up the filling crownwards, preferably with a small foot plugger, if thin tape is used, in such a manner that the gold is worked with the point or toe well against the walls and into any undercut that may have been made here, and then by placing the heel in the cavity and the toe outwards, work the gold carefully up to and over the edges and build up the external surface convex so as to restore the contour, thoroughly consolidating the whole of the gold, including the surface as the work proceeds. (Figs. 16 & 17.) If there is any difficulty in wrapping the gold over the edges, use for this purpose a hand plugger with broad condensing surface. (Figs. 18 & 19.) When the filling reaches the crown carry it well across the floor of the coronal cavity, and then carefully and solidly fill the retaining undercut at this part, and then complete the filling by working backwards to the approximal surface.

In cases where it is difficult or impossible to start the filling at the cervical wall without undue or undesirable undercutting, commence at the coronal undercut, work along the floor of the crown cavity, then carry the gold over the approximal floor until the cervical wall is reached, carry it along this and pack the gold here as above described until a firm strong border is made, and then complete the filling by working crownwards.

If desired, a starting point can be made at one or both of the cervical angles, and the filling commenced with annealed gold, gradually working small pieces from one angle to the other across the cervical wall until a firm foundation is made.

FIG. 18.

FIG. 19.

When it is necessary to use hand pressure in posterior cavities owing to difficulties of access, the gold is best packed with small and medium sized points, and the wrapping over the edges may be done with suitable surface pluggers. These instruments should also be used in connection with the points for consolidating and giving form to the surface as the contour building proceeds. In addition to the two already illustrated (Figs. 18 & 19), Nos. 25, 26, 29 and 30 of the Darby Perry set will be found useful. With non-cohesive gold place cylinders in position at the cervical wall in the manner described for starting with unannealed gold, but take care that the ends project somewhat beyond the walls. Proceed in this manner using a fine point against the walls until the crown is nearly reached, and then commence at the coronal undercut and work backwards until the approximal gold is approached, then wedge cylinders firmly between these two masses of gold to key them in place, and finally condense the protruding gold as much as possible. (Fig. 20).

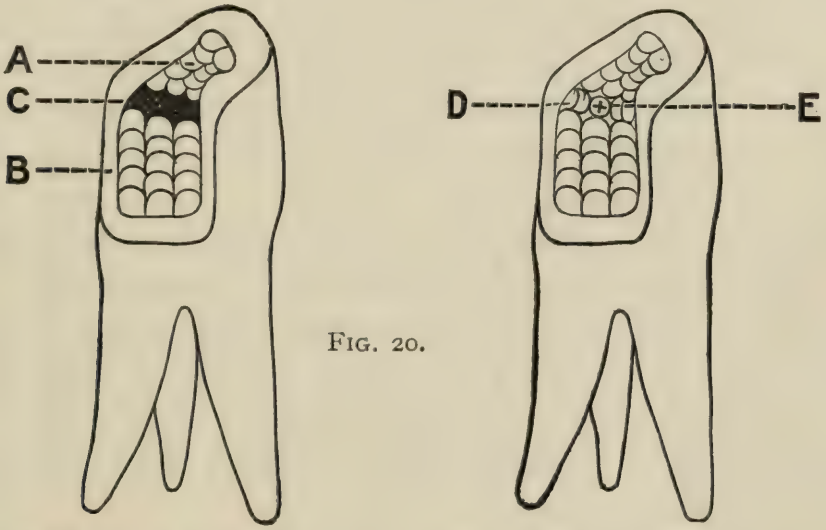

FIG. 20.

A.—Gold packed in the coronal part. B.—Gold packed in the approximal part. C.—Space left between the two masses of gold. D.—Pellets or cylinders wedged between the two masses of gold, commencing at either end of the space, and finally introducing the keying piece E in the centre.

Matrices.—In filling cavities on the mesial and distal surfaces of bicuspids and molars prepared as already described, many dentists use a matrix, and consider it enables the filling to be more rapidly and easily packed ; others think it is of no value, and some hold that it is a distinct disadvantage. It is considered by many that it interferes with freedom of manipulation, and that any saving of time and trouble is obtained at the expense of the work : imperfect

margins usually resulting. It appears to me that if the filling is made entirely, or almost entirely, of cohesive gold, it will prove of no advantage—rather the contrary—while if soft gold is used until the masticating surface is nearly reached, there are many cases where it can be used with excellent results, and often time is saved.

After fixing the matrix, pellets of soft gold should be wedged to place as previously described, and carefully worked against the cervical wall and lateral walls and against the matrix, being very careful to pack the gold accurately into the joint formed by the matrix and the walls. When the masticating surface is reached cohesive gold is used, and if it is well anchored into the coronal part of the cavity there is no fear of the filling standing any ordinary strain. It is advisable, however, to notice the articulation before putting on the rubber dam; it is necessary for the soft gold to be protected with a certain thickness of the cohesive, and if the opposing tooth should have long cusps, and this should not have been observed, it may be necessary to cut away so much gold in order to adjust the bite that the softer portion of the filling is exposed to the force of mastication and may consequently break down. On the removal of the matrix the soft gold will be found to "give" somewhat under the burnisher, but will be sufficiently hard to take a nice finish, and a well contoured filling is obtained. The Lennox matrix is scientifically constructed, easy to adjust, and answers all requirements.

Instruments for Packing Gold.—The pluggers used for filling teeth with gold are many and various. Such a great number have been designed that it is hard to make a selection. The difficulty is not so much in knowing what to choose as what to reject, for it is impracticable to regularly use more than a certain number. The following are all useful.

FIG. 21.

* The point of this instrument should be in the same line as its shaft.

Two or three sizes of point of each instrument should be used, varying from about one thirty-second to one sixty-fourth part of an inch in diameter. A small foot plugger, such as No. 12 of the Ladmore set, should be added (Fig. 22), and also some of the surface pluggers already alluded to. One or two ball-ended burnishers for exposed surfaces, and one or two thin flat ones for use between the teeth will complete the set. In packing gold it is of great importance to adapt it as accurately as possible to the walls of the cavities. It is rarely that an absolutely moisture-tight filling is produced, but the more nearly perfection is attained in this respect the better for the preservation of the teeth.

FIG. 22.

The best adaptation is produced by working the gold directly against the walls. In filling a crown cavity of medium size for instance, with cohesive gold, the best adaptation will always be found to be against the floor, because this is the only part that the point of the plugger works directly against. In very many cases working directly against the walls is principally a question of using suitable instruments, and I beg to call attention to Nos. 6 and 7 (Fig. 21) as being very valuable instruments for this purpose. They are long well curved corkscrew pluggers, and are taken from the Libbey set.

Finishing Gold Fillings.—When the filling of a cavity is completed, the surface of the gold should be further consolidated and rubbed somewhat smooth with a burnisher, using firm pressure. The gold is then to be trimmed to the desired shape, the edges brought to fine lines and the filling generally made fairly smooth with files, fine cut burrs, stones, emery or sand paper strips and discs, etc., using one or more of the above as necessary. The burnisher is again to be thoroughly used, and if desired, the filling may be finally made as smooth as possible with a suitable polishing powder applied in any convenient manner. Some dentists are opposed to the use of a burnisher, they consider it unnecessary if the filling is of solidly packed cohesive gold, and that it has a tendency to give the surface a wavy or slightly furrowed appearance, and imparts a lustre to the gold very undesirable in exposed positions.

A burnisher will, however, consolidate and harden the surface of solid metal. I am informed by a silversmith that the burnishing of silver goods hardens the surface and adds greatly to their durability. In order to obtain a fine finish they are also always polished after-

wards. If a burnished gold filling is afterwards carefully polished, the æsthetic objection falls to the ground. The finishing of gold fillings is often tedious, and takes up much time; there is usually very little space to work in, and freedom in the use of the methods employed is in many cases impossible. It may, however, be laid down as an axiom that extra care and time spent in preparing a cavity will facilitate and improve the filling, and that extra care and time spent on the filling will reduce the time and labour necessary to spend on the finishing.

Mallets.—Before leaving the subject of filling teeth with gold a brief consideration of some of the various mallets that are used in connection with cohesive gold may be useful.

It is probable that no better work has ever been accomplished than that which is done by means of the old fashioned hand mallet. No other percussive instrument enables the dentist to feel so exactly what he is doing, and to vary the force so accurately and delicately. In order to use the hand mallet with ease and precision, it is necessary to employ an assistant. Very few operators are ambi-dextrous, and, even if a dentist is equally skilled in the use of both hands, an assistant is often necessary to hold back the cheeks of the patient and to throw light into the cavity with the mouth mirror. The necessity therefore for a skilled assistant will always prevent its general adoption, more especially so as some very efficient substitutes have been invented. These substitutes are the automatic, engine, electric and pneumatic mallets, all of which are so well known that a detailed description of each one is unnecessary.

The improved automatic mallet is a very efficient instrument: as a condenser it is as good, if not better, than the hand mallet; its action is, however, slow, and its use takes up a great deal of time.

The Electric Mallet (Dr. Bonwill's) is an extremely rapid striking instrument. It is very popular with many of the most skilful operators. Personally, judging by tests made out of the mouth, I have never been able to make an absolutely cohesive filling with it. I should not like to say however that in certain hands the results obtained by it are anything but satisfactory.

Of the various engine mallets the Bonwill is the best known. This is also a fast striking instrument, and in favourable cases more rapid work has been accomplished by its use than by any other means. The cohesion and solidity produced by it are excellent. To use it satisfactorily, a Bonwill engine, or some other engine, by

means of which the mallet is practically suspended, is necessary. If it is used with either the S.S. White's Cable Engine or the Shaw (even with a slip joint) there is "a pull on the hand" that is very disagreeable.

A good pneumatic mallet more nearly approaches the action of the hand mallet than any other substitute. For some reason or other this kind of mallet has never received the appreciation that I think it deserves, and I take this opportunity of saying a good word for it. Whether it is useful or not greatly depends on the principle of its construction. If the plugger point is screwed into the hand-piece so that they form one rigid plugger, and the blow is given *above* the hand-piece so that it receives the full force of it, the operator knows what he is doing and can regulate the force of the impact far better than when he has to hold a case in which the plunger works.

I have used a pneumatic mallet constructed on this principle for some years with great satisfaction. The Lennox-Thomas Pneumatic Mallet, worked with a foot bellows, gives a rapid continuous succession of blows similar to the electric and engine mallets. It appears to be a very good instrument, but I have had no practical experience in its use.

The Manipulation of Plastic Materials.

Amalgam.—The directions given by the manufacturers of amalgams, many of whom either are or were dentists, are often contradictory and confusing. The method that appears to give the best results, and which is adopted by many dentists, is to insert the amalgam in a fairly plastic condition, varying according to the case, but always sufficiently soft to be easily and thoroughly well adapted to all the walls.

When the cavity is lined and partly or wholly filled with the plastic mass a much drier mix is made, squeezing it, if desired, into a wafer like form. This is added to and incorporated with that already in place until the cavity is over filled. The surplus is then scraped away, and if the surface of the filling is found to be sufficiently hard, it is trimmed with suitable instruments, and finally smoothed and condensed with light burnishing. If the surface is not sufficiently hard, it is again alternately built up and scraped away until sufficient quicksilver has been drawn from the filling into the overlap to admit of proper finishing.

The quicksilver is worked up to the surface by pressure, and this method of absorbing it with surplus amalgam is a convenient means of obtaining as good results as are possible with amalgams. It is advisable to go round the edges of all masticating surfaces with a spoon excavator to remove any thin overlap that would probably soon chip or break away. Straight edges are preferable to bevelled ones in using all plastic materials. Many operators use a matrix in filling all compound approximal cavities in molars and bicuspids with amalgam ; they claim, and with good reason, that greater pressure can be brought to bear on the filling, and consequently more of the quicksilver is absorbed than if it is dispensed with.

Tin Foil.—Tin foil is usually prepared and manipulated like non-cohesive gold. To work it cohesively, use a flat instrument with the edge rounded into a segment of a circle and made sharp by bevelling in one direction. Press the pellets firmly to place one by one with the bevelled side, and then work each one into the greatest possible solidity with the sharp edge.

Phosphate Cements.—The manipulation of phosphate cement varies somewhat according to the preparation that is used. A method that is the best for one kind will probably give very bad results with another. All agree that the powder should be worked gradually and thoroughly into the liquid ; it is the question of the thickness of the mix and whether the desired consistency shall be attained by addition of the powder solely, or by continuing to manipulate a thin mix on the slab (without adding more powder) until it becomes sufficiently putty like to be placed in the cavity. Everything probably depends on the manufacture of the ingredients themselves. I find that following the directions sent out with the phosphate cement I use enables me to obtain the best results with it, viz., to make a mix of about the consistency of softened gutta-percha, and, if desired, to add as much powder as can be done without making the cement crumble ; kneading it with the thumb and fingers before insertion. A cement filling should be pressed to place at once with a flat spatula like instrument, and if necessary worked well up to all the walls with blunt points. In some cases, especially if the retainage is doubtful, it is well to plaster a soft mix in the cavity at first, and then to press in as stiff a mass as can be made without crumbling

(*To be continued.*)

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting of the above Society was held at 40, Leicester Square, on the 13th ultimo, the President (Mr. David Hepburn, L.D.S.Eng.), in the Chair.

The minutes of the previous meeting having been read and confirmed, Mr. E. L. Dudley and Mr. H. D. Matthews were admitted members of the Society.

Mr. C. S. de Prideaux, of Dorchester, was proposed for membership. Mr. G. H. Bowden, of Reigate, and Mr. D. Rubery Chambers were ballotted for and elected members.

The Curator (Mr. Storer Bennett) stated that Mr. W. F. Forsyth had presented to the Society two specimens of old bone work, one a very beautiful specimen, showing the insertion of natural teeth in front of the case. This specimen, although it looked so clean, had been worn for some months, and was an instance of work which nowadays one never had an opportunity of seeing. In the other specimen tube teeth instead of natural teeth were used, and two pins were to be seen, showing that swivels had been employed. Mr. Forsyth had also presented an ancient instrument for the extraction of teeth. Though clumsy in appearance it was a very ingeniously constructed and beautifully carried out piece of mechanism. By closing the handles of the instrument the outer blade which ought to lie on the buccal side was driven forward and firmly grasped the tooth for a certain distance, but not to such an extent as to close up entirely and crush the tooth. After a certain amount of closing had been arrived at the whole blades are bodily raised and the tooth drawn out of its socket. Mr. Whatford, of Eastbourne, had sent an interesting model showing a large geminated mass between the normal left upper central and the normal left upper lateral incisor.

Mr. Charles A. Clark presented a photograph of a second lower molar taken by the Röntgen rays. It would be seen that the roots were shown as well as the pulp and the enamel. It was taken by carefully covering the plate in the mouth with black

paper to protect it from the ordinary light, and rubber-dam was used to protect the plate from moisture. The bulb was held close against the tooth and the exposure was four minutes.

Mr. MARMADUKE SHIELD then read a paper on "A Case of Aneurism by Anastomosis involving the Vessels of the Hard Palate." The patient was a retired officer, aged 57, and had suffered from liver affections, but never from malaria. In 1893 he had an accidental fall and broke his nose. He had repeatedly suffered from severe epistaxis referred to the congested condition of his liver. On January 15th last bleeding occurred into the mouth, and he lost about half a pint of bright blood. Considerable bleeding also occurred on the two succeeding days. An ulcer the size of a three-penny piece on the left side of the hard palate was noticed about opposite the second molar tooth and close to the alveolus. Arterial blood was spurting in a jet from the centre of this, and the patient was losing a quantity of blood, his mouth being filled with clot. Mr. Shield on being called in made a very gentle examination and found a pulsatile swelling the size of a filbert occupying the tissues at the base of the alveolar basis. Its margins were not defined, but faded away imperceptibly. The pulsations were so strong as to lift the examining finger, and felt exactly like those of an aneurism. There was one large pulsating vessel posteriorly, the compression of which did not alter the pulsation of the tumour. The teeth were quite sound, and the morbid swelling, whatever its nature, terminated abruptly at the base of the gums. The ulcer was quite superficial, and devoid of any induration or distinct margins; it looked like an accidental abrasion from hot food or a piece of bone. There was nothing to be seen on inspection of the nares, and there was no bulging of the palate generally to indicate a protruding antral tumour. After reflection, seeing the inevitable uncertainty of an exact diagnosis, the great hazard of cutting into or cauterising the growth, and the desirability of definitely stopping the bleeding by some proceeding which would be sure and certain, Mr. Shield advised that a portion of the maxilla should be removed so as to ensure complete extirpation of the growth. The patient at once acceded to the suggestion. The operation was performed on the 20th of the same month with saw and cutting bone forceps. The lip and side of the nose being incised, and the tissues reflected. There was no unusual bleeding. A portion of the upper jaw was

removed, comprising the whole alveolar margin from the second incisor tooth, and the hard palate as far as the middle line. The posterior palatine artery spurted persistently, and was only restrained by plugging the canal with a spicule of wood. Mr. Shield drew special attention to the advantage of the lateral posture in all these operations, with the head well hanging over the edge of the table. The horse-hair sutures were removed in a week, and union of the lip was proved firm and good, the cicatrix scarcely showing. All this time the mouth had constantly been kept washed with benzoin and chlorinated soda mouth wash. The recovery was uneventful. The highly vascular nature of the tumour was apparent after removal, and the portion of the bone—for it subsided and contracted so that what was once a prominent pulsating mass was now only a flattened thickened area of sponge-like tissue – with a small superficial ulcer in the centre. The microscopic examination fully bore out the appearances during the life of the hæmorrhage and free pulsation. The only case at all similar which Mr. Shield had been able to find recorded was that described by Mr. Salter, from whom he quoted at considerable length. In conclusion, he justified what he said might be regarded as needlessly severe and extensive treatment, on the ground that the patient had already been much weakened by the serious loss of blood, and the uncertainty as to the true nature of the swelling. The prognosis was highly satisfactory, and there was every hope that a definite cure was ensured.

Mr. Albert mentioned a case seen by himself at the London Hospital, in which a distinctly periosteal tumour on the upper alveolus was removed, as far as he remembered, without extirpation of the bone. He also remembered a case at St. George's Hospital of a young man with a perfectly healthy set of teeth who had, what was found subsequently to be a sub-periosteal hæmorrhage on the cheek inside the mouth. The surgeon, at his (Mr. Albert's) suggestion, tapped the growth with a trochar and cannula but got nothing out. The subsequent history of the case fully bore out Mr. Shield's remarks. Inadvertently—not guessing for a moment that it was vascular, or even a growth at all—the growth was opened, and the poor fellow ultimately practically bled to death. It was a very peculiar case. After the operation was performed the growth increased enormously, and finally a large fungating sarcoma appeared. A very few days after the original trochar and cannula

had been inserted, a similar swelling occurred on the upper jaw in exactly a similar position, and either a trochar or cannula or probe was passed into it with exactly similar results followed by an attack of hæmorrhage, and from that date hæmorrhages recurred at varying intervals. During the progress of the case, in one night the patient got a group of secondary deposits over the abdomen and chest, and one or two on the scalp. They varied in size from a filbert to a pea They were all in the subcutaneous tissue. He put an ink mark round some of them to see what would happen, and some got smaller, one disappearing entirely. It was very unusual for a sarcomatous tumour to form a secondary deposit or to disappear in that way. Ultimately the patient died from loss of blood, exhaustion, and pain.

Mr. W. B. Paterson had treated one case of adenoma situated on the outer side of the alveolus above the incisor tooth. Its small size tempted him to break the rule of surgery not to cut into a tumour which could be made to disappear by pressure. He cut into it expecting bleeding, and was prepared with an actual cautery. It bled furiously for a small thing. He was able, however, with the actual cautery, to check it. The only result of the case was necrosis of a portion of the outer palate which he freely destroyed with the periosteum by the process of cauterisation. He subsequently met with a case somewhat larger in size and was not tempted to deal with it in at all the same way. Hearing Mr. Shield's case described it occurred to him whether, if it had been a case simply of pulsating tumour, and Mr. Shield could have felt perfectly certain in his mind that it was a simple adenoma with no sarcomatous tendency about it, he could have got at the course of the posterior dental, particularly in its exit from the foramen at the back of the palate ; possibly by a little carpentery it might have been plugged with wood, such a thing had been done before—he would not refer Mr. Shield to cases, but no doubt he knew perfectly well that it had been done ; that a case might be treated by extirpation, and pressure by means of a plate applied to the surface of the extirpated growth and fastened to the teeth. Such a plate would have been easily capable of adjustment, and pressure could be kept up to quite a sufficient extent to check hæmorrhage. Had the case been a simple one such a treatment might have been successful, but he quite saw the difficuly of Mr. Shield's case, which was certainly of a suspicious nature.

Mr. SHIELD, in reply, said the criticism offered by Mr. Paterson was a perfectly just one. Of course, the possibility of plugging the posterior dental foramen occurred to him at once. It was very easy to talk about, but very difficult to do. He had seen it attempted in operations for cleft palate by distinguished anatomists and surgeons on several occasions, and had always seen them fail. However, it was recommended in the books and it ought to be possible to do it. The reason for its rejection on this occasion was that he felt a large pulsating artery. The moment he went to press upon it with the finger there was no pulsation in the growth. The growth was evidently supplied by arteries from every direction, as these aneurisms by anastomos generally were. He thought if he has seen the case before there had been much loss of blood, and whilst the patient was in a fairly good condition, it would have been quite justifiable to have attempted to have removed the whole growth and so apply some mechanical pressure such as Mr. Paterson suggested, but the difficulty to be encountered was the serious loss of blood the patient had already undergone. He would only just add one word with regard to one point noticed in his paper, where he had spoken of a slight recurring hæmorrhage which was checked by making the patient sit up, immersing the lower extremities in hot water, and injecting the buttocks with ergotine. There was no process so valuable as that for checking hæmorrhage in the mouth, and it was one of their most useful means in dealing with those terribly troublesome cases which members of the Society must have met with of recurring hæmorrhage into the tooth-socket.

Mr. STORER BENNETT gave a Casual Communication illustrated by lantern slides. He said it would be remembered that in December, 1888, Mr. W. C. Harding presented to this Society an upper incisor which had been fractured across the crown, and which he had extracted from the mouth of a girl 17 years of age only three or four days before he presented it. The history of the patient was that some ten months previously she had fallen down, striking the tooth and driving it high up into its socket. It became impacted, and remained fixed in its position causing more and more irritation up to the time that Mr. Harding saw it. The pain then became so intense that he considered there was nothing to do but to remove it. He then discovered that the tooth had been fractured across the

crown in a direction obliquely upwards and backwards. He (Mr. Bennett) was asked to make a microscopic examination of the specimen, and he therefore cut a section perpendicularly from front to back. The slide now exhibited showed the two outer halves after the section had been removed. It would be seen that the broken halves of the specimen were firmly knit together by some calcified material which occupied the central position of this gap, but the bulk of the tissue beyond this space that occupied the outer portions and edges of the fracture were of a tough and leathery consistence, not calcified at all. Having taken the section from the tooth, the appearances presented were as follows: in the middle half between the fragments there was a calcified mass of material which was of a spongy or cavernous character, largely made up of blood vessels. There were numerous blood vessels, as shown on the slide, ramifying through the whole of the tissue. Also in the cavernous spaces there were masses of some material somewhat resembling pulp, but he did not wish it to be understood that these *were* pulp. A further enlargement showed in various positions absorption of the normal dentine. One little patch was shown on the slide, but the amount of absorption was very slight. There were also patches of absorption shown, and in these patches of absorption might be seen lacunæ and canaliculi. The amount of cementum was very great. Of course, an examination of subsequent specimens suggested to one's mind two different sources for the new material, either pulp or periosteum, extravasated blood, and so forth. The pulp was exposed, but only to a very small extent. A very small opening led from the other side of this specimen into the middle, and of course it was possible to imagine that enlargement took place; that the over growth of the pulp filled up the spaces between the two fragments, somewhat similarly to the chronic enlargement seen in cases of polypus of the pulp, and that ultimately this calcified. On the other hand, they had evidence that there was a cementum in the section with lacunæ and canaliculi present in certain parts in rather large numbers; there was an absence of evidence of any definite dentinc structure being present. They had here, he thought, a case in which, hæmorrhage having taken place, a natural capping of exposed pulp had occurred, somewhat similar to the case of a wound which has healed under a scab. The blood, being poured out between the fragments, became organised blood vessels, evidently

largely extravasated, calcification took place, and eventually, if it had been left long enough, he thought the whole of the space would have been filled up with calcified material more or less resembling bone, or bone and cementum together. But the specimen was unlike any other he knew of, in so far as the cementum had been deposited between the fractured portions of *the crown*. There were many specimens described where cementum had united a fractured tooth in *the root*. He regretted that the exhibition of the specimens had been so long delayed, but perhaps it was fortunate inasmuch as Mr. Tomes had come across a specimen of a fractured tooth which would compare with his, and no doubt they would listen to some very interesting remarks from him.

Mr. Tomes then read a paper on "A Case of Calcification of a Widely Exposed Pulp." He said the specimen to which he would call attention was so remarkable and so instructive from several points of view as to fully repay somewhat close examination. The tooth, though broken right across its pulp cavity, had nevertheless succeeded in repairing the damage and sealing itself up again—an event of such rarity that he only knew of one other recorded case. The tooth was either a lower wisdom or a small second molar, the loss of the neighbouring teeth rendering its exact determination impossible. The patient was brought to him on account of very severe intermittent pain of a neuralgic type, recurring most days, but not every day. He found a tiny opening in the gum which was otherwise of healthy appearance. A probe introduced disclosed the presence of what felt like a complete but rather rough surfaced tooth. The history was that some three years previously an attempt had been made to extract a tooth in this situation, but that it had been broken off. It was exquisitely tender, and occasionally very painful for a long time afterwards, but it gradually got better and healed over, though it never remained absolutely comfortable for long together. The severe paroxysmal pain which brought her to him was only of a few weeks' standing. With the aid of cocaine he reflected the gum from over it, and subsequently had no difficulty in removing it with an elevator. He then found that it had been transversely fractured a little way above its neck, and that what should have been an open pulp cavity was occupied by a cauliflower-shaped mass of shining polished ivory, projecting up above the original surface of fracture, and overflowing on to it. By cutting it

carefully with a hair saw he was able to get four good longitudinal sections, and found that the pulp was not wholly calcified, but that a residue of the pulp chamber was still occupied by living pulp. On examining it with a low power the large mass of secondary dentine was found not only to project a good way above the general level of the fractured surface, but also to have, so to speak, overflowed it all round the orifice of the pulp cavity, and to be everywhere closely adherent—indeed, continuous with the old dentine. Roughly speaking, its structure might be thus described : its free or upper surface presented distinct lamination parallel with the surface, next came irregular lacunal spaces, then sparse dentinal tubes, and finally, in its deepest portion—which was inside the original pulp cavity—abundant dentinal tubes, which were in places continuous, though oftentimes joining by an abrupt bend with the dentinal tubes of the original dentine. The overflow on to the fractured upper surface of the original tooth in places was slight, in other places it extended in a gradually thinning layer out to the very edge of the tooth ; but what was especially noteworthy was that there were included in the new calcified growth quite a number of entirely detached and displaced splinters of the old dentine. Mr. Tomes then proceeded, aided by some beautiful photo-micrographs thrown on a screen, to describe in minute detail the character of the new tissue. Continuing, he thought that his astonishment at the extraordinary vitality of this pulp, and its amazing success in repairing damages, would be shared by everyone present, and some speculations as to the conditions under which it took place would not be thrown away. The whole roof and a little of the sides of the pulp cavity had been torn off, and the pulp thus widely exposed apparently a little below the edge of the gum. This must have been temporarily protected by the formation of a coagulum, and ultimately by the contraction of the edges of the gum and its almost complete healing over it, and under these conditions its astonishingly successful calcification went on. Was there not a practical hint to be derived from this ? Here was a lacerated pulp with loose fragments of sharp splintered dentine jammed into it, coated over only with coagulum, and which did not die or inflame, but calcified. He thought that in capping a pulp, and especially a traumatic exposure, they would probably do better to carefully not wipe away any blood, but leave the effused blood to coagulate ; they could put nothing better upon the pulp surface.

And probably, when they did commence to cover it, they would do best to put something organic—sterilised fibrin or gelatine for instance. He should certainly try such a course of procedure when the opportunity offers, and refrain from placing in contact with the pulp either inorganic materials or strong medicaments. But there was another and less hopeful side to the suggestions presented by this case ; there was almost absolute success in the formation of secondary dentine, with absolutely no loose nodules or irregular encroachment on the pulp, in fact, precisely the condition which they hoped to obtain when a pulp is capped ; and yet it was not comfortable. Notwithstanding its full protection under the gum it became the site of characteristic pulp irritation, and consequent neuralgic pain. Was this an accident ? or was the capping of pulps to end in this way usually ? Clearly they could hope for no better results in the way of repair, yet why did it become so painful ? For all that they could see post mortem, the immediate surroundings of this pulp had become almost exactly those of a healthy pulp with its dentinal tubes radiating from it. Another set of speculations of a more theoretical kind arose, how was the calcification done ? Ordinarily, the odontoblasts would be torn off and remain adherent to the portion of the tooth which was broken away in the attempted extraction. Were they not torn off ? or were they reformed ? or was it done without odontoblasts ? If so, then dentinal tubes could be manufactured without odontoblasts, which, from what they knew of the process, did not seem likely. But in any case, the first formed, or outer layers, were laminated, unlike anything which happens in normal tooth formation. Were these laminated layers a plastic exudation ? shed out from the wounded pulp, subsequently organised, and finally calcified. He confessed that this idea rather commended itself to him, as it would give an easy explanation of the way in which the new tissue flows over the fractured surfaces exactly as if it had got there in a fluid form. One section seemed to afford clinical proof that the material which subsequently calcified was originally fluid. A piece of old dentine has been raised at one end, but left attached at the other, just as happens if a chisel is driven into wood nearly parallel with its surface, but the chip not detached. This had been glued on by something which ran in right under the raised dentine with a degree of completeness which strongly suggested its original fluidity.

The same idea was equally strongly suggested by the manner in which the overflow, subsequently calcified, ran out in places over the whole fractured top of the tooth, reaching even to its very outside in a gradually thinning out layer. So far as it was possible to read the history of events, this appeared to have happened : the roof and part of the sides of the pulp were torn off, the exposed part probably retaining its odontoblast layer, swelled out somewhat from the orifice, and shed out plastic exudation over its whole surface, which flowed out over the top of the tooth left. The plastic exudation became permeated by migrating leucocytes, and in and under by the healing over of the gum, &c. After the fibrillation and organisation of the effused plastic exudation, the pulp itself commenced to calcify in the ordinary way, its odontoblast layer determining the number and form of its tube systems. That this was the case was indicated by the fact that though the area was larger there were not more tubes, but only larger interspaces between the tubes on its expanded portion, and so far it pointed to there being neither a fresh formation nor multiplication of the odontoblasts. They were stretched apart, and so, in the stretched portion, the tubes were far apart, becoming dense in the more expanded portion. Thus, so far as it went, it was a strong confirmation of the view that dentine tubes are a consequence of the presence of an odontoblast. The fragments of dentine, with the exception of a few small pieces which were driven in more deeply, lay on the surface of the pulp, and were stuck to it by the plastic exudation. Hence the dentinal tubes commence under them (with trivial exception), and mark the limits of pulp tissue and exudation tissue.

Mr. Tomes next read a paper entitled "Further Notes upon Amalgams," being a record of the continuation of investigations communicated to the Odontological Society (and reported in the Dental Record for February, 1895. Mr. Tomes did not put forward his notes as in any way completing the investigation of the subject, but it was so large and complex a one that it seemed to him better to communicate his results in instalments, and thus contribute something for other observers to work upon. By spreading a thin layer of Welch's amalgam (which was used throughout the experiments because it is one of simple and known composition containing 51·52 tin and 48·48 silver) upon a microscopic slide he was able to examine its surface by illumination from above ; it had

a smeary semi-fluid appearance, with numerous spherical or hemispherical projections, which look like, and doubtless were, beads of mercury. After a time these beads wholly disappeared, and their place was occupied by crystalline forms of metallic lustre. These crystals were sometimes cubes, sometimes six sided rhombs, and, apparently, sometimes flat plates with six sides. From this it would appear that the process of setting in amalgam was one of crystallisation. Further, if a slide which had thus become crystalline were heated, the beaded appearance returned, but the crystals reappeared in a few minutes, almost as soon as it had cooled. Again, if a slide of freshly mixed amalgam were heated crystals appeared at once instead of taking some hours to form. Heat brought about the immediate setting of the amalgam, but not until it had cooled. The examination of four slides, one prepared with amalgam mixed so as to be just plastic, a second with more mercury, a third mixed with a considerable excess of mercury, and then squeezed till only just plastic, and a fourth with the expressed mercury squeezed flat under a cover glass, showed no material difference in the size or appearance of the crystals formed except with regard to the fourth in which no rhombs appeared, but only foliacious forms similar to those in which tin crystallises. This crystallisation is the reason why an amalgam ordinarily used gets a mat surface when it has set, though left with the burnish on it. The crystals on the slides were for the most part rhombs. The driest of the samples had not so lustrous a surface as the others, even the under surface which was in contact with the glass being less bright, and this was seen to be due to the presence of a certain amount of dull granular-looking material. The tendency of thin slabs to curl as they set which had been described by several observers could hardly be detected in any of them. These facts contained an intelligible explanation of the addition of old amalgam reheated and mixed with fresh amalgam, causing very rapid setting of the whole. Not only did the old amalgam tend to re-crystallise as soon as it cooled but it caused the new to do likewise. What was the practical application of these facts? In the first place, with any freshly mixed amalgam it was impossible to control the surface, however smooth it might be at first. It would soon become covered with small crystals, and this roughening of the surface was not a change in the right direction. But the crystals are not dead hard,

and if an amalgam setting with inconvenient rapidity be burnished in, it remains smooth and to a great extent retains its burnish. Mr. Tomes was able to confirm Dr. Black as to what Dr. Black termed the "flow" of amalgams, viz.: that with a steady pressure of a strong spring a foreign body could be squeezed into an amalgam which would set without any apparent breakage occurring. In other words, the crystals are plastic, and the hard amalgam is capable of taking an impression to a degree of delicacy which it would not when fresh. Another point of importance was that the size of the crystals differ much in different amalgams. With regard to manipulation, if a fresh mix of amalgam be put upon a hot plate and heated till it just begins to swell it sets almost instantly, and can be used almost like fusible metal with a hot burnisher. If a fresh amalgam is to be used Mr. Tomes is of opinion that there is no method which in its results approaches that advocated by Dr. Bonwill, viz.: to squeeze the amalgam when in the cavity, in other words, using it fairly plastic and forcibly squeezing out the excess of mercury by means of little pledgets of wool or bibulous paper. In conclusion, there were one or two pitfalls to be avoided. Unless the cavity be a simple one there would be a danger if every part were not thoroughly burnished of leaving crumbly places, especially under undercuts. Old pieces of amalgam being uncertain in their composition, Mr. Tomes advocated a specially prepared old amalgam. For the intelligent use of amalgams it should be borne in mind that even when fully set it has a certain sort of plasticity.

Mr. F. J. Bennett wished to know whether Mr. Tomes had investigated anything beyond amalgam. Professor Roberts Austen had been working on alloys at different temperatures in the fluid and also the solid state, and had obtained most remarkable results. The Professor took cylinders of lead about three inches long, attaching to the end of them a small cylinder of gold of similar diameter. Keeping these two cylinders at a temperature far below the melting point of lead in three days he found the astonishing result that particles of gold had found their way right up to the top of the lead cylinder in considerable quantity. Mr. Bennett had not been able to find a full and accurate account of these experiments, a short notice of which appeared in the scientific column of *The Graphic*.

Mr. H. Baldwin regarded this migration of metals as a confirmation of the correctness of the view of Mr. Amos Kirby as to the alteration that amalgams undergo. Mr. Kirby had always attributed the alteration in amalgam to a warpage, not necessarily to a contraction; in other words, more mercury being in one part of the amalgam than another it would redistribute itself evenly over the whole mass, and the portions of the amalgam from which the mercury went, shrank, and those to which it migrated, expanded.

Mr. George Cunningham thought that in reading the excellent paper of Professor Black they ought not to forget the wonderful work done by Mr. Kirby. It was to be regretted that Professor Black himself seemed unaware of what Mr. Kirby had done. With regard to the heating of copper amalgam, Mr. Lennox had suggested taking two masses of copper amalgam and mixing them at two different temperatures, then fusing them together with the crucible and mixing them up. This certainly gave an amalgam which would set with considerable rapidity.

Mr. Reinhardt, with reference to the rapid setting of amalgam, asked if Mr. Tomes remembered that many years ago it was suggested that the proper way of using amalgam was to use it very dry—in a sort of powder—and pack it with hot instruments.

Mr. Storer Bennett wished to be allowed to correct a misapprehension. In speaking of the blood clot he did not mean literally that the blood clot itself was organised, but spoke of healing under the clot, intended simply to imply that blood was poured out and that organisation took place over the periosteum. Mr. Tomes had attributed to him the suggestion with regard to the treatment of exposed pulps, but Mr. Tomes himself was absolutely the author of the idea, and Mr. Bennett did not wish it to appear that he claimed the notion as his own.

Mr. C. S. Tomes in reply said he never had believed in amalgams taking on a spheroid form, and he still less believed it now. Mr. Cunningham seemed rather to accept Dr. Black's idea that what was found in amalgams was due to flow. The flow of amalgams was an extremely interesting thing, and bore very much upon the investigation of the subject, but he doubted if it had anything to do with what happened in the mouth.

The usual votes of thanks concluded the Meeting.

News and Notes.

It is with extreme regret that we hear of the death of Mr. P. Dubois, who was knocked off his bicycle and run over by a coach when turning a corner of a Parisian street. He recovered consciousness, but died within twenty-four hours. Mr. Dubois was Editor of *L'Odontologie*, President of the Association of Dentists in France, and a Professor in l'Ecole Dentaire. An influential and representative Committee has been formed to collect subscriptions for the Widow and Children. The Treasurer's address is M. G. Vian, 47, Coul Haussmann, Paris.

We have received a copy of the Pictorial Menu of the Twelth Annual Dinner of the Edinburgh Dental Hospital and School. We can simply wonder at and admire the ingenuity and draughtsmanship of Mr. F. Page, which enables him year by year to produce such excellent menus. This, if we might be allowed to say so, is more refined in character than some of its forerunners.

At Preston, on April 21st, Herbert Berry, sixteen, a pupil teacher, was summoned for assaulting three scholars. It was alleged that the defendant gave the lads the option of being caned or having their teeth drawn, and when they elected the latter, he performed the operation with his own hands. The defendant was fined £3 and costs in the first case, and the other cases were withdrawn on payment of costs.

Dr. J. Hume sends the following report the *British Medical Journal*: "On March 17th, J. B., aged 10 years, died in my hands while under chloroform for tooth extraction. The boy's teeth were abnormally strong, and he had been suffering for some weeks from abscesses at the roots. The chloroform was administered on a handkerchief in the recumbent position, and he took it well. The dentist extracted three teeth, when the boy suddenly became pallid and the heart's action stopped. Artificial breathing was resorted to and ether injected, but without avail; not more than half an ounce of chloroform was used. I learned afterwards that the boy had been restless and excited for some nights previously. He had chloroform for tooth extraction some time ago and stood it quite well. He was a strong healthy boy.

At the instance of the British Dental Association, H. W. Shellard, of High Street, Cardiff, was summoned before the local stipendiary on March 23rd for practising as a dentist, not being registered under the Act of 1878. The chief witnesses were a private detective named Oxley and his wife. The latter visited the defendant, who said she wanted some new teeth. He examined her mouth and advised her to have a new set. She ordered them, paying 5s. on account. She admitted in cross-examination, that, in giving her name as Hackman, she told a professional lie, as also when she said she would call again. The stipendiary imposed a fine of 40s. and costs, but disallowed the expenses of Oxley and his wife. In another similar case, in which Osborne White, of Charles Street, was the defendant, a like penalty was imposed.

Mr. R. Ley presided at the Annual Meeting of the Devon and Exeter Dental Hospital. During the year 5,214 cases had received attention, making a grand total of 81,123 since the opening of the institution. The receipts for the past year had been £141 13s., and the payments £141 2s. The committee recorded with regret the death of one of their oldest subscribers, Mr. Winslow Jones, who had left them a legacy of £100. That sum had been placed on deposit to form the nucleus of a reserve fund. An urgent appeal was made for further support and sympathy. It was recommended that the president, Mr. R. Ley, the retiring members of the Committee of Management, Messrs. R. T. Campion and W. S. Mortimer, and the hon. treasurer, Mr. J. M. Ackland, be re-elected, and the Rev. E. Chatterton Orpen's name be added to the committee. The Chairman moved the adoption of the report. Their institution did an immense amount of good for the deserving poor, and the public owed a deep debt of gratitude to the medical officers for the work they were doing gratuitously. He regretted they were only to receive £5 from the Hospital Saturday Fund this year instead of £10. That grant would also have to be received as a subscription and not as a donation, so that 25 recommends would have to be given away, making them poorer instead of richer for the amount. Their first duty, however, was to think of the poor who would be benefited, and he hoped another year the grant would be increased. Mr. G. Franklin, in seconding, suggested that the needs of the institution should be brought before the clergy.

Mr. Browne-Mason, replying to Mr. Ralling, said although there were many patients from the country districts, about nine-tenths of those treated were from the city.

If it be possible to accentuate the sadness of the death of Lavinia Sawdon during the administration of chloroform, the following details of the family history will do so :—Her father is a farm labourer on Sir Tatton Sykes's estate among the Yorkshire Wolds, and with a full week's employment, earns the princely salary of ten shillings a week! Upon this he has been compelled, up to a recent period, to maintain a wife and eight little ones. During the last eighteen months he has lost three children. One was run over and killed, another was burnt to death, and the fate of the third, a bright and intelligent girl of fourteen, was decided last Friday afternoon. She was only permitted to accept an engagement so far from home because her parents were acquainted with Mrs. Sykes, who was formerly a schoolmistress at Weaverthorpe, where the deceased was one of her scholars.

THE DEATH UNDER CHLOROFORM AT IDLE.

Coroner's Inquiry.

On Saturday, April 18th, before District Coroner Major Taylor, an inquiry was held, at the Alexandra Hotel, Idle, on the death of Lavinia Sawdon, whilst under the influence of chloroform, administered by Joseph Priestley for the extraction of teeth. Mr. W. I. Crabtree, solicitor, watched the case for Priestley, whilst the police were represented by Superintendent Crawshaw.

Formal evidence of identification was first given. Thomas Sawdon, a farm labourer, of Weaverthorpe, near Malton, stated that the deceased, who was fourteen years of age, left home early in last December to enter the service of Mr. Lister Sykes, insurance agent, of 9, Howgate, Idle. She was then in good health, and he had never heard her complain of any illness. On Friday he received a telegram informing him of her death, and he arrived at Idle on the Saturday afternoon.

Mrs. Sykes, the employer of the deceased, deposed that the girl entered into her service on December 3rd of last year. She appeared to be in good health, but she had suffered from toothache for several weeks. At about half-past ten on Saturday morning the girl went to have the tooth extracted, but Mr. Priestley was away

in Bradford at the time. She went a second time at about a quarter past eleven o'clock, but he had not returned. Witness afterwards sent a message, in response to which Mr. Priestley came to her house about one o'clock. The deceased had had dinner about half an hour previously. Witness told him that the girl wanted to have a tooth drawn. He examined her mouth and ascertained which tooth it was.

The Coroner: What did he say? Witness: He said that he could get it out easily, or all right—I forget which of the two phrases he used. He went into his shop to fetch his instruments, and then they both went into another room.

Did you all go into another room?—No; I stayed with my children in the kitchen. When they came out, after an interval of two or three minutes, the girl was the first to make any remark. She said that Mr. Priestley had only managed to get a piece of the broken tooth out. The deceased asked him if she could "have it out by gas," as she suffered from it very much, and she was afraid of the pain of another attempt. He said it would cost from 3s. to 3s. 6d., and I thought it was too much, so I asked her if she would wait and see if the tooth got better, as it had done before. She begged very hard to have it taken out at once. I asked Mr. Priestley if it would pain her at all if gas were administered, and he replied that she would, perhaps, feel a little light-headed afterwards, but there would be no further inconvenience. The deceased asked my consent three times to the operation being performed with gas, in order to avoid further pain, and at length I said she might go. She went into Mr. Priestley's house, and as she had not returned at ten minutes to two, I went there, thinking that she might be sick. I saw Miss Priestley, and asked, "Is Vinnie all right?" The girl was being operated on in the shop, and I waited for a few minutes in the kitchen. Miss Priestley went into the shop several times, and then said that her brother was afraid that Vinnie was dying. I ran and called my husband, and we went into the shop. He then went for Dr. Honeyburne, and that gentleman arrived a minute or two afterwards, but the girl was dead. Mr. Priestley seemed very much surprised and upset at the occurrence, and hardly seemed to know what to say about it. The body remained there until eight o'clock at night, and it was then conveyed to my house.

Mr. Crabtree: How long have you known Mr. Priestley?

The Coroner (interposing): Has that point anything to do with the purposes of this inquiry?

Mr. Crabtree: I would like the fact of his having been in practice here for seven years to appear on the depositions.

The Coroner: It does not matter if he has been practising for a thousand years. He is not on the list.

Mr. Crabtree: He does not contend that he is on the list.

The Coroner: Then he is not a registered dentist, and he cannot practice.

Mr. Crabtree: He does not say he is registered.

The Coroner: He is, therefore, an unqualified man.

Cross-examined by Mr. Crabtree, Mrs. Sykes said that the girl told Mr. Priestley that the tooth was on the right-hand side of the lower jaw. It was only the stump of a tooth.

Miss Sarah Priestley, dressmaker, of 11, Howgate, Idle, stated that she kept house for her brother, Mr. Joseph Priestley, who was, she said, a herbalist and dentist. The deceased came to the house at about a quarter past ten on Friday morning, but Mr. Priestley was away at the time. The girl came in with him about half-past one or two o'clock. They went into the shop, and ten minutes or a quarter of an hour later he called for witness to bring a bowl, as the girl was sick. When witness went into the shop the girl was sitting in a chair, and was leaning slightly forward. A moment or two afterwards he said there was a change, and that the girl was not breathing quite naturally. Witness fetched Miss Scott, a neighbour, and by her brother's instructions they chafed the girl's hands and applied cotton wool soaked in amyl nitrate to her nostrils.

The Coroner: Did the girl make any movement?—Witness: She appeared to be breathing.

Did she seem to breathe differently after the application of the restorative?—I think she breathed more regularly after my brother had worked her arms.

Did you see her move?—I don't remember.

Didn't you take any notice or care anything at all about it?—Well, I didn't remain in the room very long.

The witness went on to say that after Miss Scott came in she informed Mrs. Sykes what had occurred.

The Coroner: When were you told that the girl was dead?—Witness: When Dr. Honeyburne came.

How many bottles did you see about the shop?—Only two ; the bottle containing the chloroform and that containing the amyl nitrate. They were both on a glass case near the chair.

Superintendent Crawshaw : What was the girl's condition when you were called in—was she conscious or unconscious?—Witness : She was unconscious ; at least, it seemed so to me, but she was beginning to be sick.

Did you see anything applied to her face except from the amyl nitrate bottle?—No.

Was anything being applied to her face when you went in? —I really cannot say whether there was anything but a towel or not.

The next witness was Miss Hannah Scott, a dressmaker, of 20, Howgate, Idle. She said that she was called in at about ten minutes to two on Friday afternoon.

The Coroner : What state was the deceased in then?—Witness : She was making a breathing or sobbing noise occasionally.

Did she seem to recognise you?—Oh, no ; not at all. She was insensible.

Did Mr. Priestley say anything about her?—I asked him if a doctor had been sent for, and he said no. He was then using restoratives, and doing all he could for the poor girl.

Did he give any reason why he had not summoned medical aid? —He said that it was not necessary to fetch a doctor just then, but I thought it was.

You did not ask him anything?—No, sir. I understood what was the matter. When I went in he was working her arms about, and he asked me to hold the restorative to her nose.

Where did he get it from?—It was in a bottle containing some rather yellowish liquid.

And did she seem to get any better or worse under the treatment?—She seemed to breathe.

For how long after you got there?—It would be about a quarter of an hour afterwards.

Did she seem to die very quietly?—Yes, sir.

In reply to Mr. Crabtree, Miss Scott stated that when she asked if a doctor had been sent for the deceased had not begun to be sick.

Police-sergeant Arthur Inman, of 13, Marlborough Road, Idle, said : In consequence of information received, I believe from

Mr. Priestley, I went down to his shop in Howgate at a quarter to eight on Friday night. He said : I have some very bad news to give you. About half-past one o'clock the girl Sawdon came to the shop to have two teeth drawn, and requested me to use chloroform. I accordingly used a quantity of chloroform, and drew one tooth out. I then gave her a second dose, with the intention of drawing another. Immediately I gave her this I saw that she was dying, and at once sent for Dr. Honeyburne. He arrived about two o'clock, and found her dead." Priestley further stated that he had used about half an ounce of chloroform. I took charge of the bottle, which contained a small quantity. It is labelled "Poison." I afterwards removed the body to Mr. Sykes's house.

The Coroner : Did he make the statement without any question from you ?—Witness : Oh, yes, quite voluntarily.

Mr. Crabtree : Did he tell you that before administering the chloroform he measured it in a graduated glass phial ?—No.

Did you ask about any measure ?—No.

And have you asked for it since ?—No.

Dr. Richard Honeyburne, of Greenfield, Bradford Road, Idle, gave evidence to the effect that he arrived at Mr. Priestley's house about two o'clock on the previous afternoon in response to a summons.

The Coroner : Did he say anything to you about the girl ?—Witness : No. I looked at her, and saw that she was dead. I said, "What have you been giving her ?" and he replied, "Chloroform." I then unfastened her dress, and found that her heart has ceased beating. There were two or three buttons at the top of her dress unfastened, but the remainder of her clothing had not been disturbed. I turned round to Mr. Priestley and said that she was dead. He asked, "What had I better do ?" and I replied that it would be best for him to report the matter to the police. When I got to the house the girl had apparently been dead about ten minutes or a quarter of an hour, and the extremities were beginning to grow cold. Dr. Honeyburne proceeded to give the result of a post-mortem examination which he had made of the body. Externally there was nothing unusual except a small bruise on the forehead, over the left eye. There was intense venous congestion in both lungs and other parts of the body. The heart was quite empty, but perfectly healthy. There was no obstruction in the larynx, but the stomach

contained a large quantity of undigested food. Upon examining the mouth he perceived that the first left lower molar had been recently extracted, and one fang of the corresponding tooth on the other side appeared to have been broken off some time ago.

The Coroner : In your opinion, what was the cause of death ?—Witness : I should think the chloroform.

Was there anything besides that to account for death ?—Nothing whatever.

There could hardly be a healthier person ?—No, she was perfectly healthy. There was no disease of any kind about her.

And chloroform is, of course, a poison ?—A deadly poison.

For the purpose of an operation under chloroform is it necessary to have more than one person in charge ?—It is usual to have someone else to administer the anæsthetic. A medical man would never both administer chloroform and perform the operation.

It is a well-known practice, I suppose, to have a second person ?—Unless circumstances of extreme urgency occur to prevent it.

Can such an operation be performed by one person properly ?—No ; though we are sometimes compelled to ignore the custom in cases of absolute necessity.

Superintendent Crawshaw : Is it proper to administer chloroform to a patient in a sitting position ?—Witness : No ; it is not.

Is it usual to administer it after a good meal ?—No.

What was the general condition of the girl ?—She was well grown and very well nourished. She certainly looked older than fourteen years.

Was it a proper thing to have all her clothes fastened up during the operation ?—No, it was not. The corsets and bodice should always be unfastened, so as to allow perfect freedom in breathing.

Mr. Crabtree : Although she might appear to be quite healthy I suppose it is just possible that she might have some local weakness which could have escaped observation ?—Witness : I think not.

No weakness of the heart ?—No.

What are the usual symptoms in cases of this character ? Is it usual for the patient to vomit ?—Yes, if there is anything in the stomach.

Having regard to the healthy condition of the deceased and the quantity of chloroform administered, are you not rather surprised at the result ?—No ; I cannot say that I am.

Do you complain at all of the quantity?—I don't complain of anything.

The Coroner: It is the way in which it is given.

Mr. Crabtree: The quantity of chloroform to be administered varies with different people, I suppose?—Witness: Yes.

But with a healthy person would you consider the dose mentioned to be unreasonable or excessive?

The Coroner (interposing): I don't think you can tell that. The question can be raised some other time.

In addressing the jury at the conclusion of the evidence, the Coroner said that he did not think it necessary for him to carry the inquiry any further. They had heard the medical evidence, and no one, he felt sure, could have the slightest doubt that the unfortunate girl met with her death in consequence of the administration of chloroform. Anybody might draw a person's teeth, and if the person wished to take chloroform it could be administered, but it was of the greatest importance that reasonable precautions should be taken to prevent any mishap. No man had a right to conduct an operation with chloroform by himself, especially if he were not qualified, though it might be done in cases of special urgency. There could be no such necessity in the case of Lavinia Sawdon. The girl was willing to place herself under the dentist's care, and to some extent this might possibly be considered an extenuating circumstance; but at the same time she was probably unaware of the dangerous nature of the drug. Even if she had full knowledge of the risks of taking the poison, she would have no right to put herself in a position of danger. That would afford no adequate excuse for the person undertaking the operation. Mr. Priestley attempted to draw the girl's teeth. According to his own admissions he used chloroform, and the girl died under the operation. If the jury considered that there was no necessity whatever for Priestley to administer the anæsthetic, that he neglected to take the necessary precaution of obtaining the services of a medical man, and that he had been guilty of a grossly rash and improper act, they would have no alternative but to bring in a verdict of "Manslaughter." But if they were of opinion that it could not have been avoided the verdict would merely be, "Death by misadventure." Even with the exercise of the greatest care, patients undergoing operations at the hands of properly-qualified practitioners sometimes died while under the

influence of anæsthetics, but a case which was treated by a person comparatively ignorant, and in which a doctor was not sent for immediately serious symptoms were discerned, was upon an entirely different footing. If a properly-qualified medical man had performed the operation without assistance, with similar results, it would doubtless be deemed to amount to manslaughter. A person who persisted in dangerous work of this character without taking due precautions, in the absence of circumstances of special urgency and absolute necessity, ran very grave risks.

The jury, after a lengthy consultation in private, returned a verdict of "Manslaughter" against Priestley, who was immediately placed under arrest.

In reply to Mr. Crabtree, the Coroner intimated that bail would be granted in the sum of £50 and two sureties of £25 each.

On Monday, April 20th, at the West Riding Court, the prisoner pleaded guilty, but reserved his defence. He was committed for trial at the West Riding Assizes. Bail was allowed.

Abstracts and Selections.

THE NEXT GREAT ADVANCE IN ANÆSTHESIA; INCLUDING A NEW EXPOSITION OF COMMON SENSIBILITY.

By Sir Benjamin Ward Richardson, M.D., F.R.C.P.Lond., F.R.S.

Mr. President and Gentlemen,—I remember no event in the course of this century that ever filled the public mind with greater wonder than did the discovery of anæsthesia fifty years ago. It was not altogether an unexpected discovery, for many men in the background of history, as we may say, had for ages been working at it; but the general mind had become primed with the idea that pain was a necessary part of creation; that it entered the scheme of nature as a necessity; and that to try to abolish it would sure to be a failure. The first part of this objection was urged after the discovery of the abolition of pain had become a successful fact, and

An Address delivered before the Society of Anæsthetists, on March 19th, 1896.

the wonder, altogether, has not passed absolutely away even in the present hour. At this time, however, we are confronted by a new difficulty; we are hearing week by week about the deaths that are taking place through anæsthesia. At first the deaths were very few, and had it been otherwise, that is to say, had there been many deaths previous to that of Hannah Greener, which occurred at Winlaton, near Newcastle, on January 28th, 1848, anæsthesia would probably have died out as a practical part of surgical science. As it happened, a rare death from it did not materially affect the process of anæsthesia, and it is not until now, when the process of administration has become all but universal, that we find the public, as well as the professional, mind becoming astonished and perplexed at reading of the frequency of the occurrence. I do not know that there are more deaths now amongst those who take chloroform than there were in the early days of which I have spoken, for I remember very well, at the time when Hannah Greener died, a practitioner named Mr. Robinson, who lived at Haverhill, in Essex, telling me privately of a similar disaster that occurred to him in his own practice and that was never made public, the tendency in those days being less strong in the matter of publicity. As time passed away the tendency to publish such details as those noted above became more and more marked, so that in the time of Dr. Snow we had such a number of deaths collected that he was able to announce no fewer than fifty, a number which included all that he was himself acquainted with from administration, but which did not account for two deaths, which he himself saw, from amylene. Snow collected his facts about the year 1857, and I published them from his manuscript in the following year, 1858, anæsthesia having been in use in England for a period of about twelve years. It looks, therefore, as if we only recorded five chloroform deaths a year for ten years, or a tenth part of those recorded in the year 1895.

A few years after the death of Snow I made a tour through England and collected facts of the deaths which had occurred in various parts. I visited hospitals in which not less than 17,000 administrations had occurred without a death, but as I went on the deaths continued to increase on my register, not depending, as far as I then understood, on the hospital, the operator, the patient, or the mode of administration, but on accumulation of numbers of cases, so that I was brought to the conclusion in the years 1865-66 that

death ought to be reckoned as one in every 2,500, a figure has been very particularly relied upon since I calculated it out, and which, I take it, is very close to the truth up to that date. It is not extremely difficult to account for this figure, quite apart from its having been based originally upon recorded facts, for it seems that there is always in a community a certain number of persons who, from one cause or another, are ready to die under unfavourable circumstances. I have named this class of mankind the "morituri," because of this readiness to die, and I estimate that there never exists a collection of 3,000 middle-aged people but that there is sure to be one who is possessed of some fatal tendency which might lead to the occurence of death, so that the administration of anæsthetics does not necessarily modify or intensify the chances of death amongst them. This is satisfactory as far as it goes, but at the same time as all are not "morituri," it does not do away with the necessity of inquiry as to why death appears in the proportion named from anæsthesia. Neither does it limit our investigations into a mode of killing pain that could not possibly at the same time kill the person who would have to be anæsthetised. Dr. E. Andrews, the Professor of Principles and Practice of Surgery in Chicago Medical College, summed up his observations in 1870 almost in similar figures as mine. He calculated the deaths from chloroform as one in 2,723, but he added other figures. He said that the deaths from sulphuric ether were one in 23,204 administrations; from mixture of chloroform and ether one in 5,588; from bichloride of methylene one in 7,000; while to nitrous oxide he gave the credit of not one death in 75,000 administrations.

Without staying to enter into any analysis of these figures we are obliged, as practical men, to ask the reason why there should be any deaths at all from anæsthesia, in which question we shall include why there are so many deaths from one anæsthetic and so few from others. If it be true that there are no deaths in 75,000 administrations of nitrous oxide there can be no reason, whatever may be our theoretical generalisations, why there should be so many from other anæsthetics, except there be some error either in the anæsthetic employed or in the mode of giving it. Some will argue that season, temperature and all the meteorological conditions are favourable to death in the case of one anæsthetic and not in another; but this is hardly fair, because we calculate, or rather include, the same facts in

one anæsthetic as we do in another, and we, therefore, ought to have the same results from one as from another. If I administer nitrous oxide as many times to 2,500 different people and have no death, and administer chloroform to the same number of people and have one death, it is clear that, *ceteris paribus*, there is something in the nature of the anæsthetic that determines the result; or if I administer ether to 23,000 persons with one death, and administer chloroform the same number of times with more than nine deaths, which is about the estimate, it must turn out there is something in the composition of the two substances—ether and chloroform—which determines the result. It may be urged by other argumentatists that whilst there is a distinction between the composition of the two substances which yield such varying conclusions, a great deal has to be said in favour of the worst of them because of other virtues they possess. Thus the most fatal of the anæsthetics may have the virtue of being rapid in its action, convenient in its administration, and while the patient is unconcious, certain in its effect. I have heard this urged ever since I can remember, and I recall, as if they were only at this moment spoken, the words of Snow himself to the effect that chloroform was to ether like the lucifer match to flint and steel; he preferred its readier application and accepted its risks. But this, I think, is not a good argument, for the reason that it only requires more industrious examination and consideration to obtain an agent which shall be just as safe as ether, or even as nitrons oxide, and yet shall possess all the qualities and characteristics in administration that chloroform possesses; that shall be as rapid as chloroform, as convenient, as certain, and at the same time, as safe as any other.

This particular thought has been on my mind for half a century and though I have not been able to solve the difficulties as I could have wished, they are what I would still like to press forward, and which I would rejoice to leave to the investigation and exposition of the future man who shall solve the problem. I perhaps cannot do better in this place and at this moment than point out what these difficulties are, and the mode in which I have laboured to overcome them, because in so doing I may lead someone else in the direction in which I have not had time to continue myself.

In promoting anæsthesia the thing we do is to make the person about to be anæsthetised imbibe and take into his blood and nervous system an atmosphere which shall so entirely change his whole

nature that he shall go to sleep, and shall lose all that sensitiveness of his nervous system, which, under ordinary circumstances, causes what is known as sensation, and in extreme circumstances produces what is called pain. A double or duplicate action is thus implied —one of sleep and one of insensibility. According to our present knowledge sleep and insensibility happen to be united, but there is no definite reason why there should be such unity. It is not absolutely necessary that there should be sleep, and impossible as it seems to be that a human body should have no consciousness of the surgeon's knife and yet be awake, there is no absolute reason why consciousness and insensibility should not be separated. We see, in fact, this phenomenon. I have known a person suffering from what is termed anæsthetic hysteria, who had no sensitiveness in any part of the skin, and who was yet able to carry on a conversation and to take food the same as if it was perfect sensitiveness. Moreover I have had under my observation a patient suffering from partial paralysis, motory and sensory, who would not have suffered at all if the affected part of his body had been cut away, but who yet would have been conscious of all that was going on round about him. I have also met with some drugs which produce a partial insensibility and yet do not materially affect consciousness and *vice versa*. It is, therefore, not too much to expect that we may find agents which do really destroy sensibility without materially interfering with consciousness, and this is the direction in which we have to explore, a direction I have myself been constantly on the look-out for, but have never perfectly succeeded in completing. What the atmosphere is we want to introduce into the body which shall destroy sensibility and at the same time sustain consciousness, is the thing we have to look for, and we have also to consider what condition of the nervous system is induced which interferes with one function and does not interfere with the other, or *vice versa*.

The first and most telling effect is that we can put the body in such a condition as absolutely to destroy all feeling and yet apparently not to touch so as to injure those centres by which we think and act. This is precisely what we do under the influence of cold ; we put a part of the body into such a condition that there shall apparently be nothing going on in it whatever in the way of chemical change ; we freeze such a part and we say that it fails to receive those vibrations which we call sensory or sensational. We

see a surgeon put a knife into such a part, and though we be the patient ourselves we do nothing but look on, nor do we from any local manifestation become aware of the most refined dissection or manipulation which the surgeon is effecting. When this is the fact it is certain that we are rendering benumbed or practically dead those parts of the nervous system which ordinarily are the seats of impressions which signify the person's sensibility, while there has been no injury to the other parts of the nervous system which convey to us intelligence of the vibrations leading to the manifestations of consciousness. This is a most singular circumstance, showing as clearly as can possibly be shown the duality of the animal system ; the truth that duality can be distinctly separated, and that what we actually want to do is to find out how, through the whole system, to make such a duality and to let life, however low, continue in progress. In hibernating animals nature, who is cleverer than we are, is apparently carrying on the very process which I would define—that is to say, she is maintaining life without the necessary connection of sensibility, for I have seen a hibernating animal which did not feel and I suspect that hibernation will be the final triumph of anæsthesia. I have also seen an animal become insensible during the inhalation of oxygen condensed by cold, and if we could, by any fortunate method, discover a plan of making perfectly cold oxygen pass into the body the ends we have in view would for the time be completely attained.

While we wait for so grand an attainment we are bound to endeavour to produce a similar result by submitting the organisation o a series of gaseous or vaporous substances, which, by their presence, shall have the power of performing the task that might come from mere cold.

Nature of Common Sensibility.

I feel it will be best in this paper to place before the society the conclusions to which I have been led after a period longer than, perhaps, has been known to any other man and attended with more experimental research. I know that in what is about to be stated I am breaking completely away from the common dogmas of a physiological kind and am advancing entirely on new ground, but this I cannot help because I am merely following the facts that have been put before me by Nature herself in the course of my work. I

hold, then, that we live obedient to the outer world and that we live from the outer world and from nothing else, and are always picking up its vibrations as we do its food and drink. It is usually conceived that in the body the cerebro-spinal system is a kind of independent organisation, and that all impressions are received by it and all commands are given forth from it; and this, no doubt, may be held in a certain way as the fact. But it is commonly assumed that the brain is fed by the blood and upon such feeding it exercises its own independent functions. I do not myself accept this reading. I conceive that as we own nervous expansions like the retina, which seizes impressions from without by a very simple mechanism, so we have distributed over the whole surface of the body an impressionable nervous root or expansion which receives vibrations from all the universe; that enter us in the same way that the retina receives special impressions; that the nervous expanse distributed over us is made up of, and concentrated into nervous fibres, and that nerves thus formed carry to the brain the impressions we have received just in the same way as the the optic nerve carries the picture. Thus every vibration made upon the outer surface of our bodies—from the mere vibration incident to heat and cold, from the vibration incident to the merest touch, or the vibration incident to the surgeon's knife—are all gathered up by the nerves from the nervous expanse and so conveyed to the central organ of the nervous system. This universal expansion from which sensitive nerves spring is, in my opinion, everywhere in the body where blood can penetrate, where blood can burn, and where, by burning, animal heat is generated, and can not only find its way in nerve tracts, but can also yield the substance out of which the tracts themselves are formed. That the natural brain or mass of nervous matter so carefully sealed up can receive all the impressions given to it, and, receiving such, make the body the companion and—it may be said—a part of all the universe, is a clear and simple proposition. It is not strange that centres which can thus receive impressions can lie by and give them out in their turn—acts that the nervous system performs, taking in whatever vibration is presented to the nervous expansion by which it receives sensation, and giving back that with which it is surcharged in the form of motion. The explanation given tells with special effect in regard to anæsthesia because it conveys that whenever through the blood current we diffuse over the whole

nervous expanse, in which vibrations arise, some substance possessing the power of modifying natural vibration, we, by necessity, get an effect. To my mind, therefore, when with the air in the blood we spread, to every part of the body the air can reach, a foreign substance like chloroform or any of its allies, we so modify vibration that the sense is lost to the full extent of the diffusion of the substance we have introduced.

In the course of my life I have tested the effects of over thirty-five different substances which are capable of passing by diffusion with the blood over the universal nervous surface, and I have divided these substances according to their nature, or rather according to their constitution. Starting with what I have considered an anæsthetic base, or basic element, I have followed the action of each substance and placed it under what seemed to be its true head ; thus, taking carbon as a base, I have followed it through the amyl, the butyl, the benzine, the true carbon, the ethyl and ethene series, the methyl and methene series, and the turpene series. I have also taken nitrogen and hydrogen as bases, followed the series apparently depending upon it, and by this increase have learned so truly the nature of results, that, if the chemist can place before me any substance he may possess, telling me its composition, weight, solubility in water, vapour density, and boiling point, I can on pure grounds of calculation tell whether it is or is not an anæsthetic, and if it is an anæsthetic, how much, according to the weight of the animal, it will take to produce narcotism, how long it would take in a given quantity, and what would be the termination of the phenomena before it escaped from the organism. I need not trouble the society with the details of these researches, but I may indicate that they have been repeatedly stated in the various papers I have read at different times ; but what I would say is that no group of phenomena has ever occurred to me that has not to some degree resembled the effects arising from cold—that model anæsthetic which has already been referred to, and which seems to prevent the nervous expansion, either locally or generally, from absorbing and transmitting to the nervous fibres, which spring from it, vibrations of sensibility.

From these observations I am led to infer that anæsthesia whether local or general depends always upon the same condition, namely, the suppression of vibrations from the origins, or expansion,

of the peripheral nervous fibres spread out in the membranous structures ; nerves—according to my interpretation—commencing there, not terminating, and forming afterwards the nervous cords that pass and carry direct vibrations to the brain.

It seems to me also that there is a special arrangement for the commencement of the vibration, as in the act of vision, where the picture is directly imposed upon a special surface like the retina. Again, as in the case of hearing, the impression is made upon a vibratory membrane and is thus communicated to a nervous surface. Again, in regard to smell, the membrane is a nervous surface, the Schneiderian, and the impression is conveyed by special nerves rising from it ; but the sensation we call feeling, which, indeed, is a sense as certainly as is seeing and smelling, is that common sensibility which springs from the vibration in the extreme termination of nerves in all parts ; the vibratory movement which usually excites it being the oxidation which is taking place at every point between the oxygen of the blood and the structures it laves, a vibration easily communicable to all parts and easily transmissible from all parts to the centre through the nerves which originate in the periphery, to be reflected back again in the centre, when it is necessary in the form of motion.

Under these observations we must consider every anæsthetic the same in action ; if we freeze a part we stop peripheral vibration ; if we abstract all the blood from a part we stop peripheral vibration ; if we make extreme pressure we stop peripheral vibration ; if we introduce some other agent locally we stop peripheral vibration ; if we divide the filaments of nerves which conduct vibration we do the same thing ; and, to crown the whole, if we introduce into the blood by the lungs some vaporous substance which the blood can absorb, and get that vaporous substance carried into the peripheral surface, we stop vibration everywhere and create universal anæsthesia. This proposition brings us direct to the agents which, being absorbed by the blood and carried by it over the whole system, interfere with the animal fire, and suppress the vibratory origin of feeling—creating anæsthesia. It is this I have ever had in mind in considering what a true anæsthetic should be. Nitrous oxide is for a moment an anæsthetic simply, because it replaces oxygen and does not sustain universal vibration—is, in fact, an asphyxiated substance. Carbonic acid holds precisely a similar place. Ether stands practically in the

same position, but with the difference that a little oxygen travels with it, so that vibratory phenomena are reduced rather than checked and in the long list of anæsthetics which have passed through my hands I have seen not one the quality of which cannot be read off in a similar manner. Turning to chloroform, which we may still consider the king of anæsthetics, though it may be the most fatal, its action admits of ready explanation. It is quite certain to those of us who remember its origin that it came in first as ether—the so-called "chloric ether." It did not come from any theory as to mode of action, but simply from observation of effects ; as a vapour it has the power of being slightly absorbed by blood ; the blood does not take up a great deal of it, the whole mass of blood being able to absorb not more than twenty grains of chloroform so as to make a uniform diffusion. If more than this be introduced into the blood the chloroform begins to separate ; its molecules begin to attract one another, and form minute points or blocks, which refuse to make the complete round of the circulation, and which I have actually found in the blood as direct modifiers of its course through the minutest vessels. But when it is simply homogeneously diffused through blood itself, its properties are those of suppressing heat and interfering with the vibration which springs from the chemical change in progress. The way in which chloroform acts in this particular is, I think, not difficult to explain; and is due to one of its elements which is too heavy for the quick vibration which constitutes feeling ; that element is chlorine, which forms a large part of the fluid, which is as thirty-two to twelve compared with the carbon, and thirty-two to one compared with hydrogen in the same quantity of fluid. No wonder, therefore, that it stops sensation and that in its presence the surgeon's knife or the burning cautery are not detected.

I have at all times seen that the chlorine has been the danger in regard to chloroform, and I once traced the direct action of chlorine in a specimen which I was administering to the subject. Fortunately, I saw this in time, and inhaling a little of the chlorine myself detected the cause of danger and did no further mischief. I have also observed that in tetrachloride of carbon, where the hydrogen is entirely removed, there were always signs of the influence of chlorine, and a great many years ago I was so impressed at these effects, that I thought it would be possible to remove certain portions

of the chlorine and to make a lighter compound. This led me to the employment of bichloride of methylene, which means a fluid from which one atom of the chlorine is extracted from the chloroform. The extraction is made by the action of zinc, which, in contact with chloroform, takes up a particle of the chlorine in the presence of a little alcohol, producing chloride of zinc and leaving a fluid containing a trace of alcohol with bichloride of methylene. In the first of these experiments I succeeded very remarkably, and from that time I have always administered methylene, instead of chloroform, with success. I treat with the silence it deserves the continental rumour that the great French chemist Regnault—who died on January 19th, 1878—made a specimen of the bichloride, from which, in my opinion, the chlorine could not have been properly removed, and which was, therefore, fatal. I treat also with the same silence the widespread absurdity that bichloride of methylene is a mixture of chloroform and alcohol. At the same time I would never unduly press forward bichloride of methylene, first, because it is rather a difficult product to make, and secondly, because it contains chlorine, which always has been, and is, a dangerous element. Chloride of methylene would, in fact, be a better compound to use than the bichloride, as it gets rid of two of the chlorine elements; but it is a gas, is managed with difficulty, and again, it has the objection of containing chlorine. You will gather from these observations that the temporary introduction of a member of the chlorine series into the anæsthetic series has been from the first a mistake—a mistake which must by necessity be met in the future by the exclusion of so objectionable an element. What then, you will say, ought to be put in its place? This is the grand question which is left to be solved. Many think that ether is sufficient; many do not think so, and it must of necessity be slower in its action because it contains oxygen. Bromine and iodine, which in many points play the part of chlorine, are objectionable on the same grounds, and all the amyl series, in which hydrogen is an important element, are objectionable because they are not easily soluble, but separate in the blood, and producing minute globules of themselves are obstructive to the course of the blood, and though I have tried them all, as well as the hydrides and olefiant gas—which is a pure hydro-carbon—I have found one or other objection against their use.

The body that has seemed to me to present the best qualities for general anæsthesia is what is called methylic ether, a substance on which I have reported several times and have administered over thirty times in surgical operations. It has an objection that it is a gas. I discovered it in 1867, and I repeat what I then said—namely, that it may be considered the safest anæsthetic that has yet been discovered, although it is troublesome to administer and would have to be condensed like laughing-gas if it were to be brought into use. It has a curious faculty of destroying sensibility before it destroys consciousness, and recovery from it is exceedingly rapid. Its effects were very well manifested in a patient to whom I once administered the gas for Mr. Brudenell Carter. The patient, though feeling nothing, was quite conscious of all that went on during the operation. I observed also—and reported—that the gas is so safe that an animal under its influence may remain breathing it for twelve minutes without dying, and if allowed apparently to die, may be recovered by artificial respiration so long as seven minutes after the cessation of respiration—that is to say after what appears to be actual death.

Consciousness and Common Sensation.

It is time now that I concluded this paper and I do not think I can do so at any better point. Thirty years ago I showed that it was quite possible to destroy common sensation and yet not destroy consciousness, and I press this matter once again as of vital importance. In several cases where I administered the methylic ether for removing pain in surgical operations, the patients, when quite insensible to pain, were so conscious that they were able to obey every request asked of them, and in some instances were even anxious to reason, stating that they knew what was going on, and arguing that they were not ready for the operation because they were sure they should feel pain. Nevertheless in this state of mental activity they were operated upon, and afterwards, while remembering every incident, were firm in their assertion that they felt no pain whatever during the operation. One patient who sat for the extraction of two teeth selected the tooth to be first extracted putting her finger to it, and afterwards rearranging her position for the second removal. To the looker-on it seemed, in fact, as though no change in her life had occurred, yet she affirmed that she was

sensible of no pain whatever ; and several other less striking, but hardly less singular, examples came before me. We may then, I think, fairly assume that in course of time we shall discover manageable and certain anæsthetic substances which will paralyse sensation only, leaving the muscular power unaltered, and the mental little disturbed ; and we gather from this either that in the cerebral hemisphere there is some distinct and simple centre of common sensation which may be acted upon by certain agents without involving all the cerebral mass, or that the peripheral nervous matter may be influenced withont involving the other portions of the nervous system. On the whole I incline to the view that the action of those agents which destroy pain before they remove consciousness is primarily on the peripheral system ; for we know from the process of local anæsthesia that it is easy to destroy sensation at the extremities without distroying or even interfering with consciousness, while those who have inhaled the vapours which destroy common sensation before interfering with consciousness describe the experience of a numbness and insensibility in the extreme parts of the body.

That which we medical men most require is an agent that shall be easily applied, and shall admit of being so applied generally as to induce insensibility to pain with or without destruction of consciousness, as the case before us may demand. There are many minor surgical operations for which consciousness need not be destroyed, although pain ought to be ; there are other operations in which the consciousness of the person operated upon is of great service to the operator ; and there is a third class of cases in which it is essential to suspend both sensation and consciousness. Now those agents which first destroy common sensation can always be pushed to the extent of destroying consciousness, so that if we could get a perfect agent of the kind we should have the full requirements in our hand. Up to the present moment we have been content with two classes of agents, one which destroys consciousness and sensation at the same time, the other which locally destroys sensation and has no further influence. I look hopefully for a method in which, by means of a single agent, we shall be able at will to suspend common sensation alone, or to exalt the process into suspension of consciousness. When this object is attained with safety and facility the science of anæsthesia may be considered as perfect.

Postscript.

As I peruse the above MS. on this day, March 18th, 1896, I recall with great regret that the fatality from the administration of chloroform does not show any signs of decrease, and that the patients in whom the deaths occur are, as heretofore, often sufferers from trifling ailments. I also notice that the symptoms of deaths are very rapid; that the amounts of chloroform administered are exceedingly varied, and that the mode of death seems usually to be the same as that in which Hannah Greener—who was the first to succumb to chloroform—died, some fifty years ago. I observe, further, that in one of the deaths from chloroform, which took place at Dudley, the patient was a healthy young man who submitted himself to the narcotic for the operation of tooth extraction; that he was fully examined beforehand and gave no indications of disease; that he inhaled with readiness; that the operation was performed dexterously; that the chloroform was perfectly pure; and that the post-mortem appearances afforded no evidence of the cause of the collapse. These frequent recurrences of death support the conclusions already advanced as to the danger attendant upon the reception of all bodies of the chlorine series, and they also suggest that every specimen of that series should be administered slowly in small quantities, so that narcotism should be induced by eighteen to twenty minims at the most. The question of small and slow administrations is one of the most critical, and makes a distinction between surgery proper and anæsthesia, which is of vital importance. When there was no anæsthesia, surgical art was, of necessity, predominant. The surgeon was the most brilliant man who could operate most quickly, and, with a steady nerve, could perform any possible operation. As a result of the work of ages it became natural that surgery should still in our days hold the first place, and that although in nineteen cases out of twenty the surgical operations might be mere bagatelles as compared with the production of unconsciousness by a narcotic agent, it has required a long time and a hecatomb of deaths for the fact to be demonstrated that the work of the anæsthetist calls for the first and most serious consideration. The old conception has continued to keep surgery in its original state and to cause anæsthesia to be looked upon as a mere adjunct. There is another element of danger in respect to the

question of time. As in surgery brevity was the primary process, it came to be expected, both by the public and by the profession, that brevity in anæsthesia ought to keep pace. Thus during an operation the surgeon expects the completest insensibility, and, not getting it, spurs on the anæsthetist to be as brief as he wishes to be himself—a direction which the administrator, by habit, is as willing to obey as if he were simply an adjunctive aid. In the future all this must be changed. The anæsthetist must know and feel that he must be left quite independent in producing painlessness, while the surgeon, however brilliant, must follow his lead and not think of operating until the patient has been pronounced by the administrator safe, senseless, and ready for the knife.—*Lancet.*

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

CHLOROFORM IN DENTISTRY.

To the Editor of the "DENTAL RECORD."

SIR,—It would probably have been better for a certain class of your readers if, instead of interpolating in your article merely a few phrases from my letter to the *Lancet* you had published that letter in full, and in order to afford you the opportunity of now doing so I enclose a copy.

Surely it is merely playing with the question to suggest that, manœuvered as it may be, a dentist's chair can be made to subserve the same purpose as a couch, and to pretend that when chloroform is given in the chair the patient is, as a rule—if even recumbent—undressed and under the conditions considered essential in general surgery. It is also most dangerously misleading to suppress the fact that the mortality from chloroform, compared with that from nitrous oxide, is so great, not to say appalling, that on this ground alone chloroform is forbidden in ordinary dentistry. The cases in which it is defensible to risk life in order to spare the pain of tooth extraction are so rare that if no safer anæsthetic existed the employment of chloroform would be under all common circumstances unjustifiable.

In the event of occurrence of deaths from chloroform in a dentist's chair in the future—the anæsthetic being administered in the reckless fashion sometimes lately adopted—it is extremely probable that a verdict of manslaughter may be recorded against the operator, or the anæsthetist, or both. The verdict does not, as you seem to suppose, depend in the first instance upon a "judge," but upon a coroner and a jury, and as many coroners are medical men, fully acquainted with what has been in late years written on this subject, it is certain that a jury will be before long instructed to bring home responsibility to those who display culpable negligence in safeguarding the lives of patients placed in their hands.

I am, &c.,

9A, Cavendish Square,
April 14th, 1896.

HENRY SEWILL.

MR. SEWILL'S ENCLOSURE.

COMMENTING in *The Lancet* of December 8th, 1894, on a fatality from chloroform in a dentist's chair, I ventured emphatically to affirm that the cases of dental operation in which chloroform or ether could be considered indispensable were so rare that practically the use of these always dangerous agents in ordinary dental surgery was unjustifiable. I pointed out that nitrous oxide gas was *par excellence* the dental anæsthetic; that the cases in which it did not in every way suffice were highly exceptional; and I explained that much more could be done with it than seemed commonly supposed. The several deaths from chloroform during tooth extraction which have occurred since I expressed these opinions—opinions in entire accord with those you now put forth—have strengthened my conviction. I think this view will be supported by the bulk of dental surgeons as well as by the great majority of specialists in anæsthesia, and I believe they will go with me when I further declare that it is highly culpable to give chloroform in dental cases without clearly explaining to the patient or his friends the risk incurred, and that henceforth, after the warnings which have been lately published, administration of chloroform for tooth extraction in a dentist's chair—the most dangerous of positions—without every preliminary preparation and precaution usually taken in serious operations, will, when death ensues, deserve a verdict of "Manslaughter" against the operator.

How serious is the mortality attending chloroform anæsthesia seems frequently forgotten. It is doubtful if that mortality has been decreased since, after collection of a great mass of statistics many years ago, Sir B. W. Richardson proved that deaths averaged not less than one in four thousand cases. Deaths continue to occur, and in the hands of highly skilled administrators, and as often as not in cases in which no organic disease is discoverable either during life or after death to account for the fatal issue. This is the practical fact, in spite of the teachings of Dr. Lawrie and of his strenuous contention—of which I express no opinion—that chloroform can be administered in every case with perfect safety. On the other hand, the mortality of nitrous oxide gas anæsthesia is so slight that the gas in skilled hands may be almost said to be perfectly safe. A few deaths, it is true, taken place during its employment, but from these must be deducted a considerable proportion not actually due to the effects of the gas, in which the operator, working by rule of thumb and knowing but very little about the nature of complications likety to arise, has had no resource on appearance of untoward symptoms than to "run for the doctor," and the doctor on arrival has not infrequently found the patient dying or dead, perhaps with a foreign body in the glottis or suffering from some similar mishap which timely assistance might have averted. Deaths under gas do not commonly occur even from preventable accidents in the hands of ignorant operators; deaths from chloroform do frequently follow its use, even where the utmost vigilance and the highest skill are brought to bear. Whatever justification of its employment in other departments of minor surgery may be possible, chloroform is surely forbidden in the ordinary practice of dentistry.—*The Lancet.*

ANSWER TO CORRESPONDENT.

A. P. PATERSON.—Your letter should be addressed to the Chairman of the Company.

THE DENTAL RECORD.

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Original Communications.

SOME EFFECTS OF THE SPECIFIC INFECTIOUS FEVERS UPON THE MOUTH.*

By HAROLD AUSTIN, M.D., B.S (Lond.), M.R.C.S., L.R.C.P.

Mr. PRESIDENT AND GENTLEMEN,

As students of dentistry and dental practitioners we are concerned with diseases and injuries of the teeth. Diseases of the teeth, equally with diseases of other parts of the body, may be classified into congenital and acquired. Acquired diseases of the teeth may be apparently idiopathic or primary, or secondary, either more or less obviously to some defined local lesion, or, in a more imperfectly understood way, to some general constitutional disturbance, inducing modifications in arterial and nervous supply which are undoubtedly connected with the general vitality of the tooth and its power of resistance to external adverse influences: such constitutional disturbance frequently inducing abnormal conditions of the oral secretions and mucous membranes.

Good examples of such effects are found in the eroded teeth of the gouty, the carious teeth of the diabetic and of pregnancy; while no student can work long at this hospital without coming across instances of pitted or honeycombed teeth, which are ascribed to either benevolent mercurial poisoning during the first year or two of life or an attack of exanthematous disease occurring about this period. This brings me to the subject of my few clinical remarks on "Some of the Effects of the Specific Infectious Fevers upon the Mouth."

* A Paper read before the Students' Society, Dental Hospital of London.

Although as dental surgeons we shall probably seldom or never be called upon to treat the mouths of patients suffering from acute infectious disease, yet I venture to claim your attention this evening to some of the pathological conditions arising during its course. Some of these conditions having certainly, others probably, an immediate or a remote effect which will eventually bring the patient to seek our advice. Many abnormal conditions of the mouth, and indirectly of the teeth, occur during the course of the specific fevers. Some of these are specific manifestations of the particular kind of fever, others again merely a result of general conditions which are common to the fevers and to other disorders of the body. Thus, concurrently with the symptom of pyrexia, or raising of the bodily temperature, a familiar enough symptom, and one met with in many disorders, will be found almost invariably some alteration in the normal conditions of the mouth. The quantity of saliva secreted is found to be diminished, giving rise to a dryness of the mouth ; the mucous of the buccal glands, no longer kept in a state of partial solution, becomes sticky and adheres to the teeth, undergoing an acid fermentation, this acid reaction of the mouth may be intensified by some degree of dyspepsia, which often occurs. Partly as a result of diminution of secretions, and partly from disinclination of the patient to take and masticate solid food, the tongue becomes furred, and an unpleasant odour of the breath gives evidence of decomposition—due to micro-organisms—taking place in the mouth. We have, then, in the mouth of a patient in a condition of fever or pyrexia, two conditions which modern pathology regards as pre-eminently favourable to the occurrence of dental caries, namely, increased acidity, and a nidus favouring the growth of micro-organisms which are not there in health.

With the subsidence of pyrexia the mouth gradually recovers its normal condition of alkalinity and comparative cleanliness, but should the temperature chart show a rise above normal during even a portion of the 24 hours (as in intermittent and remittent types of pyrexia), the before mentioned conditions will tend to persist, while if the pyrexia be of the continued type, the effects may be aggravated. This aggravation assumes its most severe form in diseases which assume a *typhoid* type. Here to prevent confusion I must explain to any who do not know the meaning of a "typhoid" condition. The term "typhus" has been employed from the time of Hippocrates

to denote a confused state of the intellect with a tendency to stupor; it was subsequently applied to a group of maladies characterised by continued fever and profound constitutional disturbance, and ultimately by the recognition of the specifically distinct nature of the various diseases was restricted to the disease now called typhoid fever. From "typhus" was derived the word "typhoid," to denote a group of symptoms similar to those occurring in the later stages of typhus, and met with in severe forms of many other diseases (other fevers, pneumonia, severe inflammation, erysipelas, &c.) Unfortunately the word typhoid has become with the public and some of the medical profession a synonym for enteric fever, a disease in which typhoid symptoms, although common, by no means invariably occur. A "typhoid" condition of the patient, though occurring in many different diseases, is, I think, encountered most frequently in the severer forms of scarlet fever, small pox, typhus, enteric and other specific fevers. It is then that we see the most terribly unhealthy conditions of the mouth occur unless active measures be taken for the prevention of such. We see the lips dry, black and cracked, the teeth covered with flakes of dried decomposing mucous, and the tongue dry and discoloured, often cracked and fissured, a condition causing painful ulceration during convalescence. The breath is horribly offensive and the gums have a strong tendency to bleed, the blood becoming dried and clinging about the necks of the teeth. Actual stomatitis may arise, or an aphthoid condition. Acute parotitis sometimes occurs. Such a condition as just described is frequently seen in severe cases of enteric fever and typhus (though the latter disease is fortunately seldom met with at the present day in the south of England). This state of the mouth may also be present to a greater or less extent independently of a typically "typhoid" condition. In enteric fever the pyrexia is of a continued type, and its course a long one.* Relapses of the disease, one or more in number, are very prone to occur. In some cases of enteric fever under my care at the Western Fever Hospital I have known the occurrence of subintrant relapses to keep the patient in a state of continued fever

* During the acute stage the staple diet of the patient is milk; this is a point worth noticing, as milk is very liable to undergo fermentation and to set free lactic acid, a substance very destructive to the teeth. That it should often undergo such fermentation in the dry state in the mouth of enteric patients is only what would be anticipated.

for six or eight weeks.* An interesting question to the dentist thus arises. What effects upon the teeth have been observed as the result of such protracted illnesses? While in charge of the enteric wards at the Western Hospital my attention was directed to this point by a member of the dental profession, and I investigated the mouths of a number of convalescent patients. Although, not unnaturally, many carious teeth were present in their mouths, there was but few in which the caries could be referred with any degree of probability to the illness. In three or four cases, however, I found caries of the teeth, close to the gum margin, attacking several of the molars and bicuspids, and in one case (a girl of twenty-three, detained for nearly eight months in hospital owing to postenteric neuritis) such caries resulted in exposure of the nerve in two molars (lower). I have since then been informed by a dental practitioner of wide experience that such cases frequently occur, and that the teeth frequently suffer great injury from caries after an attack of enteric fever, even when they are apparently quite sound, on the restoration of the patient to health. The latter fact may account for so few cases being met with in fever hospital practice, where the patients are so soon lost sight of. But while mentioning the meagre results of my own experience, let me hasten to add that careful attention to the state of the mouth was part of the routine treatment in the enteric wards of the Western Hospital, as indeed it should always be in cases of continued fever. The tongues of the patients should be cleansed regularly, cracks and fissures carefully dressed (with borax and glycerine), sordes removed from the teeth as far as possible; and mildly antiseptic mouth washes frequently employed. Such measures undoubtedly add to the comfort of patients.

I have endeavoured to describe conditions of the mouth which may be supposed to act injuriously upon fully formed teeth. Such conditions, occurring at a sufficiently early age, may also cause arrest of development of these organs.

The specific fevers from which children are especially liable to suffer comprise certain members of the exanthematous group (scarlet fever, measles, rothelu, varicella) also diphtheria. It has been suggested† "that there is strong probability that the eruptive

* Continued or remittent pyrexia during protracted periods (though shorter than that just mentioned) is often met with in severe cases of the exanthematous fevers, being then due to superadded complications.

† Smale and Colyer.

fevers (exanthemata), which expend their force principally upon the skin and epithelial structures, should affect all epithelial structures, including the teeth." Though unable to agree with the use of the word "principally," I think there is force in the observation. In all cases of the specific fevers there is a tendency, particularly if the course be severe or protracted, to desquamation of the skin during convalescence; in other words a necrosis of the superficial epithelial structures. Transverse groovings of the finger nails are of frequent occurrence. These phenomena are most frequently met with in cases of scarlet fever, in which the desquamation is almost (if not quite) invariable, of a remarkable and pathognomonic type; while grooving of the nails occurs, in my experience, in one case out of every five or six. The general bodily desquamation following scarlet fever is preceded by a similar, though very much more transient, process in the mouth, the moist condition of the latter causing it to appear here first. It is best seen on the dorsum of the tongue which on the third to sixth day of disease sheds its surface epithelium from before backwards, leaving a bright red, raw-looking surface with pale prominent fungiform papillæ, aptly named the "strawberry tongue."

Now, it is, perhaps, conceivable that a physiologically functional enamel organ, itself practically a part of the mucous membrane of the mouth, should be affected in such cases. But I think this will apply in a much greater degree to other pathological conditions of the mouth met with in scarlet fever. Severe inflammatory conditions of the mucous membrane occur as the result of direct extension of inflammation from the throat in the severely "anginose" cases of the septic and necrobic varieties. Inflammation of a catarrhal or a pseudo-diphtheric type is often seen involving the hard and soft palate and extending to the gums in the upper jaw during a protracted acute stage in children. Severe ulcerative stomatitis is by no means uncommon in young subjects, attacking the gums and buccal mucous membrane; in the former situation occasionally exposing the bone of the alveoli. A milder and more superficial apthoid form is very common in the second and third weeks of the disease, appearing suddenly and soon yielding to appropriate treatment. A third variety of an ulcerative and sloughy type, though not very acute, is seen amongst convalescent children—in the third to the sixth weeks. It need not therefore

surprise us, reflecting upon these various pathological conditions, that aberrations of function on the part of the enamel organ should occur, leaving indelible traces upon the permanent teeth of many persons who have suffered from scarlet fever during the first five years of life, and this even if we disregard the arrest in development occasioned by lowered physiological activity in all severe constitutional disturbance. Regarding the exact anatomical lesion that takes place in the enamel organ, we recollect that, at a recent meeting of this Society, Mr. F. Bennett informed us that in several cases of scarlet fever he investigated, the injury was most apparent in the stellate reticulum, the external and internal epithelial layers being comparatively unaffected.

Diphtheria is a disease the mouth symptoms of which present in many cases an analogy to those of scarlet fever. Thus, stomatitis is rather apt to arise during convalesence. True diphtheritic inflammation of the tongue, gums and buccal mucous membrane is never seen except in conjunction or with the presence of false membrane on the tonsils and soft palate. Such cases are not common, and are, in my experience, invariably fatal when occurring in children. In the fatal hæmorrhagic form of the disease the gums are frequently spongy, and bleed readily and freely ; in many cases of this terribly malignant type the state of the mouth is so positively appalling that I shrink from attempting any description, feeling that no words of mine can bring the reality before you. But in these cases again we can, as dental students, take merely an academic interest, as the mortality is cent. per cent.

The effects of *measles* on the mouth, as far as local inflammations go, are much less marked than in scarlet fever and diphtheria. The throat lesions are slight and transitory, except in cases complicated with one of the latter diseases. Simple or ulceration stomatitis sometimes occurs during convalescence, and in weakly debilitated children the terrible malignant stomatitis, or cancrun oris. The text-books state that measles seems more prone to the production of honeycombed teeth than scarlet fever. This observation, though seemingly somewhat at variance with the facts just mentioned, may be however partly accounted for by the much greater prevalence of the former disease amongst very young children (one to two years), and a correspondingly graver constitutional disturbance, shown by its greater mortality at these ages.

In *rothelu* and *varicella* the effects on the mouth, if any, are slight and transitory.

In addition to the various ways already described in which the specific fevers may be supposed to act directly or indirectly upon the teeth, another must now be mentioned. I allude to necrosis of the jaw, a disease said to follow many of the specific fevers, but more especially scarlet fever. It is in connection with the latter disease that I shall alone dwell upon it, having never met with a case clinically in the other fevers. Necrosis of the jaw is not a common complication of scarlet fever. It occurs in only about one case out of two or three hundred treated at the Metropolitan Asylums Board Fever Hospitals. It is most commonly met with in cases of a severe type, in which the throat symptoms are prominent, and is usually first clinically recognised in the second or third week of illness, at which time the patients, in these severe cases, are still acutely ill. Children between the ages of four and six are the most frequent sufferers, though it is occasionally met with in younger patients. I have never seen it attack adults.

Scarlatinal necrosis of the jaw is most frequent in the lower incisor region on the labial side. It is, however, often seen in the bicuspid and molar regions on the buccal aspect. To the former situation it is usually symmetrical, less frequently so in the latter. In one case, under the care of a colleague, necrosis occurred on the inside of the ramus, well behind the last molar tooth, and not involving the alveolus in any way. The necrosis may involve the bone forming the sockets of the temporary teeth only, or more rarely and especially in the lower incisor region cause destruction of the bone enclosing the sacs of the permanent teeth.* The sequestrum usually takes two or three weeks to separate. The mortality of the cases in which necrosis of the jaw takes place is high, partly from the usually intrinsically severe nature of these cases, partly from aggravation of the symptoms caused by the necrosis. In the worst cases the mouth becomes horribly foul, and the patient soon dies of pyæmia or septic broncho pneumonia. Two causes may be clinically recognised for this necrosis of the jaw in scarlet fever. Firstly, exposure of the bone by ulceration of the gum, seen in severe stomatitis, already alluded to.

* The fact that so many of these cases die probably accounts for some cases of destruction of the permanent tooth sacs being overlooked.

Secondly, and more frequently, injury. The latter cause may appear a somewhat remarkable one to anyone not acquainted clinically with this disease.

For the efficient treatment of the very severe throat conditions present in so may cases of scarlet fever, constant applications to the fauces (of antiseptics, &c.,) becomes necessary, with removal of any secretions likely to decompose or lead to injury. This is done by syringing, spraying, or swabbing, the latter procedure being most effective. These methods however necessitate the introduction into the mouth of bone or vulcanite syringe nozzles, spatulas to depress the tongue, occasionally a cork wrapped with lint to gag the mouth open temporarily. However great be the care employed it is almost impossible in some children to avoid injury to the temporary teeth. They will bite the spatula or the nozzle of the feeding vessel, &c., until the teeth become quite loose and fall out, the septic state of the mouth then causing ulceration and ultimately necrosis of some part of the socket. I have been many times surprised at the very slight pressure with a spatula, or other implement used in examining the throat will loosen or extract the teeth in these cases, even when employed with the greatest care and gentleness. Even short of extraction of these teeth I am convinced from clinical observation that necrosis of the alveolus often arises merely from pressure on the crowns and that not undue in amount ; thus one is often between the Scylla of an untreated septic throat and the Charybdis of a jaw necrosis. In severe cases in which extensive necrosis appears I am convinced that it is best to leave the fauces entirely alone, and to feed the child solely with the nasal tube, as if the treatment be persevered in the case will only go from bad to worse.

I have mentioned two causes for this jaw necrosis in scarlet fever. Other cases arise, not admitting of such explanation. Under this heading must be grouped the cases in which necrosis is said to arise during convalescence, appearing *de novo* in the fourth to eighth week of disease.

This is the form of exanthematous necrosis described originally by Mr. Salter. Its occurrence during convalescence from scarlet fever, as a phenomenon altogether distinct from the acute stage of the disease, must, I think, be very rare. During my tenure of office at the Western Fever Hospital nearly 5,000 cases of scarlet fever were treated. All these cases (with the exception of the fatal ones)

were under observation for eight weeks, many, owing to chronic ear discharge, albuminasia, &c., for a longer period. I never, however, saw a case of necrosis of the jaw arise during convalescence, or one in which this pathological condition, when it occurred, could not be referred to the acute stage of the illness ; and this had also been the experience of the medical superintendent of the hospital during a much longer tenure of office than my own.

I would venture to suggest that in many cases of this apparently secondary jaw necrosis, the mischief has taken place really during the acute stage of the illness. One can readily imagine that a small piece of necrosed bone might remain hidden beneath the gum for some time, any discharges finding their way into the mouth unnoticed, at the necks of teeth, and the true condition only becoming manifest after the lapse of some weeks when the overlying tissues by a process of ulceration. The theory that this necrosis is a true secondary specific sequel would thus seem to be unnecessary.

I must now conclude these remarks, which aim at nothing more than a brief clinical account of some aspects of the subject ; expressing regret at having no exact pathological observations to record, or indeed any at all save those which he who ran might read.

NOTES ON THE TREATMENT AND FILLING OF TEETH.

By W. Cass Grayston, L.D.S.

(*Continued from page* 202.)

Guttapercha.—In using guttapercha I have discarded the various heaters that are considered necessary to prevent overheating and consequently spoiling the material. I simply warm the shank of the instrument, and when the heat is conducted to the point pick up a piece of guttapercha with it and at once place it in the cavity and pack it. A good deal of the softening of the pellet taking place in the cavity. This is simple, and gives me as good, if not better, results than I formerly obtained by the use of an elaborate apparatus. I endeavour to work the guttapercha at the lowest possible heat, and often hold a piece in the cavity with an instrument in the left hand while it is softened and worked to place with another one in the right. It is principally a question of convenience and the size of the cavity whether one or more pieces are used to fill it. If several

pieces are used, it is advisable to work them somewhat on the non-cohesive gold principle. Sufficient heat to make one piece intimately cohere with another would in all probability injure the guttapercha. Large, medium, and fine pointed pluggers may be used as desired, and are all useful, the surface being finished by trimming and smoothing with thin flat instruments, heated just sufficiently for the purpose.

Separation of the Teeth.

In filling cavities on the approximal surfaces, more especially if gold is to be used, it is necessary to press the teeth apart somewhat in order to obtain room to work and to admit of the filling being sufficiently contoured in the molar and bicuspid region to prevent food being wedged between them. If space is not made by pressure, the cutting away of the gold in finishing will reduce the contour sufficiently to leave a space between the teeth.

To separate the incisors make what is known as a tent of cotton wool, using a tough variety (Lawton's Asorbent Cotton Wool is excellent), roll the fine end very tightly and force it up between the teeth, keeping this end outwards, then pull it forward with either the fingers or pliers until the thicker part is tightly wedged between the teeth, then cut off the protruding cotton wool back and front with scissors. The Quinby Gum Scissors are very convenient for this purpose. As a rule the fingers are preferable to pliers for pulling the cotton wool forward ; with the latter too great pressure may result, and some soreness of the teeth may follow. Manipulated with discretion this method of using cotton wool is convenient and answers all requirements, and the teeth rarely become sore. If a wide separation is desired this operation may be repeated every two or three days until sufficient space has been secured. If the edges of the cavity are ragged and cut the cotton wool, they may be smoothed by passing a fine saw between the teeth. If the teeth are so close together and so firmly set in the alveolus that it is impossible to press the cotton wool between them, a strip of rubber dam may be used instead, and on the following day the cotton wool can be easily inserted.

In separating the molars and bicuspids it is advisable to open and partly or wholly prepare the cavities, and then to wedge one or more balls of cotton wool into them and between the teeth. If the

cotton wool, instead of being packed into cavities in these teeth is drawn between them, as in the incisors, it will be found that it works its way down into the triangular space at the neck, and sets up considerable irritation, without effecting any separation. It is often useful, particularly in molar and bicuspid cavities, to saturate the wool after insertion with chloropercha. Some dentists, after partially preparing cavities in this region, fill them with a guttapercha such as the red base plate, which expands somewhat, and by wedging it between the teeth obtain gradually and conveniently a wide space. The objection to this, speaking generally, is that it takes several months to produce the space, and patients are apt to forget all about it, and as long as they are comfortable carefully avoid the dentist. The Perry Separators are very useful instruments in many cases for immediately securing space ; used on the incisors they are rather in the way, and if the cavities in the molars and bicuspids are large, extending down to the cementum, and well cut away at the sides to secure free edges, the points of these instruments extend right into the cavity and completely interfere with the filling at this part.

To secure space immediately between the incisors, first paint the gum with cocaine on both sides, work it also well on to the gum between the teeth, then trim a long stick of orange wood to a tapering round point, soap it and insert it between the teeth at their necks, pressing it in until the patient flinches, then wait a short time and press in still further, and again stop as before, then firmly press it in as far as possible, using considerable force. The object of using a long and preferably a thick stick is to admit of its being readily grasped in applying the pressure. Never hammer a wedge of wood between the incisors, the shock of the blow is most disagreeable.

Treatment of Diseased Conditions of the Teeth Preparatory to Filling.

Exposed Pulp.—If a carious tooth is left unfilled, sooner or later the decay progresses until the pulp chamber is encroached upon and a portion of the pulp becomes exposed. Previous to the exposure the pulp has probably been irritated, but there is a likelihood of its recovering under treatment, unless the chamber is actually opened. It is impossible to know the extent of the irritation and whether or

not it will lead to uncontrollable inflammation. All that can be done is to form a judgment from the patient's description of the duration and severity of the pain, and act accordingly.

Experience seems to point out the probability of saving many pulps that are not actually exposed, particularly if only slight pain has been suffered. The application of soothing remedies and temporary fillings may enable the tooth to be subsequently satisfactorily filled without having to resort to "pulp killing." Experience also seems to show that the probabilities of success are very slight if the pulp is actually exposed. Many cases of satisfactory pulp capping may be quoted. I have had two exposed pulps in my own mouth satisfactorily capped, the last one being done eight years ago, but the proportion of failures to successes is so large that, as a general practice, it is hardly wise to attempt conservative treatment. It is as a rule (except, perhaps, for patients with very strong teeth and robust constitutions) preferable to waste no time and run no risks of future annoyance, but at once to apply the minute quantity of arsenic necessary to destroy the pulp. In applying the arsenic the usual directions are to make a free exposure and apply the devitalising agent directly to the pulp, having previously soothed it if necessary by appropriate dressing. If pain is caused by the arsenical application it is considered to be due, as a rule, either to imperfect exposure or to pressure in sealing it in. I have never been able (except in exceptional cases) to freely expose a pulp without causing the patient great pain, even with the lightest manipulation, and I have therefore been obliged to content myself with such exposure as might exist after the removal of loose *debris* and whatever excavation I felt justified in making, preferring (except as a last resource, short of extraction) to apply the arsenic then, and if pain followed (which is by no means the rule) to make the exposure when the first application had obtunded the surface of the pulp. One of my friends, who practices abroad, informed me that he never had any trouble after applying arsenic, his method being to freely expose a pulp and then give it a good cut with an excavator to make it bleed well. This may commend itself to heroic practitioners, but I have never had the hardihood to attempt it myself.

The resistance of pulps to the action of arsenic varies considerably. It is often a very difficult matter to succeed in destroying some pulps by the ordinary method in anything like a reasonable

time. Time after time a patient will return ; the tooth will be redressed, and although the superficial sensitiveness may be sufficiently obtunded to admit of the freest exposure, deeper exploration produces pain, and eventually the arsenic is removed, the tooth temporarily filled, and the patient told to return in six months, or earlier, if painful symptoms develop. If a large quantity of arsenic is used, and the dressing frequently repeated, or left in the tooth a long time, in all probability severe periosteal inflammation of an almost uncontrollable nature will be set up, and extraction will usually follow. This resistance of pulps to arsenic may be the exception rather than the rule, but it occurred so frequently in my practice that I had serious thoughts of giving up its use and capping all pulps that could be made comfortable, not with any expectation of preserving them, but to save my own and my patient's time. It appeared to me to be just as useful to remove a temporary filling some months after insertion and find the pulp had died a natural death as to spend considerable time in applying arsenical dressings, and then to be obliged to dismiss the patient with the same advice as to returning, and to eventually obtain precisely similar results. In the text books allusion is made to the *occasional* resistance of a pulp to the action of arsenic, but as far as I know Mr. Arthur King was the first to call attention to its being *frequently* met with in practice.* The method of applying arsenic advocated by Dr. N. T. Shields, of New York, appears, however, to be an improvement on the usual practice, and I have used it for some time past with excellent results. Briefly, the procedure is to cut or drill a small hole in the sound dentine remote from the pulp, place the arsenic in it and seal it up, leaving the arsenic in contact with freshly cut dentine, a soothing application is placed on or over the pulp (Dr. Shields uses cocaine), and the tooth temporarily filled. At the end of a week the dentine may be painlessly drilled nearly to the pulp, and in the bottom of this deepened hole another application of arsenic is placed. At the end of another week the pulp will be found perfectly dead and can be painlessly removed. Dr. Shields claims that by this method the arsenic is kept from direct contact with the pulp, and consequently no periosteal inflammation will be produced and that the whole operation is painless. I find that should pain occur it is easy to reapply the soothing application without disturbing the arsenic ; that there is no fear of

* *Journal of the British Dental Association*, April, 1894.

the devitalising dressing being disturbed by the patient ; and that it is usually a painless and, as far as my experience goes, generally a certain operation.

Where a pulp is completely dead, which is readily ascertained by delicately inserting a fine Donaldson's bristle down the canals, it is necessary to remove it. The bulbous portion in the crown is readily cut out with an engine burr and the prolongations down the roots are extracted by means of the ordinary "nerve extractors," if the canals are fairly large, and with the fine Donaldson canal cleansers if they are small, scraping the dead pulp out bit by bit if necessary. If it is necessary for a great deal of the tooth to be cut away in order to enable the pulp extractor or cleanser to be used, and it is desired, if possible, to avoid this, the dead pulp may be thoroughly dried up with the Evans Root Canal Drier. The insertion of this instrument will cause no pain at first, but some little pain will be felt if it is held in the root for any length of time. The patient may be instructed to give notice of this, and it should be at once withdrawn and reinserted when the pain has passed away, repeating this until the pulp is considered to be thoroughly mummified. If, after the extraction of the pulp, there is no flow of blood down the canal the roots may be at once filled if desired and the case completed.

The careful and thorough removal of pulps from the roots of teeth (after the application of arsenic) is often difficult, and frequently takes up a great deal of time. In order to save time and trouble, and also in many cases to avoid cutting away a good deal of sound tooth structure, it has been suggested that the bulbous portion of the pulp should alone be removed, and the cavity thus made filled up with an antiseptic paste that will have the effect of mummifying the pulp that is left in the roots, so that it will remain in a permanent antiseptic condition, and form in itself an excellent root filling. Drs. Witzel, Miller, and Herbst, are the most prominent pioneers in this new treatment, which is still in the experimental stage. In the *Dental Cosmos* for November, 1895, appears an interesting article on this subject by Mr. Söderberg, who advises the use of a paste made of equal parts of alum, thymol and glycerol, with zinc oxide sufficient to make a stiff paste. Whether this new procedure will prove an advance on the older methods time alone can prove. It certainly appears worthy of the attention of all progressive dentists.

The Treatment of Teeth Containing Putrid Pulp.—When a pulp has died a "natural death" it will usually be found in a putrid condition. If it has been long dead the roots will be filled with foul *debris*, in a more or less liquefied condition, and owing to the irritation caused by the absorption of the products of putrefaction the peridental membrane will be usually in a more or less inflamed and diseased condition.

The treatment consists in gently scraping out all the contents of the canals, being very careful to avoid forcing anything through the apices, in flooding the canals with some powerful germicide, and either at once or at some subsequent sitting filling the roots, having, if necessary, sufficiently reduced any active inflammation which might interfere with this.

The irritation and inflammation of the peridental membrane, whether acute or chronic, is caused and kept up by the septic condition of the root canals, and by removing the cause nature is often enabled to affect a cure.

When there is much degeneration of the membrane, and when pus has formed, producing what is known as an alveolar abscess, the removal of the cause is not sufficient in many cases to effect a cure, and it is necessary to cauterize or stimulate the parts to healthy action.

This can usually be accomplished by pumping the remedy through the apex, using an old "nerve extractor" (perfectly clean) wrapped round with a few fibres of cotton wool. Some operators use a small syringe for this purpose, personally, I much prefer the former method. It is, of course, necessary for the canal to be perfectly freed from all *debris* before an attempt is made to force anything through the apex. Carbolic acid (full strength) is generally efficent for this purpose. In obstinate cases, sulphuric acid (20 to 50 per cent.) may be used, and in a few cases where everything else has failed, I have had happy results from the use of nitrate of silver—bearing in mind that it may cause disagreeable discolouration. Should a fistulous opening exist, and remain open after the roots are filled, the remedy may be applied to the diseased parts through this opening, enlarging it if necessary. In cases of blind abscess an opening may be made to the root by cutting or drilling through the alveolus. This latter heroic procedure is not recommended as a method of general practice, owing to its being usually very painful. Many

dentists think it is unnecessary and even inadvisable to postpone the filling of roots providing there is no flow of either blood or pus down them to interfere with the operation. They trust to mechanical cleansing, and to the use during and immediately after this of some powerful germicide, and consider the result to be quite as good, if not better, than if the filling operation was delayed. Others, on the contrary, hold that the dentine has absorbed products of putrefaction, and can only be sterilised by thoroughly soaking it with a germicide, and that this cannot be accomplished at one sitting. They are aware that the sealing of the apex by root filling, if thoroughly accomplished, will prevent the passage of anything through it, and that a barrier is thus set up which may prevent any further trouble. Some, amongst whom I include myself, have not much faith in their own ability, or in the ability of others, to fill all root canals in such a manner that the filling always extends to and never beyond the apex, and with materials that can be packed tight and will remain tight without either shrinkage or absorption. The experiments made by Dr. Kirk, of Philadelphia, to prove whether the coagulation of albumen produced by certain remedies (such as chloride of zinc) prevented their absorption, certainly show that the dentine and cementum are more permeable than is generally supposed, giving good grounds for the fear always felt by the present writer that sooner or later (granting the apex is perfectly sealed), products of putrefaction absorbed by the dentine will find their way to and irritate the dental periosteum through the solid structure of the tooth.*

There is no doubt that excellent results have been attained and are being attained by immediate root filling ; whether they will be as permanently successful in the majority of cases as the older methods time alone will prove, and beyond saying that I have a decided preference for what has been termed "the dressing method" I do not think it is advisable, with our present knowledge, or want of knowledge, for anyone to be dogmatic on this subject.

A Method of Immediate Root Filling.—A method of immediate root filling that I have practised with success is a modification of Dr. Richmond's method. First of all flood the cavity with carbolic acid, then with a Donaldson Canal Cleanser, dipped in the carbolic,

* *Dental Cosmos*, March, 1894.

proceed to remove the contents of the canals. It will be found that carbolic acid acts somewhat as a lubricant, and enables the instrument to be more readily inserted and manipulated in fine canals. After removing, with great care and delicacy, all the putrid contents, continue the scraping until any softened dentine is also removed. Scrape the canals until the walls feel hard and nothing but a white powder is to be seen on the withdrawal of the instrument, and at once fill them.

The Dressing Method.—This consists in flooding the canals with a germicide, and either at the first or at some subsequent sitting, removing their contents, the germicide being sealed in the tooth with a temporary filling. This is repeated until it is considered that not only the canal but the whole of the infected dentine is sterilised. Then, and not until then, the roots are filled.

In the *Dental Cosmos* of April, 1889, is published a very important table giving the value of various Essential Oils, and some other well-known remedies as germicides and antiseptics in the treatment of root canals. These tables, drawn up by Dr. G. V. Black from his own experiments, give great value to the oils of cassia and cinnamon, 1 in 4,000 of the former and 1 in 2,000 of the latter proving effective. Since that time I have regularly used one or the other of these oils in the treatment of pulp canals containing putrescent pulp or *debris*.

Dr. Harlan on Essential Oils.

In the *Dental Cosmos*, October, 1889, appears a very interesting paper on certain of the Essential Oils, by Dr. Harlan, in which he alludes to the valuable properties of the oils of Cassia, Cinnamon, etc., and from which the following is taken :—

"The most remarkable property possessed by the essential oils is one that has heretofore escaped general attention. The writer first pointed this out in a paper read before the Odontological Society of Great Britain in 1887. Essential oils of the varieties mentioned above and a few others not necessary here to particularize, when introduced into a cavity of a living tooth and sealed therein slowly deposit vaporizable camphors, which are potent antiseptics. These camphors are very sparingly soluble in water, and in consequence of this are not easily dissipated by moisture should the cavity be not hermetically sealed. The same vaporizable camphors are likewise deposited when the oils are sealed within the roots of a tooth. It is on this account that they so readily and certainly disinfect polluted

dentine. The writer (Dr. Harlan) wishes it distinctly understood that he believes that the dentine of a pulpless tooth—long dead, and in which the pulp or other vegetable or animal matter has decomposed—must be disinfected in order to prevent a gradual deterioration of the cementum and pericementum. This is a necessity to to insure a feeling of comfort in a pulpless tooth after the root and crown have been filled. Many pulpless teeth filled and treated by purely mechanical methods, without respect to the complete disinfection of the dentine, are a permanent source of discomfort to their possessors.

"Of the many agents and processes for the disinfection of the dentine of a pulpless tooth, none possess so few disadvantages in the handling as the essential oils. They do not act with the instantaneous rapidity that some forms of mercury do, or even with the rapidity of hydrogen peroxide, but their action, if slower, is more perfect and continuous. The oils do not lose their property by exposure, they do not deteriorate, and their efficacy has been established clinically as well as in laboratory experiment. To sum up their advantages in dental practice I would say :—

"1. They possess local anæsthetic properties.

"2. They are stimulants.

"3. They are non-coagulants.

"4. They are sparingly soluble in water, and on this account are not contaminated by saliva, food, or other foreign substances.

"5. They are diffusible.

"6. The camphors which are deposited when brought in contact with the slightest quantity of water, saliva, or blood serum, are vaporizable as soon as formed. At a temperature of about 94° F. their extreme volatility permits them to thoroughly impregnate the dentine. The camphors are disinfectants in full strength, as was shown by their deposition on the sides of tubes coated with broth in which various forms of bacteria were planted. In the ends of the tubes, where the camphors were not deposited, a vigorous growth was invariably observed.

"7. The vaporizable camphors are the agents which disinfect the so-called blind abscesses, even when the oil is not introduced into the root of a tooth further than the pulp-chamber, where it is sealed only moderately tight.

8. The foul contents of a root canal, after being in contact with the oil of cinnamon, oil of cassia, and eugenol for two days,

when planted in sterilized beef-broth failed to show any sign of life or development at the end of fourteen days. Repetition of this experiment by planting a fresh tube daily for fourteen days failed to show any sign of bacterial life."

My general method of procedure (based on Dr. Harlan's) is at the first sitting to open up the tooth, clear out the bulbous portion of the pulp chamber, place in it a ball of cotton wool saturated with the oil and fill with temporary gutta percha, making two or three small holes through the filling to the cotton wool for the escape of the gases of putrefaction.

At the second sitting the canals are partially or wholly cleaned out and the oil worked down them, taking care to avoid pumping it through the apex, as it is irritating, and proceed as before. At the third sitting complete the cleansing of the canals (if it has not been done at the previous sitting), place twists of cotton wool saturated with the oil loosely in them (if the canals are large enough) and complete as before, only this time make no holes in the filling. If the tooth is perfectly comfortable for three days the roots may be filled and the case finished. Should any trouble arise (which will rarely happen unless the oil is forced through the apex) making two or three holes through the gutta percha gives relief. This simply means that the tooth is not thoroughly sterilized, and one or two more dressings will be necessary. One great advantage of these oils is that they appear to be more permanent and persistent in their action than many other remedies. Many germicides act while they are being applied and for a short time afterwards, but practically for a ten minutes application a ten minutes result is attained, while with these oils the action seem to continue for several days, and it is comforting to put something in a tooth that will be working of its own accord during the time that intervenes between the sittings.

The oils of cassia and cinnamon have a tendency to sometimes discolour teeth, and it is therefore unwise to use them in the incisors, for even a slight change of colour that would be unnoticed in the bicuspids and molars is here very apparent.

In the treatment of pulpless teeth there is still much to be desired, and that there is a great field here for new and improved remedies is shown by the eagerness with which dentists fly to new antiseptics and germicides. To allude to all the remedies that have been used in this connection with more or less success would be

beyond the scope of "these notes." Many of the newer germicides have only had an ephemeral existence, others have "come to stay." Amongst those that have found favour of late years may be mentioned Dr. Schreier's Kalum-Natrium ; sodium peroxide and the various strengths of pyrozone (the 25 per cent. etherial solution being an efficient bleacher of discoloured teeth).

Many experienced dentists believe that the old-fashioned creosote is quite as good, if not better, than any of the more modern productions. It is not as powerful a germicide as some (Black's tables give 1 in 400 as being efficient), but, perhaps, combines in itself more valuable properties than any other single remedy. It is an excellent cauterant for an alveolar abscess, and if accidentally forced through the apical foramen when not needed is less irritating than the oils of Cassia and Cinnamon, &c. ; it appears to be fairly persistent in its action, and also appears to possess some local anæsthetic properties ; its odour is, however, strong, and is considered disagreeable by many patients. Wood creosote is considered to be the best. The quality of many germicides, drugs, &c., probably varies somewhat, and this doubtless accounts for the different results obtained at times by different dentists.

Every dentist who gives much attention to this work probably has his favourite remedy, but success will always depend more on its application than on the remedy itself. Time, patience, care and finger skill are the main requirements, and although different conditions may demand variations of treatment, the best results will always be obtained by the intelligent selection and skilful use of a *few medicaments.*

Filling Roots.—The most satisfactory method of filling roots appears to consist in first introducing some liquid or semi-liquid material that can be readily worked in, and which if accidentally forced through the apex will not be very irritating, and then to ensure its being driven to place and also to prevent as far as possible any shrinkage, to introduce some solid material prepared in a form that will admit of its ready insertion.

The introduction of chloropercha and then guttapercha points appears to fill the requirements better than anything else in the majority of cases. This is readily accomplished by first filling or lining the root canal with chloropercha, introducing and pumping it in with a fine steel bristle, and then pressing into the canal one or more of the guttapercha points that are made for the purpose.

There is, however, some slight shrinkage in this filling, and the addition of rosin to the chloropercha, suggested by Dr. Goble, is doubtless a very valuable improvement. Dr. Goble states that the rosin prevents shrinkage, produces an absolutely tight filling, and is in itself an antiseptic.* It is important to introduce the gutta-percha points with as little pressure as possible, to avoid forcing the liquid through the apex, and if they do not quite reach the ends of the roots the solution will probably fill the small space efficiently.

A root should never be solidly filled unless it has been thoroughly well scraped out, for fear of forcing some of the *debris* through the apex and setting up inflammation by either septic or mechanical irritation.

The scraping of roots with the Donaldson Canal Cleansers usually enlarges them sufficiently to admit of their being filled, and there are much safer instruments with which to enlarge canals than drills and reamers. Very fine canals that cannot be thoroughly scraped out may be sterilised as far as possible and left unfilled. Dr. Callahan's method of applying a 50 per cent. aqueous solution of sulfuric acid and pumping it down fine canals with suitable probes (Dr. Flagg advises iridium-platinum and platinum-gold probes) enables many apparently inaccessible roots to be cleaned out and filled.† It is often advisable to fill roots with an antiseptic paste. Many fine or tortuous canals cannot be solidly filled, and there are many cases where, owing to the impossibility of thoroughly removing all the contents of the canals, it is unwise to attempt solid filling. In what may be called doubtful cases in general, a paste root filling is also indicated. Anyone who has laboured many hours to remove guttapercha and other solid root fillings—sometimes vainly—and who recognises that a recurrence of trouble usually necessitates venting the canals, will become inclined to pick his cases for solid filling. In the majority of cases the solid filling is doubtless the best practice, but there are many cases in which the more cautious procedure is advisable. This must be left to the judgment and experience of the operator. Iodoform mixed with glycerine or vaseline is probably as useful as anything, nothwithstanding that iodoform is now considered to have no antiseptic properties. The addition of oxide of zinc powder to the above makes a smooth paste, and probably adds to its stability. If remnants of unde-

* *Items of Interest*, April, 1894. † *Dental Cosmos*, April and Deecmber, 1894.

composed pulp are left in a canal, the addition of a little tannin to the above will be advantageous. In fairly large canals cotton wool may be saturated with the paste and then packed into the roots in the usual way. The great objection to these pastes is that they may become absorbed, and that unless the apex is solidly filled moisture may find its way into the canal from the tissues surrounding the end of the root and a septic condition be again produced. I am inclined to think (unless the apical foramen is large) there is just as much chance of moisture finding its way to the root canal owing to defects or leakage of a filling, and it is therefore always advisable to cover the coronal ends of the canals with oxychloride or phosphate cement. Almost everything that can be used for the purpose has been tried for filling roots, and different methods in different hands may give equally good results. The perfect root filling has yet to be discovered—unless salol should prove to be the one thing desired. It melts at a low heat and is said to be readily pumped or injected into canals, which on cooling it fills solidly. It promises well, but has yet to stand the test of time.

If much degeneration of the peridental membrane has taken place the use of germicides and cauterants and the most thorough cleansing and careful root filling will fail to restore the parts to health. An improvement in the conditions is all that can be hoped for. It is astonishing, however, how long a badly diseased tooth may be comfortably and usefully retained in the mouth owing to the above treatment, although sooner or later it will be lost.

Dr. Thomas, of Philadelphia, who practices extraction as a speciality, finds that sooner or later all "so-called dead teeth" fall a prey to the forceps, but that careful treatment postpones this in the majority of cases for a long time. Much depends on the constitution of the patient. The exact condition of the affected parts cannot be ascertained while the tooth is in the mouth. All that can be done is simply to apply remedies, and if the tooth readily becomes comfortable and can be satisfactorily used for mastication, a cure may be considered to be effected. Those dentists who treat and fill all pulpless teeth that appear to be worth saving find that a very great majority are by means of the treatment usually retained for a long time, and although it is impossible to accurately guage the life of any individual pulpless tooth, or to hope every case will respond to treatment, the success and practical value of root treatment and filling is beyond question.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting of the above Society was held on the 4th ultimo, at 40, Leicester Square, the President, Mr. David Hepburn, L.D.S.Eng., in the Chair.

The minutes of the previous meeting were read and confirmed. Messrs. Northcroft and Bateman were elected auditors for the ensuing year.

Mr. Robert Stephen Fairbank was proposed for membership.

Mr. G. H. Bowden and Mr. D. Rubery Chambers were formally admitted members of the Society.

Mr. George Brunton gave an account of his experiments in colouring porcelain for teeth and gum bodies or enamels. The porcelain he had used was a low fusing one, 1045°C being the melting point. It was more like glass in appearance, and would be more correctly described as enamel.

The analysis of his porcelain was as follows :—

Silica	65·44	per cent.
Alumina	4·57	,,
Magnesia	2·26	,,
Lime	13·52	,,
Soda	9·96	,,
Potash	0·66	,,
Sulphuric Acid	0·53	,,
Loss on ignition	1·66	,,
Protoxide of iron	0·23	,,
	98·83	

This he compared with the analyses of the three porcelains, viz.: (1) Chinese; (2) Berlin; (3) English:—

	I.	II.	III.
Silica	71·04	72·96	39·88
Alumina	22·46	24·78	21·48
Lime	3·82	1·04	10·06
Bone earth	—	—	26·44
Alkalies	2·68	1·22	2·14

And with glass:—

	Window.	Crown.	Sheet.
Silica	69·0	67·7	56·0
Lime	12·5	9·9	—
Alumina	7·4	1·4	1·0
Soda	11·1	—	—
Potash	—	21·0	8·6
Lead oxide	—	—	34·4

The metals which produced very little in the porcelain when used alone seemed to answer best for the purpose of producing the delicate

gradations of colour. He had endeavoured to produce a more natural gum by mixing a high fusing gum body with the low fusing plain uncoloured body and obtaining the desired shade with metallic chlorides; but this plan resulted in raising the fusing point, which was, of course, a drawback in using the mixture on a low fusing body. The high fusing gum from which he had obtained the best results was John Allen's body, using equal parts of the high and low fusing bodies. Mr. Brunton exhibited specimens of the results he had obtained, and remarked that it would be observed he had not yet got beyond the experimental stage. Mr. Brunton also showed a simple method of applying rubber dam by stretching it on a thin wire frame. The rubber was sewn on to a piece of calico by which it was kept off the patient's face. It had only three fastenings, and though somewhat similar to Fernald's holder, he thought it would be found lighter.

Mr. REINHARDT asked if Mr. Brunton had tried mixing chloride of tin with chloride of gold? He would also like to know what were the strengths of the colouring solutions Mr. Brunton used.

Mr. BRUNTON: The gold chloride was a 2 per cent. solution, and most of the others were 10 per cent. solutions. A mixture of tin and gold would be seen by daylight to produce a slightly purple pink. In mixing silver and gold care should be taken to put only a small quantity of silver, otherwise a yellow tinge would result; the same remark applied to zinc, cadmium, and the other metals which were used for white porcelain.

Mr. OSWALD FURGESS presented a framed photograph of "Long Calderwood," famous as the birthplace of William Hunter and John Hunter. He asked the Society to accept the picture because John Hunter's first published work was his article on "The Natural History of the Human Teeth." When it was remembered that John Hunter had not the modern microscope to aid his researches they would feel a sense of wonder that he accomplished so much.

Mr. J. F. COLYER then opened a discussion on the "Early Treatment of Crowded Mouths." He strongly advocated early treatment, and claimed the advantage that if adopted as soon as it became evident that a crowded mouth at a later period would otherwise inevitably result, the case, when all the teeth were erupted, would simply resolve itself into one of a misplaced canine or bicuspid—a condition comparatively easy to remedy. Whereas, if the case were left untreated, the difficulty of remedial measures would be increased

by the fact that the teeth had become more fixed in their irregular position and more teeth had become involved. Having weighed the advantages and disadvantages of extraction in comparison with expansion, Mr. Colyer passed on to consider the treatment of individual examples under the two heads :—(1) Cases where the first permanent molar is unsavable. (2) Cases where the first permanent molar is savable. For the former class he recommended the removal of the temporary canines directly crowding seemed inevitable, by this means enabling the incisors to come into a regular line at the expense of the space left by the removal of the temporary canine. The bicuspids are then able to erupt in the normal way, leaving the mouth fairly regular, with the exception of the small space between the lateral incisor and the first bicuspid, so that the canine erupts external to the arch. The first permanent molars are removed directly the second permanent are sufficiently through to permit being held in place by a plate. Space having been made for the bicuspids, they move back, generally without further mechanical treatment, and the canine falls into place. The extraction of the unerupted first bicuspid was recommended by Mr. Colyer as the most satisfactory method of dealing with cases of the latter class, and, in support of his theoretical contention, he exhibited on the screen photographs of twelve cases in which this treatment had been adopted, in most of them with excellent results. In conclusion, he enumerated the following points as a suggestion of the limits and scope of the discussion : (1) Is it advisable to treat a crowded mouth directly such a condition in the future seems inevitable ? (2) What are the comparative merits of extraction and expansion ? (3) In cases where the first permanent molars are savable, is extraction of the unerupted bicuspid a good form of treatment in the majority of cases ? (4) In cases where the first permanent molar is unsavable what is the best course of treatment ? (5) At what age should the first permanent molar be removed in crowded mouths ?

Mr. R. H. Woodhouse regarded himself as particularly unsuited to criticise the chief feature of the paper because he had never himself adopted the treatment recommended. He would be very unwilling to subject to any form of treatment for prospective irregularity the cases brought forward by the opener, because the longer he practised the more he was convinced of the immense power of nature to correct irregularities that appeared early, and he

preferred to give her every chance. With the one exception of the lower teeth not biting in any way inside the upper ones, he would not himself attempt to regulate any of the mouths that Mr. Colyer had thrown on the screen. With regard to the others, he did not think it was advisable to treat a crowded mouth directly such a condition seemed inevitable, because he felt that it was impossible in such an early stage to say what the future of the mouth would be. It could not be really foreseen what teeth might become decayed in the course of three or four years ; it must be at the best only conjecture. Owing to the introduction of carborundum discs, mouths which formerly he would have been very anxious about could now be treated with much greater prospect of success by free divisions between the molars. He adopted that treatment with much greater heroism than he ever did before because it could be done with much less suffering to the patient. By nursing a mouth up to the age of 14 they would be able to see what the future of the mouth was likely to be, all the teeth would be fully erupted and in their places, and they could then decide with much greater confidence which teeth it would be best to sacrifice. With regard to the second question, if any treatment must be adopted, in his opinion extraction was the best ; it was speedy, it saved the patient an immense deal of trouble, and it enabled them to meet a large number of cases that could not be met in any other way. They were all confronted with the difficulty of boys and girls attending school, and the consequent impossibility of obtaining the frequent visits necessary for treatment by the expansion method, so that he was more and more inclined to adopt extraction as the best remedy for crowded mouths. With respect to the third question, he felt it necessary to be careful in offering any criticism, for he thought that at present they knew very little about it. He did not think they knew enough to recommend it to their patients, and it seemed to him a little cruel. The operation was needlessly severe. And, again, they really lost the very centre of masticating strength by removing the temporary molars in the way suggested. With reference to the fourth question he would certainly unhesitatingly take out the six-year old molars if a mouth of the age of 14 needed thinning, though in many cases he had deferred doing so until a later date, and had then taken out the second bicuspid instead of the six-year old molar. He thought they should make their operations as merciful as possible to their patients. Exceptions

might arise where they got hopelessly crowded mouths, but as a broad principle he would never operate for the relief of overcrowding until all the teeth were well established in position.

Mr. H. Baldwin thought the profession had not really made up its mind as to whether it was better to extract unerupted bicuspids or not ; and it had not made up its mind, in cases where six-year molars had to be extracted, whether it was better to extract them before the eruption of the 12-year old molars or after. He had been looking at Mr. Colyer's models and he thought the results of his treatment in most cases were satisfactory. In those cases where Mr. Colyer thought he had not got too much room, he (Mr. Baldwin) was inclined to think it was otherwise. The patients were still at a very early age, and in time those spaces would entirely close up. With regard to the second question, it seemed to him that it depended very largely on the condition of the lower arch. In cases of general crowding of both upper and lower it would certainly seem better to extract, and so put the teeth straight; but if the lower teeth seemed to be fairly regular and the upper teeth crowded, and at the same time the upper jaw distinctly contracted, showing the outer cuspids, that would seem to him a typical case for expansion of the upper jaw. Question number three was one on which they would all be glad to hear individual opinions. With regard to question five, personally, he thought it was better to wait until the second molars were erupted, because then they got the full benefit of the extraction ; they got the full amount of room without the tilting of the second lower molars which they otherwise would get if they were extracted very early. If the six-year molars were extracted very early a good deal of the space was frequently lost by the coming forward of the second molars. As to whether it was better to extract a savable six-year molar or a bicuspid, it seemed to him that there were nearly a dozen reasons why the bicuspids should be chosen instead of the molars.

Mr. George Brunton said that his own experience coincided rather with Mr. Woodhouse than with Mr. Colyer, but Mr. Colyer's method was comparatively a new one. With reference to expansion plates, he thought that most of them capped the molars, but although he had made a good many, he only remembered having capped the molars once; he could generally manage to expand without doing so, thereby saving the teeth from premature decay.

Mr. Sidney Spokes was content to say "no" to Mr. Colyer's

first question. With regard to the second, speaking generally, he was in favour of extraction as against expansion. The third question contained the crux of Mr. Colyer's communication. He would suggest to Mr. Colyer, if he wanted more room in some of his cases, and felt obliged to do something, he should extract the temporary molars and leave the first bicuspid alone. In some of his cases it appeared that the extracting of the temporary molar alone would have given him quite sufficient room. The extraction of both the temporary molars would be another way out of the difficulty. The larger size of the temporary molars had not been referred to by Mr. Colyer, although no doubt the matter had occurred to him. In nearly every one of Mr. Colyer's cases there was an approach to a V-shaped arch, was this the result of his treatment? In the case of the permanent canines he should leave them to become a case of outstanding canines, and deal with them at the usual period and in the usual way, taking into consideration the question of whether the first permanent molar had to be lost or whether the first bicuspid—he generally removed the first bicuspid. One of the strongest arguments that Mr. Colyer had brought forward was with regard to the crowded condition of the teeth producing caries. They knew that that was one of the predisposing causes of caries, but at the same time he thought it was rather unusual, unless in a very severe case of overcrowding, where the incisors were overlapping one another to a large extent, to find any large amount of caries before the age of 12, when the second permanent molar was coming up. He thought the two permanent molars should be left to come in contact before the first permanent molars were removed if they wanted to keep the space. Mr. Colyer had said that the case might be treated as soon as the second permanent molars appeared through the gum, but he (Mr. Spokes) would be disposed to wait a little longer and let the bicuspids interlock thoroughly.

Mr. George Cunningham regarded the questions of function, mastication, and articulation as fundamental essentials in discussing the subject under consideration, and he looked upon the failure of the opener to refer to them as an important omission. He recognised the coming man's idea about the extraction of the unerupted bicuspid. He had never yet had an opportunity of removing the bicuspid, and in all his experience of cases of treatment of irregularity he had never yet had to extract a lateral tooth. He could not really understand how the author ever countenanced marring one of the main

objects he evidently had in view because he regarded the æsthetic function as being extremely important. As to the form of treatment in the majority of cases, extraction or expansion, he supposed that by expansion the author meant large regulating plate that covered the teeth. He thought there was a great deal in the newer methods where, by means of bands, caps, and springs they could get rid of some of the objectionable features of the older methods. There was no doubt that the plate, especially when it was uncared for, led to disastrous results. He knew of one very serious case of innumerable points of caries caused by using the ordinary expansion plate with piano wire. With regard to question three, it was evident that they must have some method of treatment, but any treatment which did not retain as a principle and a major factor the function of mastication in the first permanent molar was not worthy of consideration. Therefore he rather endorsed what the author had said in his paper. Question four was one which nobody had settled. He had had a case in which most men would have said, and he himself would have said at one time, that the four molars were unsavable. He had kept those four molars and treated them by other means than extraction, and although it would be ten years before he would be able to tell definitely what the result of his operation was, yet in the meantime the case had been going on well, and it was still full of hope. With regard to the fifth question, notwithstanding the many authorities who had never repented taking out six-year molars, he had repented several, and was convinced that he could have done much better by other methods.

Mr. Robbins was somewhat surprised that Dr. Cunningham, with his vast experience, had never seen a case in which he was justified in removing a lateral tooth. He could show him two or three models in which he thought he had been more than justified, and in which he thought it was the only thing that could be done for that individual patient. Those cases were all cases in which the mouth had been somewhat neglected. In one case the lateral had permanently locked inside the lower bite before he saw it, and the compression had been very great. The removal of the lateral gave a very good result indeed; the central and the canine came together without any apparatus, and by just tipping off the canine teeth, he did not think a casual observer would notice it much in the mouth. With reference to the heroic treatment of Mr. Colyer's method—they always admired Mr. Colyer's heroism—a little while

ago he (Mr. Robbins) performed the same operation, with, he thought, fairly good results, but, on the whole, he would like to strike the midway distance between Mr. Colyer and Mr. Woodhouse, and he agreed with Mr. Woodhouse entirely as to the necessity of waiting until most of the teeth were well in. He should make the age 13 rather than 15, provided, as Mr. Woodhouse said, there was no instanding laterals to work upon. He gave parents three good reasons why they should not be in a hurry: First, it was generally a great inconvenience; secondly, it was a great expense to the parents; and thirdly, there was no doubt about it that a frame, if worn for any length of time (even though kept clean) did more or less injury to the permanent teeth.

Mr. HUMBY asked Mr. Colyer on what grounds he supposed that the apex of the root of the teeth was the centre of the circle from which the crown moved. His own experience was different. He thought, as Mr. Cunningham had mentioned, that in all the cases Mr. Colyer had shown one factor had been left out of consideration. He thought they limited their observation too much to the look of the model, that was to say, they saw the result that the surrounding conditions had on the dentition, but did not take into consideration the surrounding conditions. He thought there were many surrounding conditions which modified considerably the eruption of the teeth, and he thought it would be well if they were to consider what those conditions were. One condition which he found had never been touched upon in any of the works on the articulation of teeth, was the effect of a thick muscular contractile lip upon a crowded condition of the mouth. He did not see that could be regulated by any apparatus. There was another thing which would bring about a crowded condition, viz., tonsilitis. He thought those two conditions were only the beginning of a long list that might be made up in connection with things they should consider with regard to crowded mouths. The size, even, of the tongue, should be considered, because they were taught that the tongue formed the inner boundary and the lips the outer boundary. If that was the case they had to consider that an abnormally small tongue or abnormally thick lips would materially influence the question. There was another matter that he was very pleased to see one gentleman seemed to have met with in his practice, cases in relation to the tilting of the second permanent molar in consequence of the extraction of the first permanent molar. He himself had

seen a considerable number of cases, and the cases where he had the most tilting had been with the late extractions. In late extraction the wisdom tooth had a greater forward pressure upon the second molar, and by extraction they were taking away a forward support of the second molar after it was fully erupted. There was, in fact, nothing whatever in front of the second permanent molar, except the septum and alveolus, which bordered on the medial aspect. He thought when the first permanent molar was taken away at an early age there was a greater quantity of tissue in advance of the second molar, and the leverage exerted for the advancement of the wisdom tooth was considerably less.

Mr. D. Pedley said there was one point which had not been dealt with by the previous speakers, namely, Mr. Colyer's proposed removal of the first bicuspid with the temporary molar. It seemed to him that if any use was to be found for this operation, it would be in those extremely difficult cases of anterior protrusion ; it would be agreed they were most difficult cases to deal with, and he would ask Mr. Colyer whether it was not advisable, in addition to removing the first bicuspid with a temporary molar, to raise the bite somewhat? His experience with anterior protrusion was that in the majority of such cases the lower incisors pointed right inside, either on the necks of the central and laterals, or else the upper centrals were quite outside the bite.

Mr. Storer Bennett : Had he known that Mr. Colyer intended showing the lantern slides would have brought down two slides from the museum of a very valuable specimen, a skull from which the outer alveolar plate had been removed on both sides ; it was a very unusual specimen, because, while on one side of the mouth the second temporary molar had been retained, on the other side it had been removed, and that too a considerable time anterior to the death of its owner, so that they had the opportunity of seeing the result of premature extraction on the one side, and the result of leaving the tooth in on the other. On the side of the extraction the first molar had travelled far forwards, had pressed on the unerupted bicuspids, and had driven them forward, and they in turn had driven forward the canines, so that the canines on that side of the mouth were considerably over the situation of the lateral and pressing on its root. Had the second temporary molar been retained for its due time the first temporary molar could not have so travelled forward. He would like to point out what he had never seen noted in any of

the text-books, namely, if anyone would examine a skull at the age, say, of five or six, a skull where the outer alveolar plate was removed, so that one was able to see the roots of the temporary molars, they would see that they diverged to such a considerable extent that they extended further back than the posterior surface of the crown of the permanent molars, so that they must have a very large influence in keeping back the six-year old molar and preventing it becoming too prominent. With regard to the removal of the six-year old molar, he cordially agreed with Mr. Woodhouse, first for the reason he gave, and, secondly, because by taking out the six-year old molar before the 12-year old molar was in position, all the bite came on the front of the mouth, and he felt sure that was one of the frequent factors producing superior protrusion. He was distinctly of opinion that they ought never to extract the six-year old molar for the purpose of regulation until the 12-year old molar had erupted.

Mr. Storey thought the Röntgen rays alone would enable them to settle the question of treatment, which must depend upon the circumstances of each individual case. He had in his mind the cases of two sisters. One of them was brought to him with her mouth crowded when she was about 11 years old. He postponed on several occasions the anxiety of the parents to have the case dealt with, and when she was about 13 he dealt with the case by the extraction of the second bicuspid, and the adoption of a regulation plate which was worn and kept pretty clean : that treatment was exceedingly successful. The parents thought that what was good for one was good for another, and they accordingly kept the other sister from him until she was some 15 or 16 years old, in consequence he had just now been obliged to take out the lateral incisors. With regard to the general course of treatment, he had for a long time past been taking out the six-year molars when necessary, at, roughly speaking, the age of 12, just before the occlusion of the 12-year old molars, and he had found in that way, and by watching them, and sometimes grinding down the cusps, he obtained pretty good results in regard to regulation. He also found great benefit from getting at the inside, and great help in the treatment of such cases from the split model.

Mr. J. F. Colyer, in reply, said that as far as the form of treatment went, he was perfectly open-minded on the question. He had used the treatment wherever he thought it advisable, simply and

purely with the object of learning, he failed to see unless that was done how they were going to learn at all ; he had had the pluck to do it in private practice, and should do it again to-morrow if the case came before him. With regard to irregularities of the teeth, of course they were quite in the infancy of knowing anything about the subject : they did not understand sufficiently what he might term the anatomy of irregularities—they did not seem to understand the relation that one t oth bore to another in a crowded mouth. What he found with irregularities was, that, given a crowded mouth, given the incisors crowding, it was invariably due to the pressure of the canine. The whole gist of the treatment seemed to be that they must find room for the canine. One speaker referred to the question of taking out a first temporary molar to get that room. If they would look at a skull they would find that by taking out the first temporary molar they did not give the permanent canine any room at all. The only way to make room for it was by taking out the first bicuspid then the permanent canine was able to move back bodily and the pressure was removed from the lateral. That was a result he did not think could be obtained if they waited until all the teeth were in position. Mr. Woodhouse said he would not treat a crowded mouth at an early stage ; he (Mr. Colyer) would. The older the patient became the more fixed became the teeth, and the less chance there was of getting them right. With regard to the free division between the molars, he endeavoured to avoid these spaces, and every day found the necessity of trying to contour ; directly they began to leave a space between the teeth, they were simply inviting decay, and were likely to get periodontal mischief. With regard to the wound caused by the operation that was not so bad as might be thought. If the patient was given an antiseptic mouth wash there would be very little after pain. He disagreed with Mr. Woodhouse as to the value of the first temporary molar as the centre of mastication. He (Mr. Colyer) regarded the first permanent molar as the centre of mastication ; it was in the very part of the jaw where the muscles played with the greatest power. As a matter of fact, he thought the first temporary molar, and in adults the first bicuspid, had really very little to do with mastication. Then, with regard to extraction or expansion, it seemed to him that the whole question of whether they should expand an arch or not depended simply on the direction of the teeth. If the cusps were sloping

slightly inwards it was a case for expansion, if outwards, it was not. In answer to Mr. Spokes, he would say with regard to the temporary molar, that if Mr. Spokes would examine the skull he had mentioned he thought he would come round to his way of thinking. With regard to the V-shaped tendency, ascribed to the treatment, he believed the tendency would be seen in the original models, and consequently was not the result of treatment. Where there was a V-shaped appearance afterwards they would find that tendency originally in the patient. Mr. Spokes had referred to the fact that he preferred to leave the canines until they erupted, and then adopt mechanical treatment, if necessary. That was the very point he (Mr. Colyer) wanted to hear about. He found when canines were externally erupted they were by no means easy to bring into place. With respect to Mr. Cunningham's criticism, his *penchant* for the question of "function in mastication" was well known, but the aim and object of régulation was not, Mr. Colyer thought, to procure a perfect bite ; directly they attempted to do that they left out the question of the tendency of the teeth to decay, and he thought that was the principal thing they had to fight against. He would ask Mr. Cunningham how he was going to treat a case of canines erupted over the laterals, with the lateral internal to the bite ? If that case was not to be treated by the extraction of the lateral he really did not know how it was to be treated.

Mr. CUNNINGHAM : By extraction of the bicuspid.

Mr. COLYER regarded that as another sweeping statement, if he might say so. There were many cases that came to them where it was absolutely necessary to take out a decayed molar. There were plenty of cases that came to them with first permanent molars decayed below the gum, and causing chronic periostitis. In reply to Mr. Humby, he would say he had never yet seen a tooth moved by mechanical means where the tooth moved bodily ; in his opinion it rotated on its apex. With regard to lip action on the teeth, he thought that was well known, but he did not think that tonsilitis had anything whatever to do with causing irregularities. It was argued that by tonsilitis and by the mouth breathing that went with it, the mouth was kept open, and the buccinator muscle pressed on the bicuspids. Against that argument they had to consider the following facts : The buccinator muscle lay along the

surface of those molar teeth, and those teeth were not in all cases symmetrical, the majority of them being asymmetrical. If they put their finger into a child's mouth they would not find any more pressure in the region of the bicuspid than in the region of the molar teeth. If the saddle shaped arch was due to the pressure of the buccinator one would expect to find more pressure certainly on placing the finger in the mouth. All saddle shaped arches—the majority of them, at any rate—could be accounted for by crowding. In reply to Mr. Storer Bennett, he would say he was very much opposed to taking out the second temporary molar at an early age, but he did not think the extraction of a first temporary molar had the same effect. He failed to find the second temporary molar moving forward. That was what he expected to find, but he had failed to find it. He quite agreed with Mr. Storey in thinking that the X rays might be brought into operation.

The usual votes of thanks concluded the meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

An Ordinary General Meeting of the above Society was held on Monday, May 11th, the President, Mr. J. F. Colyer, in the Chair.

The Librarian and Curator (Mr. Douglas) said that although he had nothing new in the way of books or specimens to record this evening, they would probably be pleased to hear that since the reconstruction of the library greater interest had been taken in it by the members, who had borrowed a number of the books.

On casual communications being called for—

Mr. May brought forward a case of syphilitic temporary incisor teeth occurring in a child. At first the child was not thought to be the subject of congenital syphilis, but owing to the discovery of bosses of bone upon its head and its subsequent improvement under mercury little doubt was felt. Only one case of this kind was recorded, namely, by Mr. Oakley many years ago.

The President then called upon Dr. Austin for his paper on "Some Effects of the Specific Infectious Fevers upon the Mouth." (See p. 241.)

In the discussion that followed :—

Mr. Gabell thanked Dr. Austin for his most excellent paper, but felt that the subject was beyond him as far as discussion went.

Mr. W. J. May wished to thank Dr. Austin for his paper, which was the more valuable as it was the outcome of his own observations. He remarked that the idea that exanthematous necrosis was "the result of the local application of other specific poisons to the vascular parts of the teeth" was originally Salter's. Dr. Austin had not mentioned any case of death of the pulps of adult sound teeth following fevers, this he believed was fairly common. He had recently attended a medical man who, during an attack of influenza, suffered severe pain in an upper central that had a small cavity in it which had been filled many years. This pain soon passed away, but in about two months, when Mr. May first saw the patient, he was suffering from periostitis around the root of the same tooth. On drilling into the pulp it was found to be dead and decomposing, its death being clearly the result of the influenza. He had also had a similar case in which the patient was suffering from typhoid. The tooth affected was a healthy lower incisor, suppuration took place within a week, and, although the patient was very ill, extraction was deemed advisable: the patient subsequently recovering.

Mr. Barnard said that in all the cases of necrosis he had seen it was the bicuspid and never the incisor region that was affected; the necrosed portion always coming away in masses and bringing the temporary teeth with it.

Mr. N. G. Bennet said that for some time he had been working on the subject of the relation of lamellar cataract to honeycombed teeth, but he had at present come to no satisfactory conclusion. He considered that there was *primâ facie* probability that the eruptive fevers that spent their force on epethelial structure should affect the enamel of the forming teeth.

The President, after thanking the author for his interesting paper, went on to urge the necessity of investigations bearing upon honeycombed teeth. He pointed out the peculiar advantages offered to students at this hospital for such research if only they would take the opportunities. His mind, he said, was not yet made up on the relation between the fever and its effects upon the teeth, he was rather inclined to think, however, that the fever itself had no specific action on them, but rather that it acted by lowering the general vitality of the whole body. It was not only the epithelial structure, namely, the enamel of the tooth that was affected, but also the

dentine, which, upon microscopical examination, would be found most imperfectly developed. He was interested in Dr. Austin's statement that necrosis generally occurred in the incisor region, although his experience rather coincided with Mr. Barnard's; also in his opinion that necrosis then originated in the acute stage of the illness.

Dr. AUSTIN, in reply to Mr. May, concerning the production of honeycombed teeth by attacks of the specific fevers, I wished merely to point out some of the local conditions of the mouth which might tend to aberration of the enamel organ. I should agree with Mr. Colyer that the general lowering of the vitality in these diseases is probably a great factor in their causation. Messrs. Colyer and Barnard's experience of the greater frequency of jaw-necrosis in the molar and bicuspid regions is interesting, but opposed to our experience at the Western Hospital, where this condition occurred twice in the lower incisor region for once in the former situation. If, as I have suggested, injury be a frequent cause, an explanation of a greater liability of the lower incisor region is simple. Upon such a point clinical experience doubtless varies much, and this emphasises the need for avoiding dogmatic statements, unless supported by many observations extending over a number of years. In reply to Mr. Bennett, I know of no statistical tables bearing on the subject he alludes to, and should imagine that in hospital practice it would be difficult or impossible to obtain them, owing to patients being so soon lost sight of. With reference to the occurrence of jaw-necrosis originating during convalescence, touched on by Mr. Colyer, local periostitis of the long bones is sometimes met with during convalescence from enteric and scarlet fever, measles, &c., and many cases end in suppuration with extensive destruction of bone. If a case could be found of such a local periostitis of the alveolus of the jaw arising late in the disease, an analogous pathological process might be assumed to occur.

THE DENTAL RECORD, LONDON: JUNE 1, 1896.

SHOCK AND STRAIN.

THE extraction of teeth is so common an operation, and is usually performed with so little preliminary investigation into the physical condition of the patient, that it may almost be a matter of surprise that death—the result of shock following this operation—is not a fairly common occurrence. So great a rarity is it, however, that we do not remember to have met with the record of such a case till the present month. Doubtless some have previously occurred, and may probably be found mentioned in dental literature, but the untoward event is fortunately rare enough to merit more than passing comment. This patient had suffered severe toothache for some weeks, and finally decided to have the tooth, a molar, extracted. Two minutes after the extraction she became "collapsed, and died." No chloroform or other drug was used, and the post-mortem examination showed that there was fatty degeneration of the heart, and that the death was due to syncope. Such is the brief report to hand, and it may well suggest to each the thought, is such an event likely to occur in many instances? Experience proves that it is not, but still it does teach us that the use of a safe anæsthetic, such as nitrous oxide, which undoubtedly lessens shock, is not so purely a luxury as is sometimes thought. That the wrench occasioned by the removal of a tooth is followed by a certain amount of shock is the personal experience of most, but it is usually slight and transitory in healthy subjects; still, in those diseased or debilitated, we may learn from the foregoing case that the result may be serious. In others, though the result is not so lamentable, shock is not transitory, and this is the explanation, doubtless, of those complaints, not rarely made by sickly

patients, that for days or weeks they felt the effect of the operation. In some cases this may have been ascribed wrongly to the anæsthetic which was employed, for, although this doubtless lessens the effect, yet it does not always entirely prevent it, especially when the anæsthesia is partial. It is, indeed, a question how large a part shock may have played in the large number of deaths which have occurred unfortunately during the administration of drugs for anæsthetic purposes. This is suggestive of the query, Whether, in sickly patients, the removal of a large number of teeth—granting, for the sake of argument, this is sometimes required—is a wise proceeding. The effects of shock, as everyone knows, are commonly due to stimulation of the Vagus nerve, so bringing into play an inhibitory force. But there is another class of cases which are not so easily explained, and which may be, perhaps, more correctly referred to as nerve strain rather than as shock. When this condition follows dental operations, these have usually been prolonged, continuous, and probably painful. It is no rare thing to have patients refer to some past time, when they were having their teeth put in order, as an experience they would never again repeat, and which had made them feel nervous and worn out for months. Inquiry usually elicits the fact that they had sat in the chair for hours consecutively, and had attended day after day. Well may we ask is this a desired result? Is there no simpler way, no quicker way, no less wearing method of treating the teeth of such delicate highly strung patients? Is it wise practice to attempt elaborate work, lasting for a few years, at the risk of letting the teeth be neglected for many years? Has not the practitioner rather overlooked the fact that he is not dealing with an inanimate object, and that it is as important to read correctly the character and endurance of his patient as it is to aim at mechanical perfection?

News and Notes.

ROYAL COLLEGE OF SURGEONS IN IRELAND, DENTAL EXAMINATION.—The following gentlemen having passed the necessary examination have been admitted Licentiates in Dental Surgery of the Royal College of Surgeons in Ireland :—Mr. E. C. H. Jessop (Oxford) ; Mr. A. D. Miller (Birmingham) ; Mr. F. Sievers (London) ; Mr. J. W. Turner (Birmingham) ; Mr. S. G. Yates (Ross).

DURING the April Examinations the following gentlemen passed the first professional examination for the licence in Dental Surgery of the College of Surgeons, Edinburgh :—William Alexander Stewart, Perth ; Alfred William Wellings, Salop ; Alexander Ballantyne Mackenzie, Inverness ; Carl Lotinga, Newcastle ; Robert Charles Hillman, Ilkley ; Edwin Robinson, South Shields ; James Irvine Wilson, Glasgow ; Victor Hippolyte Blane, Edinburgh ; Charles Nelson Park, Campbeltown ; George Herbert Harding, Liverpool ; Louis Anderson Dunn, Edinburgh ; William Henry Menmuir, Montrose ; Alfred Branson, Rotherham, and Robert William Markham, London. The following gentlemen having passed the final examination were admitted L.D.S. Edinburgh :—John William Edward Stewart, Dundee ; Herbert Percival Friend, Farley ; John Morris Stewart, Edinburgh ; John Kirke Nash, Edinburgh ; Edward William Albert Jeffery, Hastings ; Robert Anderson Dickson, Glasgow ; Samuel Homer, Stourbridge ; Frederick Stephen Gregory, Edinburgh ; Charles Albert Lightfoot, Newcastle-on-Tyne ; Robert Jones, Pen y Bwleh ; Tom Tinley Tinley, Whitby ; and Archibald Roland Maclean, Portobello.

STRONG glass plates, says the *Scientific American*, can be bored through by means of rotating brass tubes of a certain diameter, which are filled with water during boring. Finely pulverised emery is added to the water, and the boring solution is put into motion by a drill or bow drill. Weaker glass can be provided with holes by simply pressing a disc of wet clay upon the glass and making the hole through the clay of the width desired, so that the surface of the glass is laid bare. Molten lead is then poured into the hole and the lead and the glass drop down at once. The cutting of glass tubes, cylinders, &c., in the factories is based upon this same principle.

On May 6th, before Judge Whithorse, Samuel Darby, labourer, living at 12, Chestnut Place, Highgate Road, Birmingham, brought an action against Josiah Blackwell, chemist, Moseley Road, to recover damages for illness caused—so he alleged—by the negligence of defendant's assistant during the extraction of a tooth. Mr. Vachell told the jury that the tooth was a double one, on the right of the lower jaw. The assistant applied the forceps, and, after a severe struggle, snapped a piece off. Plaintiff complained vigorously, and declined the assistant's invitation to let him have "another go." He went home, and as his sufferings increased, he consulted Dr. McKie, and remained under his care for five weeks, during which time he was unable to work. Dr. McKie found that he was suffering from necrosis, or rotting away of the jaw, in consequence of splintering of the bone. Acting on the doctor's suggestion, plaintiff first became an out-patient and then an in-patient of the Queen's Hospital, where a large number of operations were performed on him. It was not until March 10th that the doctor pronounced him practically cured, and he was unable to obtain work until April 15th, having been in enforced idleness for 41½ weeks. The mere loss in wages was £49 16s. The plaintiff bore out this statement in the box. Dr. McKie, of Anderton Road, described the state of plaintiff's mouth when he examined it. He came to the conclusion that a piece of bone had broken off the jaw and necrosed. Cross-examined, witness said that a splinter of bone separated from the jaw would necrose. He noticed no such splinter in plaintiff's case. Walter Chapman, house surgeon at the Queen's Hospital during plaintiff's attendance there, said he found plaintiff suffering from an abscess in the side of the neck, protruding into the mouth. Two months afterwards he found a piece of loose dead bone by the side of the lower jaw. Damage by forceps would have accounted for what he saw, so would disease. The mere breaking of the crown of the tooth did not imply negligence, and the most skilful operator might damage the alveolar margin of the jaw in extracting a tooth. In a case of alveolar fracture he would not expect to find the condition of things he found in plaintiff's jaw. Mr. E. Bland Place, who attempted to draw plaintiff's tooth, said he was an associate of the Pharmaceutical Society of Great Britain. That did not necessarily include a training in dentistry, and he had not passed any examination in that subject. He did not claim to be

a dentist ; but he was capable of extracting teeth. He used the proper forceps, and gripped the tooth fairly, but the crown came away, and he did not choose to try and extract the stump, but advised plaintiff to go to a dentist and have it taken out with gas. His experience in pulling teeth was of 15 years' standing, and he drew about 200 a year, more or less, and did not break more than one in 200. Mr. Charles Jevons Fowler, Newhall Street, dental surgeon at the Dental Hospital, said he had seen Mr. Place operate on several occasions, and had no fault to find. Necrosis of the jaw might be the result of hereditary taint or violence. In defence, Mr. Young said it was not only lawful but right that a chemist should draw teeth, and he could not be held liable for an accident, provided that a reasonable amount of skill was experienced. This necessary amount of care had, he pleaded, been exercised. The jury found for the defendant.

The Idle Prosecution.—Joseph Priestley (31), herbalist, was indicted for the manslaughter of Lavinia Sawdon, domestic servant, of Idle, on April 17th. Mr. Edmondson prosecuted ; Mr. C. Mellor and Mr. Marshall defended; and Mr. Glasgow watched the case on behalf of the British Dental Association.— Mr. Edmondson said that the prisoner had been in business for some years at Idle as a herbalist and tooth-maker. He was not a qualified dentist. In December last the girl Sawdon left her home, at Weaverthorpe, near Malton, and entered the service of Mr. Sykes, an insurance agent, at Idle. On April 17th she was suffering from very acute toothache, and the prisoner was accordingly sent for. He was not at home in the morning, when the first request was made for his services, but in the afternoon he performed the operation of extracting the affected tooth. The girl was taken into his front sitting-room, and prisoner attempted to extract the tooth, but it broke. He then suggested the use of gas, which would cost about 3s. or 3s. 6d., adding that the girl would only feel a little light headed. The deceased had dinner at half-past twelve, and afterwards went to the prisoner's place of business, where, instead of gas, she was placed under the influence of chloroform. She became sick, and the prisoner remarked to his sister that there was a change in the girl's condition. The sister fetched a Miss Scott, who noticed the smell of chloroform, and thought the girl

was dying. The girl's master (Mr. Sykes) at once obtained medical aid, but Dr. Honeyburn, whom he called in, found that the girl had been dead ten or fifteen minutes before he had been sent for. The girl's dress was found to be quite tight.—Miss Sarah Priestley sister of the prisoner, who gave evidence, said the girl was in a semi-recumbent position, and one or two of the buttons of her dress were unfastened. The prisoner had been three years with Dr. Pollard Mitchell, a well known dental surgeon, and he had previously administered chloroform.—Dr. Honeyburn said the clothing of the deceased was in a normal condition. That was not the proper condition for the administration of chloroform. In answer to the judge, witness said he thought if artificial respiration had been properly resorted to the girl's life might have been saved.—Dr. Lodge, police surgeon, Bradford, considered the conditions under which the chloroform had been administered were improper, and that death was due to asphyxia.—Mr. Matthews, dental surgeon to the Bradford Infirmary, said the use of chloroform in dental surgery had practically passed away.—Mr. Ladmore, dental surgeon, Manningham, also gave evidence.—For the defence no witnesses were called, but Mr. Mellor contended that the prisoner had acted with reasonable care, and that he had taken all the precautions which a man in his position might be expected to take.—His Lordship pointed out to the jury that, while the case was a very serious one, they should remember that the prisoner did a work for poor people, in the relief of pain, which they could not get done elsewhere, except at much greater cost. Had he taken in this case all the precautions which he knew should be taken ?—The jury retired at a quarter-past one, and after two hours' consultation, returned into court, stating that they were unable to agree.—His Lordship said if they were not strongly in favour of conviction, they should express in English fashion what was expressed differently in Scotland. It would be a hardship to the prisoner if the case were to be postponed until August for a new trial.—The jury then found the prisoner "not guilty," and his lordship, discharging him, said the verdict was a merciful one. The prisoner had had a very narrow escape from conviction on a very serious charge, and he hoped it would be a warning to him and to all whom it might concern.

North of England Odontological Society.—The Second Annual Meeting of the above Society was held on April 22nd, in the Newcastle Dental Hospital. An election of officers for the ensuing session took place with the following result: President, Mr. W. Sommerville-Woodiwis; Vice-Presidents, Messrs. J. A. Fothergill and R. L. Markham; Hon. Treas., Mr. W. G. Routledge; Hon. Secs., Messrs. J. T. Jameson and W. D. Moon; Council, Messrs. J. F. Kekwick, W. J. Mason, John Kekwick, J. G. Ranken, J. W. Daniels and S. Brown. Mr. J. W. Daniels was appointed Curator of Museum and Librarian. The First Annual Dinner was held after the meeting, and was well attended.

On May 27th the City Coroner held an inquiry with reference to the de th of Rosina Elizabeth Foster, aged 14½ years, a boxmaker, lately living at 27, Shaftesbury Place, Aldersgate Street. Sarah Ann Foster, the mother, stated that for some weeks the deceased had suffered terrible pain through the decaying of a bad tooth. On Monday week she became so bad that she went to the hospital with the intention of having the tooth extracted. She was detained in the hospital, and the following day witness heard she was dead. Dr. John Michel, house physician, stated that the deceased was placed under gas and the tooth satisfactorily removed, but it was considered advisable to keep her in the hospital, and death took place very suddenly the following day. The autopsy showed that death was due to inflammation of the brain of very rapid development, but whether it was caused through the operation or the gas was uncertain. Several physicians saw the deceased just before her death, but not one of them could diagnose the case, and inflammation of the brain was not at all visible during life. It was the most extraordinary case that had ever come under the notice of the hospital staff. The general impression of all was that the inflammation was not set up by the tooth, but there was absolutely nothing to show any other cause. The jury returned a verdict that the deceased died from inflammation of the brain, but how caused the evidence failed to show.

Reviews.

PATHOLOGIE DES DENTS ET DE LA BOUCHE. By Dr. LEON FREY. Published by J. B. Baillière et Fils, Paris.

This excellent little book forms one of the series of five which have been prepared under the direction of M. Ch. Godon, for the benefit of the students of l' E'cole Dentaire de Paris, at the small price of 3 francs each. This volume deals with the pathology of the teeth and mouth in a comprehensive and lucid manner. Indeed, we are unaquainted with any other book which describes the pathology of the diseases of the mouth so briefly and yet so completely.

CATCHING'S COMPENDIUM OF PRACTICAL DENTISTRY FOR 1895.

This volume fully equals its forerunners of the same series, and that is saying much. A new section "Science in Dentistry" has been added. We really know of no book which enables a busy man to find and keep ready to hand valuable facts as does this "Compendium."

DENTAL PATHOLOGY AND PRACTICE. By FRANK ABBOTT, M.D., Philadelphia. The S. S. White Dental Manufacturing Co., 1896.

Since the views expressed on the development of teeth and dental caries are practically the same as those of Bödecker, which we have but recently criticised, we pass over the earlier chapters of this work, and proceed to those which treat of Operative Dental Surgery. We are first given a retrospective sketch of gold filling, and the evolution of the automatic and engine mallets. Immediate separation is discountenanced; death of the tooth pulp and necrosis of the alveolus being cited as frequent sequelæ. We quite agree with the author in recommending slow separation, but consider that separation sufficient to produce the effects spoken of above is never requisite. As regards sensitive dentine, Dr. Abbott (consistent with his "inflammatory" theory) says that if the pulp be alive, "the tooth is inflamed and its sensitiveness increased throughout its entire substance, the intensity of the action being somewhat dependent upon the size of the carious cavity and upon whether the caries is of the acute or chronic variety. The larger the cavity and the more acute the disease the more intense will be the inflammation

and soreness, and the more generally will they be diffused throughout the tooth structure." Now, while admitting that the tooth is more sensitive in acute than in chronic caries, we cannot endorse Dr. Abbott's statement that the larger the cavity the more sensitive the tooth. It is a matter of every day experience that some of the most sensitive cavities with which we have to deal are shallow—situated about the region of the "granular layer." On the other hand, we daily see large cavities from which the patient has received no warning pain symptoms, The excavation of these, too, often causes little or no pain. Some might think that the author—having committed himself to the theory that the dentine (and enamel too) becomes inflamed by caries, and pain being a necessary concomitant of inflammation, *ergo* the more caries there is present the more pain there ought to be—too easily persuades himself that, that is, which, by his theory, should be.

As regards the author's method of obtunding sensitive dentine, it seems both tedious and extraordinary. The treatment takes four days, and is also based upon a theory. The theory is this: that normal dentine is alkaline, and only slightly sensitive when cut, that carious dentine is sensitive, that this sensitiveness is caused by acid, that this acid condition should be neutralised to bring the tooth back to its normal alkilinity. The first day's treatment is washing the mouth out with a solution of bicarbonate of soda every hour, the second day the solution is doubled in strength, the third day the dry soda is packed into the cavities six or eight times and last thing at night, and the fourth day finds the patient's dentine "in most cases almost without sensation." Presuming this somewhat qualified result can be assured, is life long enough for this treatment, or is the game worth the candle? In addition to the above, more alkalinity may be engendered by the internal administration of soda, potash, lime, magnesia, &c.

Dr. Abbott, finding that "the use of the rubber dam is a strain upon the operator which none but those with extraordinary nerves can stand without detriment," uses a system of small napkins, seemingly in the ordinary way, but in operations on the lower jaw, makes use of his patient's finger to assist him in keeping the "doyly" in its place. In this manner he can keep the mouth dry for forty-five minutes or an hour. No mention is made of that invaluable adjunct (when properly fitted and used) the saliva pump.

When saliva invades a cavity being filled with gold, the layers of gold fail to come into sufficiently intimate contact with one another to make a homogeneous filling. This we have experienced on more than one unhappy occasion, but it is interesting and novel to find that this result is due to the presence of salivary corpuscles. We fancy that moisture of any kind even without corpuscles is usually fatal.

Dr. Abbot highly commends the Herbst system of burnishing gold into the cavity, but prefers hand burnishers to engine burnishers, as the latter being necessarily straight are unable to reach all portions of all cavities. It is especially useful "when the walls are so frail that malleting the gold would be likely to fracture them."

As regards filling teeth with amalgam, we warmly endorse the remarks of the author about the careful preparation of the cavity, believing with him that a good deal of abuse lavished upon the filling is due to imperfect preparation of the cavity. On the other hand we regret that instructions for making a "perfect paste" are not granted to us, and it might be urged that the author's direction to squeeze out the excess of mercury alters the composition of any compound amalgam. We are also told if an amalgam is left rough, mercurial poisoning is likely to follow. And it happens on this wise: "Food will lodge upon and around such rough and projecting masses, and one of the products of its fermentation is hydrochloric acid, which, acting upon the mercury, converts it into the mild chloride of mercury (calomel), an active poison, and in some instances a very dangerous one." Now in the first place we cannot understand how decomposition of food can cause the formation of hydrochloric acid, nor does Dr. Abbott explain, and in the second place even if it did, mercury is absolutely unacted upon by it. The wasting of phosphate fillings at the cervical margins is said to be due to excessive alkalinity of the saliva in that region. This requires proof. Dr. Abbott condemns devitilization both in traumatic and carious exposures of the pulp, but he makes no mention of his procedure in cases of acute inflammation of that organ when extraction cannot be resorted to.

Dr. Abbott thinks that pyorrhœa alveolaris should hardly be called a disease; it is a condition. If so, it is a very unpleasant condition. He describes mercury as a very prevalent cause.

Dr. Abbott's conviction is that hyperostosis of the cementum (exotosis) of a diffused character is in most instances not the work of the pericementum in late life, but a fœtal malformation. In reply to this we ask, Has an exostosed tooth of a diffused character ever been extracted from a child? We know of none. The classification of hyperostosis we consider unscientific, and the division of inflammation of the gum into gingivitis and ulitis is mere hair-splitting. The work is liberally illustrated, though the woodcuts are not so valuable as the reproduction of the photo-micrographs would have been. There are a few of the latter, which are well done. Due acknowledgment must be made to the printers and publishers, the type being good and the book excellently turned out.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

THE DIFFERENCE.

To the Editor of the "DENTAL RECORD."

DEAR SIR,—My attention has been drawn to a paragraph in your issue concerning my votes at the meetings held at Beckenham and Leicester Square.

Had full reports been correctly placed before you, you would have doubtless seen that at Beckenham the question was purposely narrowed down to the limit as to whether *we as a branch* were satisfied, that having approval. At the metropolitan meeting a much wider question was before us, viz., whether *any* change was *advisable*, not limiting the question to our branch, but taking the broad question, irrespective of the branch, and I believe my resolution was so worded that it could only be understood in the wider sense, but I am sure those at the meeting understood me, and I can scarcely be blamed if the reports in journals are so abbreviated that one scarcely recognises the account again unless they see their name affixed thereunto.

I am, dear Sir,

Yours truly,

H. BEADNELL-GILL.

Upper Norwood,

16*th May*, 1896.

FIG.

Alveo

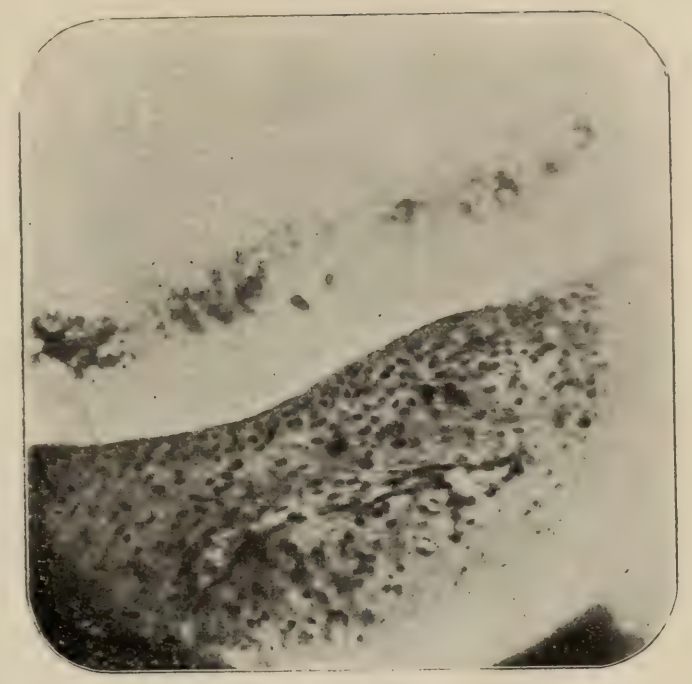

FIG. 3.

1. Alveolar dental membrane, showing increase of cells upon cemental side of the membrane. The outlines of giant cells are also shown.

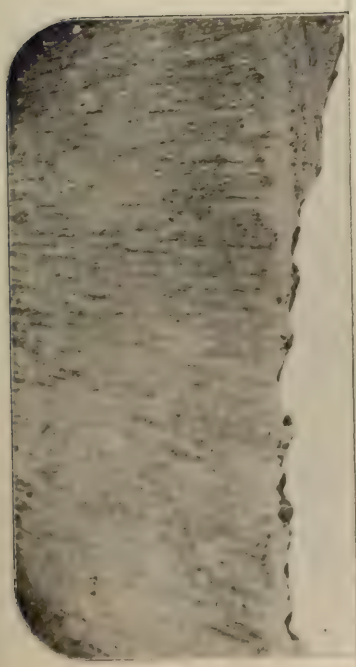

FIG. 4

Showing absorption of cem
layer

FIG. 6.

Lacunæ small and new tissue continuous, absence of lines, the membrane much thickened.

Illustrations of Mr. Douglas E. Caush's Paper.

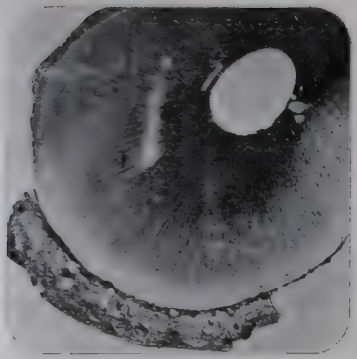

Fig. 1

Alveolus.

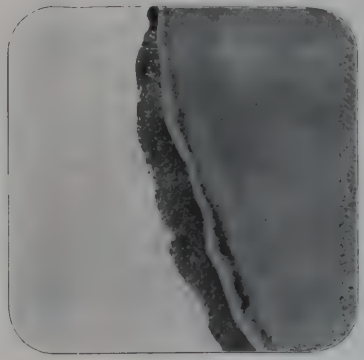

Fig. 2.

1. Thickened alveolar dental membrane. 2. Cementum. 3. Intergranular layer.

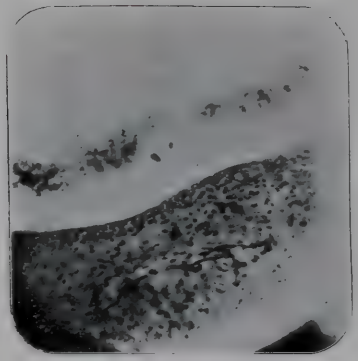

Fig. 3.

1. Alveolar dental membrane, showing increase of cells upon cemental side of the membrane. The outlines of giant cells are also shown.

Fig. 4.

Showing absorption of cementum and intergranular layer.

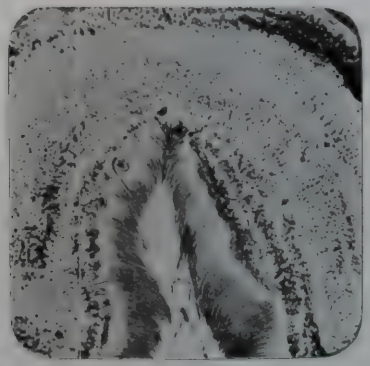

Fig. 5.

Shows absorption of original layers of cementum and intergranular layer with deposition of new tissue.

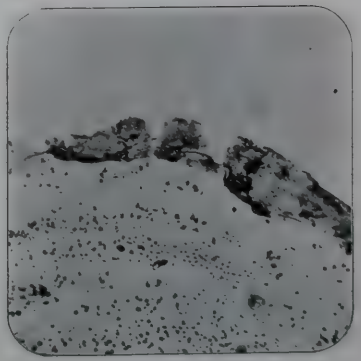

Fig. 6.

Lacunæ small and new tissue continuous, absence of lines, the membrane much thickened.

THE DENTAL RECORD.

VOL. XVI. JULY 1ST, 1896. No. 7.

Original Communications.

EXOSTOSIS.

By DOUGLAS E. CAUSH, L.D.S.I.

IN examining the microscopic preparations of exostosed teeth we can but admire the varieties of shape and size, as well as the great difference in the appearance of these sections. Yet, underlying these variations, however greatly they differ in appearance, there is to be seen by the microscopist a definite plan whereby this new tissue has been deposited, and in most cases these sections tell their own tale of the changes that have taken place during its development. Each time of rest, as well as each time of activity, is so definitely marked upon the section that it is impossible to misunderstand the changes here shown, and in the same section it is not at all unusual to find there has been times of rest as well as times of activity, times when there has been acute, and times when chronic inflammation of the alveolar dental membrane has been manifested, while the more acute alveolar abscess has not forgotten to leave its marks upon the tissue under examination.

To better understand the various changes that take place in the exostosed tooth we will commence our paper by illustrating a section of a tooth with the structures in a normal condition, at, or about, the point where these variations occur.

In this section is to be seen, in order from the outside towards the pulp canal, the following tissues :—

1. Alveolus.
2. Alveolar dental membrane.
3. Cementum.
4. Intergranular layer of dentine.
5. Dentine.
6. Pulp canal with lining membrane.

The first change that takes place is almost, if not quite, unknown to the patient, as it usually produces little or no discomfort, and consists of the thickening of the alveolar dental membrane from some cause or causes unknown, perhaps irritation from a filling, or alteration of the articulation produced by decay, or the loss of other teeth, or from some similar cause, an increased blood supply is brought to this membrane and thus causing increased activity in the cells of the membrane, as a result of the increased amount of formative material, and as a consequence the various changes take place in this tissue.

Should we at any time be successful in obtaining a section of a tooth in this condition the following changes would be noticed : The membrane covering the tooth will be more highly coloured than is usual in the normal condition, the intensity of the colour depending upon the amount of blood brought to the tissue, and in a short time after this change we should find that the membrane would be not only more highly coloured, but it would be also increased in thickness, the thickening taking place as follows :—The layer of cells in that portion of the membrane attached to the cementum becomes more and more active, breaking up into new cells, these new cells dividing and sub-dividing until there is a much larger number of cells at this point than is to be found in the membrane in a normal condition, and, as a consequence, these cells press upon the cementum. As the pressure increases with the development of the new cells, they change their character from that of an ordinary nucleated cell to that of an osteoclast, or giant cell, having the power of absorbing the cementum at the point of contact. If the blood supply becomes normal at this stage no further change takes place, and but slight or no discomfort will have been felt by the patient, but should the irritation be kept up, the cells will continue their activity ; or if the slight inflammation becomes chronic, the result will be the same. The giant cells thus formed will continue to absorb the cementum, until the whole of it is absorbed away, after which the giant cells pass into the inter-granular layer of the dentine, and there continue their work until a portion, or the whole, of the intergranular layer is absorbed. This absorption takes place in an irregular manner owing to the difference in the density of the tissue it is absorbing, this difference of density being caused by the more or less perfect calcification of the dentine ; the osteoclasts

having arrived at the more dense portion of the dentine, the absorption ceases and another change takes place in the giant cells developed in the alveolar dental membrane, the osteoclasts in this membrane are changed into cementoblasts, and begin their function of depositing cementum into the spaces produced by the absorption previously carried on.

It is not at all an unusual thing to find (especially in the layer next the dentine) a number of these cells retaining their soft structure, surrounded by cementum, as if some of the osteoclasts had been slow to change their character, and thus leaving portions of soft tissue in the newly deposited cementum. The new tissue is usually deposited in layers differing from the original cemental tissue in that it contains a large number of lacunæ and canaliculi, these frequently occupying the position previously occupied by the original layer of cementum, the new layer of cementum continues to be deposited as long as the blood brings to the cells material in the form of food for the development of new tissue. The amount deposited varies much, it may be but a very thin layer, not much thicker than the thickness of the original cemental layer, or it may be continuously deposited until it is many times as thick as the original layer.

At this point I must differ from the conclusions drawn by Dr. Bödecker in his work "The Anatomy and Pathology of the Teeth." On page 329 he says: "The question, however, is, can a diffused enlargement of the cementum occur in consequence of pericementitus, either of a local or a constitutional origin, after the cementum has once been fully formed?" This question I feel constrained to answer in the negative, and I base my opinions upon microscopical structure of such tumours.

My conviction is that hyperostosis of the cementum of a diffused character is, in most instances, *a fœtal malformation*, and, again, on page 330, he says: "Whenever a tooth becomes deprived of its nourishment from the pulp, I doubt the possibility of an osseous new formation upon the cementum, and further, should new formation have existed previously, its growth has undoubtedly ceased the moment the life of the pulp was gone."

My microscopic examination of about 1,500 (fifteen hundred) exostosed teeth leads, me to suppose that Dr. Bödecker has misunderstood the development of cemental tissue as seen in exostosis. From

those I have been able to examine, I have arrived at the conclusion that the development of cemental tissue as seen in exostosis is just the opposite to that described by him. I believe that wherever exostosis has taken place it is after the development of the tooth, and in *no case* is it produced during fœtal life. And further, the examination of some teeth show that it is probable that these changes have taken place after the death of the pulp, and correspond to certain changes that take place in the pulp canal, to which we will draw attention later on.*

That the development of this tissue is not always continuous after it has once commenced may be shown by the fact that we frequently find a number of lines in the section, portions where there are no canaliculi or lacunæ, and where the calcification of the new tissue is evidently much more perfect than in the rest of the tissue (see Fig. 5), thus showing that during the time of rest, which evidently occurred at this period of the development, due probably to the condition of the alveolar dental membrane becoming normal, the cementoblasts were turned into true cementum as seen in the original layer of cemental tissue, slow but perfect calcification having taken place, leaving a structureless mass of cementum.

When these lines exist they are most irregularly placed, varying very much in their distance one from another, and not infrequently being absent, as seen in those cases where there has been a continuous deposition of new tissue. It is not an unusual thing to find in some sections that a portion of the outer edge of the new tissue has been absorbed away, tissue corresponding with that deposited at a later date filling up the excavations previously made, here is a great proof that the development of this tissue is of a much later date than suggested by Dr. Bödecker. If the development of this tissue is rapid we usually find a number of large lacunæ with canaliculi anastomosing with canaliculi of the surrounding lacunæ, and not infrequently being grouped together and surrounded by more or less structureless tissue. If, on the other hand, the deposition of this tissue has been slow, but still continuous, the lacunæ are much smaller, and fewer in number, with, as a rule smaller canaliculi, and under such circumstances the lacunæ may be isolated and surrounded by tissue structureless in character, more perfectly calcified, and in appearance like the original layer of cemental tissue.

* Reference is made to a second paper by Mr. Caush, which we shal publish in our next issue.—EDITOR.]

ORAL HYGIENE.

By John G. Ranken, L.D.S.

The science of hygiene treats of the preservation of health, and of the proper means for its continuance. Oral hygiene is the application of this science to the mouth and its contents.

We must firstly consider what are the contents of a normally healthy mouth which predispose towards decay of the teeth.

The Saliva, as it is found in the healthy mouth, is mixed with mucous and epithelial scales from the mucous glands and the mouth surface. It is colourless, and consists mainly of water and alkaline salts. The acid mucous often renders this alkalinity neutral, and sometimes, even acid.

The chemical action of the saliva is to convert starchy materials into sugar, which is of a less sticky nature than starch and more easily absorbed.

An alkaline saliva is said to hasten the action of ptyalin, the ferment of saliva, whilst an acid condition retards this process and thus tends to allow starchy materials to hang about the mouth.

Micro-organisms.—Certain organisms whose function is of a peptonising nature inhabit the human mouth, these are principally: bacilli, micrococci, and leptothrix bucallis.

Forms of the Teeth.—Pits, fissures and prominences in the teeth themselves are a favourable site for the lodgment of foodstuffs.

Proximity.—The crowding of teeth greatly favours the retention of foodstuffs, which are difficult to dissolve or dislodge.

Nature or Strength.—Owing to infantile disorders during the developing period, or to a want of lime salts, or to the action of heredity, the nature or strength of the teeth may be such as to not easily resist the attacks of caries levelled against them.

It is the foodstuffs, especially those of the nature of carbohydrates, whose decomposition gives rise to the formation of lactic and acetic acids, which decalcify the teeth. The micro-organisms follow this and dissolve the decalcified remainder, the saliva washing the dissolved portion away. This is, according to Miller, the process by which caries of the teeth is produced, the most formidable of the diseases we have to combat.

When albuminous substances, such as meat, putrify in the mouth, acids are not formed, this accounting for the fine white colour and general absence of caries in the mouths of true carnivora.

Again, the alkaline lime salts are often deposited from the saliva, especially in the neighbourhood of the salivary ducts, over the six year upper molars and also at the backs of the lower front teeth. A constant growth in amount of this tartar brings about the absorption of the gums and alveolus supporting the teeth, and as it is of a brittle nature, the tartar frequently falls away, leaving the teeth, which it has previously supported, loose and oftentimes with an exposed periosteum. This is frequently the cause of severe periostitis and even neuralgia. The tartar present in Rigg's disease is said to be derived from the periosteal secretion, and although tartar may be a predisposing cause of pyorrhœa, it is, in some cases of this disease, entirely absent.

Now arises the question—What means can be adopted for the continuance of a hygienic state ?

The cleansing of the mouth after every meal by the patients themselves is, without doubt, the most important factor, tending towards keeping of the mouth and its contents healthy. Now let us consider the best methods by which we can properly carry out this thorough cleansing process.

Cold Water used to rinse the mouth with, or, better still, applied to the teeth on a brush. I am speaking now of water at a temperature of 10° to 15° centigrade. It is claimed by M. Joseph that this not only stimulates the leucocytes to successful action against the bacteria of the mouth, but actually re-awakens the nutritive activity of the dental pulp, and thus favours the formation of a denser and more perfect tooth substance, acting in direct antagonism to what he so ably terms "the excesses of modern refinement."

Toothbrushes.—Innumerable are the ideal or rather pet shapes and forms of toothbrushes recommended by most able and worthy members of our profession, and rather than seem to favour any special pet or crank would I recommend that patients should use a toothbrush of a small size, that is to say of a size they find most easily workable in their own mouths, with the bristles not too close together and, what is still more important, impress upon them that it is to be used not only in a lateral but also in a vertical direction, and that the backs of the teeth also require attention.

To prevent the escape of bristles from a brush it is advisable to tap it before use to see if any of the bristles are loose, after use again tap it and put it away, not in a closely shut tray, as this causes a bad odour to arise from the brush, but rather in such a position as a pen rack affords, thus leaving it free to drain and out of reach of noxious materials, except the small percentage afloat in the air.

For use on the teeth of very young children I would recommend a camelhair pencil.

There are two types of toothbrush, the waxed back and the trepanned, it is claimed that the bristles can be more effectually fastened by the workpeople in the waxed back variety, but of this I am unable to judge.

The price of a toothbrush is not exorbitant, and if patients were to get a new one more frequently and not wait until one is thoroughly worn out before renewing, I believe they would derive greater advantages from this most effective weapon.

Dentifrices.—These exist in the form of powders, pastes and soaps.

Taking soaps first, one disadvantage attending their use is that they turn the teeth brown in time. A distinct advantage is that the brush can be rubbed upon the soap and a sufficiency gathered therefrom to ensure the desired effect upon the teeth, whereas with powders it often happens that more of the powder is sprinkled upon surrounding objects and a totally insufficient quantity carried into the mouth itself.

The disadvantages of pastes is that they require, very frequently, a longer time in their conveyance to the mouth, than the majority of people give to this most important function, and it is very desirable, I think, that we should recommend our patients only that which we think they will constantly practice and not means which they will adopt upon one or two occasions and then forever forsake.

Gentlemen,—I have no ideal dentifrice, I have enquired of good authorities and all agree that the most suitable base is *Creta Preparata* (prepared chalk), it is of a fineness that will not scratch like pumice, and in fact it is the finest of the official chalks. It is of an alkaline reaction, and thus counteracts the fermentations of foodstuffs, and the evil effects of germs already existing in the mouth.

As to antiseptics, Miller places Oil of Cassia vastly ahead of any other for this purpose, it is of a pleasant taste and odour and very effective.

Of one of the so-called antiseptics I would urgently ask you to beware. I speak of carbolic. You have only to enquire amongst your patients to verify my statement that this carbolic has a great deal more to answer for in softening, whilst at the same time whitening the teeth, than any other of the extensively advertised enemies of conservative dentisty.

If it be acids and their action we are fighting against, why should we introduce a stronger one into the mouth? Chemists claim and prove by formulæ that carbolic is not an acid. I maintain that where danger exists, whatever be the name applied to it, it is best to avoid it, and this can be done by putting cassia in the place of carbolic.

Cassia is an essential oil, and it is necessary that the dentrifice should not be got in large quantities, and as often renewed as the tooth brush itself.

Charcoal when used as a base is apt to leave marks along the gum, which simulate one of the symptoms of lead poisoning, and it is not every patient who would care for its delicate flavour or dingy appearance.

Mouth washes are of most use in a mouth not typically healthy, still where the patient evinces a preference for a mouthwash over the ordinary dentifrices, the cold water treatment recommended by M. Joseph, or a prescription written to suit the case is to be recommended.

Toothpicks are to be had of almost every variety of metal, beautiful to look upon and costly in price. None are better, none are cheaper than the ordinary quill, encased in a piece of tin. This is necessary to prevent the collection on the quill of débris, which may be carried to the mouth; it also allows the toothpick to be more easily carried, enabling one to avoid the unenviable position of that tourist, who, after dinner in a Scottish inn, asked for a toothpick. He was supplied, but had scarce started on his dental organs when the maid returned to ask if he was finished, as the local farmers' club was sitting that evening, and the toothpick was the club's property, paid for out of club funds, for the general use of members only, after each fortnightly supper. Again, the case can

quickly and easily be refilled, and it prevents the quill from destroying the linings of one's pocket. These points, together with their great flexibility and less liability to break, are points possessed by no other variety of toothpick.

Tobacco.—How does smoking affect the teeth is a question, in one form or another, we are often called upon to answer.

Dr. Richardson holds that there are certain substances common to all varieties of tobacco smoke.

Firstly, a certain amount of watery vapour.

Secondly, a small quantity of free carbon. It is this free carbon that gives the peculiar dark yellowish tinge to smokers' teeth, and which, when found in out of the way places during the examination of a mouth, may be mistaken for decay beginning.

Thirdly, a certain quantity of ammonia, which gives an alkaline reaction to the smoke and partly excites the salivary glands. This it is which gives to tobacco smoke its prophylactic properties in the mouth, and it is for this reason that we find in the mouths of smokers who brush their teeth so few decayed teeth in comparison with non-smokers of a similar age.

Carbonic acid and oil of tobacco, made up of nicotine, which is an alkaloid, a volatile substance and a resinous extract are also lesser constituents of tobacco smoke, these substances affect the nervous system and other organs of the body rather than the teeth.

Scaling and Brushing.—This operation I believe to be one of the most important we are called upon to perform, and one which we should impress upon our patients, as conservative dentists, it is absolutely necessary to have performed at stated intervals of time.

Upon the thorough cleansing of the teeth by means which the patients are not themselves able to adopt efficiently, depends not only the health and comfort of this generation, but also the health, strength and comfort of succeeding generations.

The instruments to be used in this operation for the removal of tartar and other debris from the necks and surfaces of the teeth are, firstly, scalers, of which those known as How's hold, I believe, a favoured position with many operators, whilst scalers of other hands makes, shapes, and sizes are equally successful in the practised of the operators using them.

These How's scalers, backed up by a spoon-shaped excavator,

should be used upon the teeth from the lower back ones, working gradually round the jaw, so as to avoid any blood obscuring the vision of the operator.

Particular regard should be paid to the necks of all teeth, internally and externally, special attention being paid to the backs of the lower incisors and the buccal surfaces of the six-year superior molars.

Having removed all tartar and debris from the teeth by means of scalers, the next step is to render perfectly smooth the roughened surfaces of all teeth, this is done with a brush, either straight or wheel-shaped, or a rubber cup or wheel, on which has been taken up fine flowers of pumice, and each tooth carefully gone over by the brush or rubber revolved in the dental engine.

This we should follow up by a process which patients can themselves, with advantage, adopt. I mean the passing of sterilized floss silk between each contiguous tooth, after which, those operators who have not previously followed this method with their patients will be themselves surprised at the great difference and markedly changed aspect which the teeth before operation bore to the teeth after operation.

Diet.—As a means of natural dental hygiene, diet holds a premier place. A well arranged diet, together with plenty of open air exercise, would tend towards helping both young and adult patients to keep their own teeth.

Occasionally we are asked by patients what are the best foodsuffs to eat which afford a hope of preserving the teeth ; or, are certain foodstuffs injurious to the teeth ? No foodstuff is better suited for cleansing the teeth than the muscular fibre, connective tissue and tough skin eaten by carnivora. Our patients, however, are not true carnivora, and such a diet would be anything but palatable to many people. An American writer points out how inconsistent with hygienic laws it seems that foodstuffs most useful for cleansing the teeth, such as meat and well cooked bread, are served first at meal times, whilst dessert, containing so many free acids and the hydro-carbons so well suited to the life of micro-organisms, come last.

A person, young or old, subsisting upon the present day good living system, and being fed mainly upon the products of fine white flour, such as fancy pastries and the like, loose their teeth in spite of

the strictest vigilance and the most careful dentistry, simply because the preparation of this white flour necessitates the elimination of the necessary elements which are contained in good wheat bread, and without which life of a healthy nature is impossible.

Hands and Instruments.—I do not think that this paper would be complete without some mention being made of the hands and instruments which are the main agents in the prophylactic work upon which we are engaged.

Hands.—Dr. Miller, of Berlin, says : " Before beginning work in the morning I cleanse my nails, which are kept short, with a pen-knife. Then brush my hands, and nails especially, in a warm 1 or 2 per cent. lysol solution. Then rinse in hydrant water and dry thoroughly. Between operations I wash my hands and brush my nails in soap water. After attending a filthy mouth I again use the lysol solution." He further states that " he makes special appointments, generally at the close of the day, for syphilitic patients, and that " it is not permissible to handle old teeth or money, or to dive into the trousers pockets in search of jack-knife, nor to hold instruments between the teeth or behind the ear during operations."

Instruments.—These convey infectious materials by their entry into wounds much more effectually than the hands are able to do during dental operations, and it is thus absolutely necessary that their sterilization should be of the most effectual kind.

To boil instruments in water containing carbonate of soda, to prevent rusting, is a method much in vogue, and it seems to answer well, care being taken to afterwards thoroughly dry and polish excavators and forceps with chalk and chamois or buff stick.

Dr. Miller keeps two sets of instruments going and has one set sterilized whilst the other is in use. He uses a lysol or thymol solution adding a few drops of oil of cassia. Mouth mirrors should be most carefully treated, and as hot water tends to loosen the glass, it is better to brush them in some cold antiseptic solution, such as those above mentioned, or to steep them in peroxide of hydrogen or Hg. B. Fl.

The small cost of rubber dam per patient is such that no one ought ever to use the same piece twice, and to sterilize removes to a great extent the elasticity from the rubber.

Serviettes, glasses, and burs should be well looked after, burs

should be first brushed with a wire brush and then boiled or left in peroxide of hydrogen for some time, especially after use in a fou pulp canal.

Gentlemen, my paper draws to a close, and I thank you for listening so patiently to what, I trust, may benefit some and prove a source of contention for others. My paper covers so wide an area that the errors of omission and commission predominate, and for this reason I hope to derive benefit and pleasure from your discussion.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Annual Meeting of the above Society was held at 40, Leicester Square, on the 1st ultimo, the President (Mr. David Hepburn), in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. Badcock and Brunton were appointed scrutineers for the ballot.

Mr. W. A. Maggs (the Librarian), presented his Annual Report, in which he stated that 32 members had used the Library during the year, while the number of visitors was 42. Fourty-four books had been borrowed in the same period.

Mr. S. J. Hutchinson (the Treasurer), in his Annual Report, stated that the gross receipts for the year, from November 1st, 1894, to October 31st, 1895, were £648, and the gross expenditure £461, leaving a balance of £187. The amount of the Society's investments was £4,327. In the course of his remarks Mr. Hutchinson alluded to the difficulty arising from the Society's financial year commencing and concluding at a different date to its official year.

Mr. Storer Bennett (the Curator), in the course of his Annual Report, stated that, following the precedent of former years, he had placed on the table all the specimens presented to the museum during the twelve months, and he thought they illustrated a very fair range of subjects in comparative pathology as well as human, and if the museum progressed as satisfactorily in the future as it had done in the past, they might all be proud of possessing a

perfectly unique collection, unrivalled by any other museum with which he was acquainted. With regard to the work of the year, the specimens added numbered 39. Thirty visitors and nine members had attended the museum, as against thirty-six and seven respectively in the previous year.

Mr. Storer Bennett also exhibited two specimens of comparative dental pathology, presented by Mr. Morton Smale, adding that they were much indebted to Mr. Morton Smale for several very valuable specimens presented during the year. These two were interesting, though not so remarkable as some others received from him. The first was the skull of a female gorilla, showing on the inner side of the mandible a certain amount of absorption in the alveolus. The other specimen was also one of a female gorilla, showing on one side the loss of two molars, with a very large cavity of absorption of the alveolus, while on the other side the first and second molar had been lost. There was also considerable loss of bone on the right side, the result of previous prolonged inflammation. As gorillas had never been kept in captivity these losses of tissue could not be the result of confinement. He should mention that the second specimen showed a tilting of the right lower pre-molar ; the result of the loss of the first and second molars suggested that early extraction had been performed. Here was an illustration of what they were told must result from improper extraction of the second molar found in one of the lower animals which had not been subjected to captivity at any time.

Mr. Boyd-Wallis exhibited an Electrical Annealer constructed under his directions. The lamp was specially prepared for him by Messrs. Edison & Swan, and was a 100 v. 32 c. p. lamp. He was inclined to regard electricity as the only satisfactory agent for annealing sponge gold. He had used a similar lamp for the last two or three years, and, as demonstrating its heating power, might mention that it would boil water in twelve or fifteen minutes.

A paper prepared by Dr. Washbourn and Mr. Goadby, entitled "Some points in connection with the Bacteria of the Mouth," was then read by Dr. Washbourn. Its statements, inferences and conclusions might be summed up as follows :—

The authors had examined 24 mouths in all, 16 with perfectly sound teeth and eight with one or more carious teeth. Any-one who had studied this subject would be struck with certain

facts. In the first place, bacteria are found in all mouths, whether the teeth are sound or carious, and whether the individual is well or ill. Secondly, when the teeth are carious, there are generally many more bacteria present in the mouth than when the teeth are sound. Thirdly, in acute diseases more bacteria are present than in health. Lastly, a systematic cleansing of the teeth with the tooth-brush greatly diminishes the number of the bacteria present. An example which came under the notice of the authors well illustrated this point. They made a series of examinations of the mouth of a boy with sound teeth, on account of the number of spirilla which were constantly present. One day, to their surprise, the spirilla had completely disappeared, and on inquiry it turned out that the boy had taken to the use of a tooth-brush, as he was getting tired of the repeated examinations. An overgrowth of bacteria in the mouth was checked by certain natural processes Firstly, the saliva acted not only by mechanically removing the bacteria, but also in virtue of its bactericidal properties. Sanarelli had shown that fresh saliva destroys some bacteria and hinders the growth of others. In this respect it was similar to the blood serum and to other fluids of the body. Secondly, the cells which are contained in the lymphoid tissue of the tonsils act as phagocytes, englobing and destroying bacteria. There are many species of bacteria which will produce caries, just as there are many kinds of bacteria which will produce inflammation and suppuration in various parts of the body. Many of these bacteria are only occasional visitors, which have been introduced with the food or air. They remain for a short time in the mouth and then disappear, the conditions not being favourable for their development. But apart from the bacteria that are, so to speak, accidentally present, the mouth contains certain species which constitute its normal flora. Some of the constant inhabitants of the mouth appear to be incapable of multiplying outside the body under the ordinary conditions of nature, and indeed some species have resisted all attempts at cultivation in artificial media. Some, on the other hand, can be cultivated in the various media generally employed. Caries, they held, does not occur without the agency of bacteria, though imperfect development or deficient calcification were predisposing causes. Bacteria pathogenic to the human subject had frequently been found in healthy mouths, including the diplococcus

of pneumonia, the diphtheria bacillus, the streptococcus pyogenes aureous and the streptococcus pyogenes. The presence of pathogenic bacteria in healthy mouths threw light on the conveyance of disease from one person to another, and pointed to the importance of their carefully disinfecting all dental instruments. A virulent bacterium might remain in the mouth of a healthy individual without causing disease, because it is dependent upon the susceptibility of the individual for its pathogenic effect. The most virulent bacteria might prove inocuous to an individual in sound health, while the same bacterium would produce disease to a person in weak health. With regard to the presence of pathogenic streptococci in the mouth, they had made a number of observations and microscopic examinations, and their conclusions were that while virulent streptococci were *occasionally* present in healthy mouths they were not *constantly* so, and that the virulent are a different species to the inocuous streptococci, capable of being distinguished in the following manner. The streptococcus brevis (harmless) is (1) non-pathologenic when tested upon rabbits ; (2) it produced a uniform turbidity in broth cultivations ; (3) it clots mild and produces much more acid than the streptococcus longus (pathogenic); (4) the individual chains are smaller, and the chains, especially in broth cultivations, are shorter, though the length of the chain is not an absolutely reliable criterion. The general characters of the streptococcus longus, are : It grows best at 37 C., but will grow at the ordinary temperature of the air. On agar and gelatine the colonies are minute and semi-transparent, the latter medium is not liquified. The growth in broth is rather characteristic ; flocculent masses stick to the sides and fall to the bottom of the tube, while the rest of the broth remains clear and transparent. A slight amount of acidity is produced in the cultivations. The microscopical appearance of the broth cultivations is characterised by the length of the chains, some consisting of as many as 40 members. Hence the name streptococcus longus. In other media the chains are often much shorter, and in the tissues of infected animals only diplolocci forms may be met with. The streptococcus brevis of Fingelstein must be looked upon as a distinct species for the present, although ultimately this view might be proved incorrect, for it was possible that further researches might enable the streptococcus brevis to be converted into streptococcus longus, though it had not yet been accomplished. The

authors were of opinion that the discrepancies of different observers who had investigated the streptococci of the mouth were partially due to the fact that the streptococcus longus is sometimes accidentally present, and has been mistaken for the normal streptococcus of the mouth.

Dr. DURHAM said the society would be aware that serum prepared by means of streptococci had already been largely used. A certain number of cases treated had not responded at all, but in other cases the effect of an interjection of anti-streptococcic serum had been most marvellous, and he thought it clearly pointed to the fact that the streptococci which were present in various pathogenic conditions in man were not of one and the same species, and therefore the further classification and codification of the various kinds of streptococci was distinctly an advance. He was afraid that serum treatment would never reach the pitch of protecting people against acid-forming streptococci.

Mr. PACKES agreed with the reader of the paper in thinking that gentlemen were not all as careful as they should be in properly sterilizing their instruments.

Mr. HOWARD MUMMERY said with regard to the pathogenic effect of the streptococci on the mouth, there was a paper by Mons. Gallipe, published in Paris, in which he described a case of endocarditis, which he distinctly traced to the mouth. Mr. Mummery thought that too much attention could not be drawn to the question of the antiseptic treatment of instruments. The only safe method to his mind was to put the instruments into boiling water as soon as they were done with. He would like to know whether the alteration of the appearance of the cocci, the oval and round cocci, was not due to the alteration in the nutrient condition of the medium in the mouth. Sometimes there was diminution of the nutritive power, and then transition forms were obtained and not typical forms. He thought that Dr. Miller had stated with regard to the pneumonia bacillus that it was nearly always present in the mouth, but very easily killed. It succumbed much more easily to certain antiseptics than most of the other organisms. In experiments with saccharine and benzoic acid Dr. Miller found that that was one of the first organisms destroyed.

Dr. ST. CLAIR THOMSON was very anxious to hear what became of all the bacteria in the mouth. Referring to the bacteria in the

nose, he found the majority inhaled were stopped at the entrance of the nose, and the remainder stuck to the gluey mucous lining the cavity, whence they were rapidly turned out by the ciliated epithelium. Some continental observers claimed the mucous of the nose to be distinctly bactericidal. It had even been asserted that it could kill the spores of anthrax, but though he and his colleague, Dr. Hewlett, tried over and over again to confirm that fact, they had completely failed. But it had one distinct virtue, viz., that it inhibited the growth of bacteria, which was, of course, something in the same direction, though it was not bactericidal action. It seemed to him that there was no need for the mucous to be bactericidal, because the germs, as they landed on the mucous of the nose, were prevented from developing and then expelled by the ciliated epithelium. While studying the bacteria of the nose he had been astonished at the swarms of organisms that were met with in the cleanest of mouths. Dr. Washbourn had said that the saliva was germicidal; he should like to know whether the saliva was sufficient to meet those hordes of bacteria? He would suggest that the bacteria were wrapped up in the saliva, and when thus rendered inoffensive were swallowed. He was anxious to learn Dr. Washbourn's views as to the fate of all the organisms in the mouth. He would also like to know if it had occurred to Dr. Washbourn whether the bacteria were present in greater quantities in mouth breathers?

Mr. Storer Bennett thought it must be obvious to all who were familiar with the researches of Dr. Miller and others working in connection with caries of the teeth that much more was necessary to produce caries than these streptococci, even though it might be true they had the power of generating acid.

Mr. Sidney Spokes gathered that Dr. Washbourn considered the saliva bactericidal, notwithstanding he compared it to serum. Serum was one of the media that was used for the cultivation of bacteria; he, however, cauld not quite reconcile the two statements.

Mr. Goadby, in reply, said that Mr. Durham had given him personally a good deal of help in the matter. With regard to the classification of the streptococci, the point was that in various common media the streptococcus brevis gave a good many different reactions. They could not simply take the morphology of the two streptococci and say one was the brevis and the other the longus. They must cultivate on all the various media and get the different

reactions—clotting of the milk, the growth on the gelatine, &c. They grew very badly on gelatine and on potato. On potato both of them involuted a great deal, but he thought the streptococcus longus involuted the least. Mr. Peters had said something about the acid production, and Mr. Storer Bennett, he thought, had the idea that he (Mr. Goadby) meant that caries was produced by the acid of the streptococci alone.

Mr. Storer Bennett said that was what he inferred from the earlier remarks.

Mr. Goady said with regard to that point nine-tenths of the bacteria produced acid, and all they wished to point out was that the streptococci found in the mouth did produce acid and the pathogenic ones did not.

Dr. Washbourn also replied, he said that Dr. Durham had referred to the serum treatment of streptococcal infections. A very good case came under his care, the case of a boy who shortly after the removal of a tooth was taken with severe symptoms of septicæmia and cerebral disturbance. They felt quite satisfied that he had some commencing meningitis, and also that the probability was that it was due to a streptococcal infection. A little of the pus from the tooth was examined and streptococci were found. Unfortunately they did not test the virulence, nor did they make a careful series of cultivations in order to see whether it was the streptococcus longus or some of the streptococci from the mouth which had accidentally entered into the tubes. They treated the case with serum, with most remarkable results ; very soon after the injections the boy got better, and ultimately completely recovered. With regard to the case of ulcerative endocarditis, that occurred from infection through the mouth. He had no doubt that the pathogenic streptococci were sometimes present in the mouth and that septicæmia might be produced in that way when any wound of the mouth occurred. As to the shape of the cocci, they varied according to the medium in which they were cultivated. In comparing any micro-organisms, of course the cultivation should be made under exactly similar circumstances, and when they stated that the individual cocci were smaller in the streptococci brevis than in the streptococci longus, they meant when they were cultivated upon broth having exactly the same composition As a matter of fact, if the streptococci were cultivated upon potato, the cocci became elongated and looked like

bacilli. With regard to the presence of pneumococcus in the mouth, there were very many observers who said it was almost constantly present, but he had some doubts as to whether those observers had not sometimes mistaken the streptococcus for the pneumococcus. Dr. Thomson asked what became of the bacteria of the mouth. He (Dr. Washbourn) had no doubt that some of them were destroyed by the saliva, and that others were swallowed and were destroyed by the gastric juice. The gastric juice had fairly good antiseptic properties. As to whether there were more bacteria in the mouths of those who breathe with their mouths open no experiments had been made. Puerperal fever might arise from any septicæmic conditions such as the one which had been referred to ; in an alveolar abscess there were virulent streptococci, and those might very well have produced the disease.

The follow members were elected officers and councillors for the ensuing year :—*President*—R. H. Woodhouse. *Vice-Presidents*—(Resident)—John Fairbank, C. J. B. Wallis, John Ackery. (Non-resident)—George Henry (Hastings), J. F. Cole (Ipswich), Malcolm Macgregor (Edinburgh). *Treasurer*—W. H. Woodruff. *Librarian*—W. A. Maggs. *Curator*—Storer Bennett. *Editor of Transactions* J. F. Colyer. *Honorary Secretaries*—J. H. Mummery (Foreign), C. Woodhouse (Council), H. Baldwin (Society). *Councillors*—(Resident)—J. Gartley, C. Robbins, S. Spokes, A. Smith, G. D. Curnock, H. J. Gould, J. O. Butcher, H. L. Albert, H. J. Kluht. (Non-resident)—T. Arkovy (Budapest), A. W. W. Baker (Dublin), F. E. Huxley (Birmingham), G. Cunningham (Cambridge), C. B. Mason (Scarborough), J. J. Andrew (Belfast), E. N. W[illegible]bourne (Ripon), J. S. Amoore (Edinburgh), W. R. Ackland (Bristo[illegible]).

The PRESIDENT then delivered his valedictory address, in the course of which he expressed his feeling of gratitude for the unfailing support that had been accorded to him and his colleagues during the official year. At the commencement of the session he ventured to express a hope that it might be one of profit, not only to themselves but to the profession at large, and that hope he felt bound to say had been amply realised. He then proceeded to pass in review the work of the year, dealing individually with the papers that had been read ; he specially emphasised Dr. Dudley Buxton's paper on the "Nature of Anæsthesia," which he described as "a classic," and Mr. Tomes' contributions on "The Chemical Composition of

Enamel," and "Experiments in Amalgam." In conclusion Mr. Hepburn stated that three days ago he had determined to say nothing but a word of farewell, but in spite of his better self he had been tempted into offering a few desultory remarks. They must be taken merely as an evidence of the lingering regret which attached to the severance of pleasant ties and the reliquishing of an honourable position. In vacating this chair he carried with him a legacy of never-to-be-forgotten memories, and the recollection of many evenings profitably spent. He had only one legacy to bequeath in return, but it was one which he felt sure they would be glad to receive. It was an ancient volume containing a copy of the invitation signed by Mr. Thos. Arnold Rogers, and some 50 autograph letters, written in response thereto by the early members joining this society prior to the adoption of the election by ballot in 1856. It moreover, contained fragments of the correspondence with the Royal College of Surgeons, which led up to the foundation of the Dental Diploma. It contained also some original and amended drafts of that diploma and many other documents of historic interest. Its fitting home was the library of this society, and in the hands of their trusty librarian, Mr. Maggs, it would be in safe keeping. It was with great pleasure that he he entrusted it to his care. Having thus recalled the foundation of the Odontological Society of Great Britain, which took place 40 years ago, he would express his parting wish that it may long continue to flourish and prosper.

Mr. HUTCHINSON proposed a vote of thanks to the President for his address and for his services in the chair during the past session. He said that Mr. Hepburn was so well known to all of them, and so deservedly and universally popular, that any words of his would be superfluous, but it was only right that their sincere congratulations should be offered, not only to the President, but to the Hon. Secretaries for the very interesting and valuable series of papers and communications which had been provided, especially as they embraced almost every branch of practical and scientific dental surgery, and besides this, several papers had dealt more particularly with collateral surgical matters of much importance. Mr. Hutchinson alluded to the interesting fact that so many presidents of the society had been followed in due course in the chair by their sons; and he was proud to say that no charge of nepotism could be laid at their doors, as all the sons had richly earned their high position, ind-

pendently of their distinguished fathers ; and of these he would mention Mr. Cartwright, Mr. Rogers, Mr. Tomes, Mr. Mummery, and lastly Mr. Hepburn, also Mr. Woodhouse, whose uncle had been a well-known president. In conclusion, Mr. Hutchinson made feeling reference to his first visit to the society when a student, Mr. Hepburn's father then being President.

The resolution was carried by acclamation.

The PRESIDENT briefly responded.

Mr. MUMMERY moved that a hearty vote of thanks should be given to Mr. Hutchinson for all he had done for the society. Mr. Hutchinson had been really holding office for many years. He began as Secretary in 1879, was Curator from 1881 to 1885, Vice-President till 1888, President in 1891, and had been Treasurer for the last three years.

The motion was carried with acclamation.

Mr. HUTCHINSON thanked the members.

Mr. BRUNTON moved that the best thanks of the society should be given to the Council and the officers, which motion was also carried with acclamation.

Mr. COLYER replied.

AT the fortnightly meeting of the Beverley Board of Guardians, held on Saturday, May 30th, in the Board-room, the chairman (Alderman Sample) moved : "That £5 per annum be offered to Mr. Willis, dental surgeon, to look after the teeth of children in the workhouse. Mr. Abram (vice-chairman) seconded. The Master stated there were about 14 children with bad teeth at present in the house. Mr. Whitehead asked if the nurses could not look after the teeth. Not one family in a 1,000 had a dentist to look after their children's teeth. The Chairman replied that the poor-law inspector (Mr. Kennedy) had reported on the subject, and said the children's teeth ought to be looked after. Mr. Abram pointed out that the fee was very moderate, only 2s. per week. Mr. Riby thought the nurses and the medical officer could attend to this matter. Mr. Whitehead remarked that it was a pity Sequah was not in the neighbourhood at present. If the children had a tooth pulled out every week they would soon have none in their heads. After further discussion the resolution was put and carried.

THE DENTAL RECORD, LONDON: JULY 1, 1896.

THE EXTRACTION OF UNERUPTED FIRST BICUSPIDS.

THE method of treating cases of impending crowding, or irregularity, of the teeth by early extraction of the first bicuspids is not new, but none the less we are indebted to Mr. F. J. Colyer for having put this idea to the test of practical experience and for giving this experience to the Odontological Society at the May meeting. Such methods naturally suffer from the tendency to call operations heroic when they are unusual, or when they present some little difficulty in their performance. It is therefore necessary to free one's mind from such prejudice if we are to arrive at a just conclusion regarding the value of this operation. It will probably require a much larger experience of this treatment before a final opinion can be formed; but it is certain that a careful perusal of the debate which followed the reading of the paper shows that the method therein advocated suffered but little from real criticism. We take it that the question at issue is: given a case, in which it is evident that there will be crowding and irregularity, is it advisable to adopt this operation, or to wait, and, later, to treat the case on some one of the accepted lines? But few of the speakers confined themselves to this point, but rather set themselves to discuss some of the other questions which Mr. Colyer unwisely, as it seems to us, also propounded. Surely each one of these questions raises issues which would alone suffice for an evening's discussion. The points of which we want to be sure when adopting this procedure in cases of crowding, in which we presume the unerupted canine to be well above the arch, are whether this tooth will drop back into the space gained without mechanical aid and whether the crowding of the front teeth will be relieved. If we are assured that these things will happen, then the advantages of this operation

seem to us many and unanswerable. If, on the other hand, subsequent mechanical aid be needed, then we altogether fail to see that the operation is justifiable. The experience in other regulation work would lead one *a priori* to expect a favourable result, and the experience gained by Mr. Colyer reassures us. It may be well to enumerate some of the advantages that this treatment may be expected to yield. Firstly, it will obviate the need for long, wearying and expensive, mechanical methods, which, to put it mildly, often tend to damage the permanent teeth. Secondly, by early relieving the pressure of the front teeth and, to a less extent of the back teeth, one against another it will lessen or do away with approximal decay. Whilst we agree with the remark of Mr. Sidney Spokes that it is "rather unusual, unless in a very severe case of neglect or overcrowding, where the incisors were overlapping one another to a large extent to find any great amount of caries amongst the incisors before the age of 12," yet, having regard to the difficulty of permanently arresting approximal decay in a child, even when of a small extent, remembering the unsightliness of filled front teeth, and the difficulty of finding the cavities on the approximal surfaces of back teeth, whilst they are yet small, we do not believe this criticism in any way be-littles this advantage. Moreover, the very cases which he expressly excludes from his general statement are those for which we should regard this operation as expressly indicated. So too with regard to Mr. R. H. Woodhouse's remark that "it could not be really foreseen what teeth might become decayed in the course of three or four years." Surely the very motive of the operation is that we may foresee that *none* will decay, at any rate on their approximal surfaces. Approximal decay is, for the most part, a very distinct thing from crown decay, for whereas the latter is almost a necessary sequel to a pit or fissure, the former rarely occurs unless the surface be damaged by rubbing against its neighbours or be prevented by undue crowding from the cleansing action

of food and tongue. The farmer, thinking to pooh-pooh the need of tooth brushes by the remark, that he never used one, but cleansed his teeth on three-quarters of a pound of beef-steak, may have been coarse in his expression and unreasoning in his thoughts, but at least he "voiced" a fact. The mastication of food by a well arranged set of teeth is in itself a cleansing process which is absent or deficient when teeth are crowded and irregular. We may not be able to say which tooth will decay but we can with certainty prophecy that some will. Thirdly, this method, as against extraction later, will not involve any disturbance of the normal articulation of the back teeth. We regard this as a minor point, but still one to take into account. These are some of the advantages, others may occur to readers, but it will be necessary in performing this operation to remember that we are not likely to adopt this as a routine practice for every dentition, but rather to reserve it for those cases in which it is apparent that there is no space into which the canine can erupt and in which the eruption of this will further accentuate the already crowded state of the front teeth. To practise promiscuous extraction of unerupted first bicuspids would be just as unreasonable as to bridge a set on a root and a half.

News and Notes.

At the ordinary meeting of the Council of the Royal College of Surgeons of England, held on June 11th, the following gentlemen having passed the necessary examinations were admitted Licentiates in Dental Surgery :—Edgar Ashley, Ernest Dare Bascombe, Luther Bidlake, Wallace Watson Briant, Ernest Coltman, Hector Charles Cowles, Harold Sugden Crapper, Alfred Edward Binnington Crosby, Albert De Mierra, Joseph Elford Dupigny, George Russell Edey, Harold Octavius Whitfield Harris, Edwin Ernest Darley Heeson, Charles John Hinchliff, Albert Frederick Alonzo Howe, William

John Mark Lacey, Norman Henry Oliver, Arthur George Grant Lumley, Arthur Read, Norris Snell, Richard Henry Stevens, Leopold Ta Bois, Benjamin George Tasker, Ernest Reginal Tebbitt, students of Guy's Hospital. Walter Burrows Barnard, L.R.C.P. Lond., Edgar Athelstan Blomfield, Harold Conder, James Kendred Day, Harry Dunlop, Frederick Hemsted, Sydney Angelo Knaggs, Frederick William Mardon, Osbert Mordaunt, Walter Mudie, Ernest Arthur Newberry, Alfred Edward Horton Orridge, Frank Joseph Padgett, Harry Hamilton Staton, students of Charing Cross and the Dental Hospitals. George Washington Connor, M.R.C.S. Eng., Walter Sexton, students of the Middlesex and Dental Hospitals. William Edmund Hill, Charles John Hurry Riches, students of the Middlesex and National Dental Hospitals. Hubert William Moore, student of Glasgow University, Middlesex and the National Dental Hospitals. Charles Mullord, student of the London and National Dental Hospitals. Thomas Wafer Bryne, Arthur Percival Nixon, John Walter Skae, students of University College, Royal Infirmary and Dental Hospital, Liverpool. Stuart Carter, Sydney Bailey Fisher, Arthur Malcolm Robey, students of Mason College, Queen's and General and Dental Hospital, Birmingham. Ernest Fritz Bertram Beyer, student of Owen's College, Royal Infirmary and Victoria Dental Hospital, Manchester. Sixteen candidates were referred back to their professional studies.

J. Flax, of 1, Victoria-place, Eastbourne, appeared on June 22nd, before the Eastbourne Borough Bench, in answer to a summons for carrying on a practice of dentistry, on June 8th, he not being registered under the Dentists Act, 1878, and not being a legally qualified medical practitioner, and that he used the letters "D.D.S.," implying that he was registered under the Act, or was specially qualified to practice dentistry. He pleaded not guilty. Mr. R. W. Turner prosecuted, Mr. Ritchie Macoun defending. Mr. Turner said this was a prosecution by the British Dental Association. Defendant had been carrying on business in Eastbourne, and the circumstances he submitted showed an ingenious attempt to evade the sections of the Act. He detailed the evidence to be called, and with reference to the American diplomas, Mr. Turner mentioned that no American diploma was recognised in England under the

Act. He specially pointed out that under Section 3 of the Act of 1878 as amended by Section 26 of the Medical Act of 1886, a person was denied the right to use the name or title of dentist, or hold himself out as a person qualified to practice dental surgery, by the addition to his name of either words or letters so signifying unless he was registered under the Act ; and as to the use of the term American—which he (Mr. Turner) interpreted as a confession of an offence against the law—it was, he submitted, no defence to this action. William Fletcher Thomas Brown, solicitor's clerk, of 21, Bedford-road, London, stated that in consequence of instructions which he received, and acting on behalf of the solicitors of the British Dental Association, he, on the 8th inst., went to the premises of the defendant in Victoria-place, Eastbourne. Outside the premises on the house he saw a board in the Seaside-road "American Artificial Teeth Company ; Specialist, J. Flax, D.D.S.," and there were other similar boards and paintings on the door post, &c. He went up to the first floor of the premises, and there saw the defendant, who was very frank with him. Witness said to him, "I have called from the solicitors of the British Dental Association, with reference to the boards you have downstairs and particularly the letters you have on them 'D.D.S.' I said, we take them to mean Doctor of Dental Surgery, and I presume that is what you mean by them." The defendant replied, "Yes, I am entitled to use these letters. I have my diploma as a doctor of dental surgery. You may see it if you like." Witness told the defendant that the Association would prosecute him for using these letters, and the defendant said "I am perfectly competent. I can do any class of work. I don't wish to deceive the public or anyone." In proof of this latter statement the defendant pointed out a notice hanging on the wall of the consulting-room, which set forth that the defendant was duly qualified in America, and that he was also registered in France, but that he was not registered under the Dentists Act of 1878. The defendant then asked witness to go into the operating-room—the "Chamber of Horrors," as Mr. Turner suggested—where witness found a similar notice posted, and where there were an operating chair, a case of instruments, and the usual appliances. The defendant further said here that he had been a dentist in one of the Parisian hospitals, and that he had been in Eastbourne about six months. He also remarked that they used in England to

recognise the diplomas of Howard and Michigan, but that they didn't now. In cross-examination witness said he was not deceived by the letters D.D.S. On the window was the word in large white letters "American." Mr. Macoun: Is not American dentistry far and away above English dentistry? Witness: I have no experience. Mr. Macoun: Are you aware that every dentist, or nearly every dentist, goes to America to study dentistry? Witness: I do not know. Mr. Turner: You admit that he is not on the register? Mr. Macoun: Oh, yes. In defence, Mr. Macoun pointed out that the Act was passed for the protection of the public; not for the protection of registered dentists, because at the time the Act was passed there was no profession of dentistry. The Bench also must have evidence that the letters did actually deceive someone, and Mr. Brown admitted that he was not deceived. Who was to be a judge of what "D.D.S." implied. The Bench retired for a short time, and on returning the Mayor said the case had been made out, and defendant would be fined £5 and costs. Mr. Macoun gave notice of appeal.

THE following note on the use of Corrosive Sublimate as a fixing reagent is published by Mr. S. E. Denyer, in the *Guy's Hospital Gazette*.—A saturated solution should be used; this is best made by putting excess of $HgCl_2$ into boiling distilled water, allowing it to cool and crystallize, which ensures complete saturation at the then temperature and pressure. It will be found that the addition of a small quantity of sodium chloride— about one-eighth that of $HgCl_2$— gives rather better results than the $HgCl_2$ alone. The tissue should be cut into pieces not more than four mm. in thickness, as the penetrating power of the $HgCl_2$ is only two mm., or thereabouts. Allow it to remain in the solution for from six to twenty-four hours, according to the nature of the tissue. Those tissues which include skin should not be left more than six hours, as they tend to become very hard, and this causes trouble in cutting. Wash thoroughly in water for twenty-four hours, then transfer to a mixture of Sp. Vin. Meth. and water, equal parts, for twelve or twenty-four hours, then to Sp. Vin. Meth. for two or three days. After this, dehydrate with absolute alcohol, clear with toluol, and embed in paraffin.

GENERAL MEDICAL COUNCIL.

Sir RICHARD QUAIN, President, in the Chair.

June 1st, 1896.

The REGISTRAR reported that—the prescribed conditions having been duly fulfilled in each case—the names of the undermentioned persons had been restored to the Dentists' Register, from which they had been erased in conformity with the provisions of Section 12 of the Dentists Act (1878) :—

Adams, William — Gay, Daniel

Marston, Samuel

The following students were allowed to antedate their commencement of professional study, their preliminary examination having been fully completed before they commenced :—

Name.	Date of Preliminary Examination.	Date of Commencment of Professioual Study.	Date of Registration.	Date to which Student desired to be Antedated.
Blair, Daniel	Oct., '95	Jan. 6, '96	April 13, '96	Jan. 6, '96
Grewcock, William J.	Dec. '93	June 30, '90	June 13, '94	Dec. 1, '93
Griffin, Robert Wm. ..	June, '95	Sept. 22, '94	Aug., 8, '95	June 1, '95
Henderson, Thomas ..	April, '93	June 14, '94	Mar. 6, '96	June 14, '94
Hodge, Edward H.....	Dec., '95	April 21, '84	May 30, '96	Dec. 1, '95
Law, William J.	Jan., '93	June 6, '94	Oct. 3, '95	June 6, '94
McKendrick, Geo. B...	Sept. '93	Oct. 18, '93	Jan. 15, '95	Oct. 18, '93
Millett, Robert Percy..	Exempt	July 3, '78	Jan. 16, '96	Jan. 1, '94
Rathbun, Charles J. ..	Exempt	May 1, '73	May 7, '96	May 1, '91
Searle, William R.	Dec., '95	Oct. 1, '95	May 11, '96	Dec. 1, '95
Seccombe, Charles W.	Sept., '91	Nov. 9, '95	April 29, '96	Nov. 9, '95
Shearer, Walter C.....	March, '95	Mar. 18, '93	Dec. 6, '95	March, '95
Smith, Bernard	Dec., '92	May 1, '90	Feb. 21, '93	Dec '92
Talbot, Francis	June, '95	Oct., 1, '95	Mar. 11, 96	Oct. 1, '95
Tomarinson, Maurice G.	June, '90	Jan. 31, '93	Dec. 6, '95	Jan. 31, '93
Uttley, Edgar P.....	June, '95	Dec. 23, '93	Jan. 23, '96	June 1, '95
Wilkinson, Charles E.	July, '94	Oct. 1, '94	May 8, '96	Oct. 1, '94

June 6th, 1896.

Mr. Saunders had been summoned to appear before the Council on Saturday, June 6th, at 1.30 o'clock p.m., to answer the following charge as formulated by the Council's solicitor :—

"That, being a duly registered dental practitioner, you act as cover of and by lending your name and assistance enable an unqualified and unregistered person named Müller to carry on a dental practice and to practise dentistry and dental surgery in all respects as if he were a duly qualified dental practitioner."

The REGISTRAR read the following report received from the Dental Committee on the facts in regard to this case :—

The case of Clement Henry Sanders having been referred to them by the Executive Committee to ascertain the facts in regard to such case, the Dental Committee find the facts to be as follows :—

(*a*) That Clement Henry Sanders was registered in the Dentists' Register on August 13th, 1884, as having been in practice before July 22nd, 1878, and his address in the Dentists' Register is 88, Queen Street, Exeter.

(*b*) That a practice of dentistry for gain is carried on at 88, Queen Street, Exeter, in the name of the said Clement Henry Sanders.

(*c*) That Clement Henry Sanders has a dental surgery at Okehampton.

(*d*) That Clement Henry Sanders carries on a dental practice at Aldershot.

(*e*) That Clement Henry Sanders visits Exeter once every ten days or a fortnight, where he sometimes remains for two or three days at a time ; and that the practice at Exeter is carried on in his absence by an unqualified person named Müller.

(*f*) Mr. Sanders gave an undertaking to place a qualified assistant in charge of the practice at Exeter and Okehampton at once.

Mr. JOHNSTON WATSON : I appear for Mr. Sanders. Mr. Sanders is not here ; he has made a further affidavit. Possibly the better way would be for me to make a few observations upon the report as it was entered to the General Medical Council, as, of course, you are all aware that report in fact is binding and conclusive, and the facts which are found by the Committee are those facts upon which this Council is asked to act. Now the charge which was preferred against Mr. Sanders was a charge which was called covering——

The PRESIDENT : May I interrupt you ? Are you going into the merits of the case ?

Mr. WATSON : No ; I cannot do that.

The PRESIDENT : Because if you are it may ultimately lead to a very different result from what is here. It would be much more to the point if you could tell us whether Mr. Sanders has carried out the promise he made us at that meeting.

Mr. WATSON : I will with pleasure. He has done so. I must ask your forbearance for one moment. I do not propose occupying

the time of the Council at any length. I was going to point out that the charge which was preferred against Mr. Sanders is not the charge which the Committee have found to be proved. I must ask the Council kindly to bear that in mind when they come to deal with the facts. The charge preferred against him was that he permitted an unqualified and unregistered person named Müller to carry on a dental practice, and to practise dentistry and dental surgery in all respects as if he were a duly qualified dental practitioner. Now what the Committee have in fact found is not that that charge is proved, or that the charge is true in fact against him, but they have found that he did carry on himself, which is a different thing to permitting anybody else to do it, a practice at 88, Queen Street, Exeter, and then in sub-section (*e*) of the report that he himself visited Exeter once in every ten days or a fortnight, where he sometimes remained for two or three days at a time, and that the practice at Exeter was carried on in his absence by an unqualified person named Müller. I take it not that the practice was ever carried on by Müller for his own benefit, and therefore he was not sheltered in any way by Mr. Sanders, but that while Mr. Sanders was carrying on his business in Aldershot or somewhere else, as he says he did part of the week, he permitted Müller, his assistant, who was unqualified, to take some part in the business. I do not desire to say anything else on that. I wish to draw your attention to another part of the report. I have here two affidavits, one of which probably has been already before the Council, filed by a page boy, Charles Avery, as to what occurred since the hearing before the Committee. Members of the Committee may remember that I, on the part of Mr. Sanders, who was in the room, gave an undertaking that he would place a qualified assistant in charge of the practice at Exeter and Okehampton at once, and I think I am in a position to satisfy the Council, if any question arises upon it, that he has done so. Of course, whether he did so or whether he did not, cannot, I presume, affect his position except if the Council think that the charge of infamous conduct is proved against him when they might desire to know what his conduct has since been for the purpose of giving him indulgence. Otherwise I, of course, do not abandon the contention that there is nothing in the report which, in the judgment of the Council, can amount to infamous conduct in a professional respect in the finding. Now,

then, as to what has occurred, which is only a question of fact, Perhaps I had better refer first of all to an affidavit filed by the page boy, which shows there has been some delay, and, as to that I have a reason for it. There has no doubt been delay, but Avery, who was an errand boy at Exeter, made an affidavit on May 22nd 1896, which reached our hands very shortly afterwards, to the effect that for ten weeks he was employed as page boy at 88, Queen Street. Exeter, where Mr. C. H. Sanders carries on business as a dentist "I left there on the 18th day of April last." May I remind the Council that the hearing of this case was on February 25th? "During the whole of the time"—the boy apparently remained there till April 18th, and had been there ten weeks before—"during the whole of the time I was there the only persons engaged there in connection with the business in addition to Mr. Sanders were his assistant, Mr. Müller, and his apprentice, William Delve, who told me one day that he had been there about three years. There was another apprentice there called Mr. Mann, but he left when I had been there about a week. During the time I was employed at No. 88, Queen Street, Mr. Sanders did not attend there on more than four separate occasions, and on neither occasion did he stay more than four days. I used to go to No. 88, Queen Street at 8 o'clock in the morning, and was employed there all day, leaving at about 7 o'clock in the evening.

Upon that affidavit reaching the hands of the gentleman who instructs me, Mr. Sanders was communicated with, and he has made out an affidavit in which he sets out what he has done since February 25th, and the difficulty he had in finding a registered practitioner who was prepared to take his place at Exeter. That is an affidavit sworn yesterday by Mr. Sanders, who is at Exeter, June 5th. He is now at Exeter engaged in his practice there. He says: "Immediately after February 25th last, I took every step which is usual and proper to carry out my undertaking. I at once entered my name in the books of the Dental Manufacturing Company as being in want of a qualified assistant, with the result that after the lapse of about a week I had three or four names sent me, with whom I at once communicated. The letters from the Dental Manufacturing Company from the said gentlemen who applied to me are at my house in Aldershot, otherwise I should exhibit them to this my affidavit. Within a fortnight or thereabouts I was in correspondence with a

gentleman residing in Rochester, with a view of his joining me as a partner to work the practice here and at Okehampton. That having fallen through I carried on correspondence with Mr. George Gilbert Liversidge, of 7, Romary Terrace, Greenwich, a registered dentist, whose registration was effected in 1878, and ultimately engaged him as an assistaut here, to come on at the earliest possible moment, which was on April 29th last, and on that day he entered upon his duties here as my assistant, and continued to manage my practice here and at Okehampton from that day until May 17th, when he left to manage my practice at Aldershot, and I came to Exeter on May 18th last, to manage and conduct my said practice here personally, and have continued to do so during the whole period, and am now, and have since the said May 18th, in my said house and premises, 88, Queen Street, Exeter, and intend to so remain.

"From February 25th to March 2nd I was in London or Aldershot, endeavouring to engage a duly qualified assistant. On March 3rd"—this is important because it apparently shows that the boy Avery's affidavit is incorrect in this particular—"on March 3rd I came to Exeter to manage my practice here in person, and from that time to April 29th, I was in residence at 88, Queen Street, Exeter, on the average of four days in each week personally attending and managing my said practice here." You will remember that there was a practice at Okehampton which he conducted at the same time as the Exeter practice. "I say that I have used every endeavour to honestly and *bonâ fide* carry out my said undertaking, and have done so and shall continue to do so in the future."

That is the affidavit which he has made, and as to the fact I think there can be no dispute that at any rate since April 29th he has had a properly qualified person carrying on his business there. Now he has explained the short delay which arose between February 25th and March 3rd. You will remember that the terms of the undertaking were that he would at once act, but of course he would have a reasonable time given him to find a capable assistant within his means, and a person who was properly recommended. On March 3rd he went down himself, and he says between that date and April 29th he always spent four days in each week on the average at Exeter. It was in the contemplation of the Committee, I believe, but certainly in the contemplation of the parties, that if he did put a person in at Exeter he would also carry on business at Okehampton. Now I am upon

that question of indulgence to which I made reference before, even if the Committee were to think this report would justify their taking proceedings against this gentleman, and striking him off the Register, they would probably think under the circumstances that he was entitled to have that indulgence which his legal advisers certainly thought the Committee held out to him to some extent. I suppose they would not have said a word about an undertaking unless they were prepared to give due effect to any conduct on his part since the 25th February. Under those circumstances I ask this Council to extend to him any indulgence which they think he is entitled to, remembering that now he has acted in the way in which the Council desires, that according to his affidavit there has been no such delay as would disentitle him to have indulgence, and that under those circumstances the Council would be properly advised not to take any further steps against this gentleman.

Mr. R. W. TURNER: In this case I appeared before the Committee, and the case was brought before the Committee of the Council by the British Dental Association, who at the time stated that they did not desire to press in any way unduly the charge, but to lay the facts before the Council in order that these dentists might learn that the resolutions of the Council were not to be treated as a dead letter. Now as to the facts of the case, I need not go into them, for with all respect to my learned friend's argument there is ample on the finding for the Council to find covering, if they desire to do so, and to find infamous or disgraceful conduct. But I now come to the question of the undertaking, because my friend has pointed out my clients procured an affidavit from an errand-boy employed at Exeter, which stated that this gentleman, Mr. Sanders, had not been there in practice, but had left Müller to do the practice until he, the errand-boy, left, on April 18th. In answer thereto it is extraordinary that Mr. Sanders should have only filed this affidavit and should not have been here to-day to attend to a case which must affect him so materially; and I think it will be within the recollection of the Committee and those gentlemen who were there, that Mr. Sanders stated that there and then there was somebody ready to go down into the practice, and that person would go down there on the following Monday. If they were the facts, why on earth should the Committee find that he undertook to do this at once, if he wanted reasonable time to hunt round for some assistant? Those members

of the Committee who were there will bear in mind what was in fact said, and the Committee has found that he was going to do this at once. What does he do? He does not do it until April 29th, and I beg to call the attention of the Committee to this fact, that his solicitors wrote saying he was advised to give an undertaking to employ a qualified man.

Mr. JOHNSTON WATSON: It is very awkward to go outside the report. I have no knowledge of this letter.

Mr. R. W. TURNER: With regard to Mr. Sanders' zeal to employ a qualified man, this case was originally fixed to be heard by the Council on November 25th, and was then adjourned till February 25th. Nothing was done in the meantime, and nothing has been done until April 29th. It is a matter, of course, for this Council to say whether this was complying at once, and whether or not, as I understand is generally the case in these cases, an undertaking would be given that such a person would in future conduct himself in an honourable and professional manner—whether or not the Committee can be satisfied with any such undertaking they might have from Mr. Sanders, when it has taken him all that time to get a qualified man, when one knows how many qualified men there are about.

Strangers then, by the directions of the Council, withdrew; on their re-admission,

The PRESIDENT: I have to announce to the representative of Mr. Sanders that the charge made against Mr. Clement Henry Sanders has been proved to the satisfaction of the Council; and the second is, that the Council could take one of two courses—either at once pronounce judgment, or postpone judgment until next session. It is resolved that the further consideration of the charge against Mr. Clement Henry Sanders be adjourned until the next session of the Council in November, and the Council will then expect Mr. Sanders to appear in person and give them a satisfactory explanation of his past and present conduct.

June 8th, 1896.

The REGISTRAR read the following communication from the Privy Council Office in regard to the application of Mr. A. P. Merrill for registration as a dentist, together with observations prepared in reply:

(*a*) Letter from the CLERK of the PRIVY COUNCIL.

76,556. "Whitehall,

"*February 21st*, 1896.

"SIR,—I am directed by the Lords of the Council to transmit to you the accompanying copy of a petition of Mr. Alfred Perkin Merrill, a dentist, practising in Melbourne, in the Colony of Victoria, appealing to the Privy Council against the decision of the General Council of Medical Education and Registration of the United Kingdom, not to place his name on the Dentists' Register, together with a copy of an affidavit sworn by Mr. Merrill in regard to his qualifications as a dentist, and I am to request that, in laying the same before the General Medical Council, you will move that body to furnish their lordships with any observations they may desire to offer upon the appeal of Mr. Merrill.

"I am, Sir,

Your obedient Servant,

"*The* REGISTRAR *of the* C. L. PEEL.

"GENERAL MEDICAL COUNCIL."

(*b*) PETITION TO THE PRIVY COUNCIL.

"(*Copy*).

"TO HER MAJESTY QUEEN VICTORIA, Her Heirs and Successors in HER MAJESTY'S PRIVY COUNCIL.

"*The Ninth day of January*, 1896.

"May it please your Majesty and the Right Honourable the Lords of the Judicial Committee of the PRIVY COUNCIL.

"THE HUMBLE PETITION of the undersigned ALFRED PERKIN MERRILL, of 52, Collins Street, Melbourne, in the Colony of Victoria, Dentist, setteth forth :—

1. "That I am a registered dentist of the Colony of Victoria, and I also hold the Diploma of D.D.S. of the Philadelphia Dental College, U.S.A.

2. "I obtained the said diploma in the year 1866, and I was, moreover, practising in the British Colonies years before the English Dental Act came into operation, viz., for some months in Canada in the year 1862, and in the Barbadoes in the year 1864.

3 "After obtaining the diploma of Doctor of Dental Surgery (D.D.S.) at the Philadelphia Dental College, I practised as a dentist at Montreal, Canada, for three months. Thence I went to New

York, U.S.A., where I practised as a dentist for some years. I became Secretary of the Odontological Society of New York, and I was also Professor of Operative Dentistry and Dental Histology in the North Western Dental College, Chicago. I resigned this position on account of ill health.

4. "Though I am an American citizen by birth, I have spent many years of my life in the British Colonies. I have lived for years in Canada, and am fully acquainted with all English modes of dentistry. I now hold a leading position as a dentist in Melbourne, Victoria.

5. "Being desirous of being registered as a dentist in Great Britain, I applied to the General Medical Council of Great Britain for registration, and forwarded an affidavit (of which paper marked 'A' is an exact copy) in support of my claims.

"6. The General Medical Council refused my application, and I forward herewith an exact copy of their reply (which was addressed to my Solicitor, Mr. Ernest Joske), on paper marked 'B.'

7. "And I do myself the great honour to appeal against this decision of the General Medical Council, and humbly pray that you will in your wisdom and goodness direct such General Medical Council to recognise my diploma and to register me accordingly as a dentist of the United Kingdom.

"And your Majesty's humble servant will for ever pray.

"(Signed) ALFRED PERKIN MERRILL, D.D.S.

"Melbourne, Victoria,

"*January 9th*, 1896."

(*c*) Copy of Affidavit.

"I, Alfred Perkin Merrill, of 52, Collins Street East, Melbourne, Victoria, make oath and say,

"That I am *a Registered Victorian Dentist*, and hold the Diploma of D.D.S. of the Philadelphia Dental College, U.S.A.

"I obtained my diploma in the year 1866, but I was previously to that year practising as a dentist in the British Colonies, viz.:—In the Barbadoes, where I followed my profession as a dentist for close on twelve months, and previously to that I was for some months practising as a dentist in Canada.

"Upon obtaining my diploma of D.D.S., I practised as a dentist in Montreal, Canada, for three months. I proceeded thence to New

York, where I practised as a dentist for some years. I was formerly Secretary of the Odontological Society of New York, and I was also appointed Professor of Operative Dentistry and Dental Histology in the North Western Dental College, Chicago. I resigned this position owing to ill-health.

"I have spent many years of my life in the British Colonies, and am fully acquainted with all English modes of dentistry. I conduct my practice in a strictly professional manner.

"I am a naturalised subject in Victoria of Her Majesty, Queen Victoria.

"(Signed) ALFRED PERKIN MERRILL.

Sworn before me this
20th day of February, 1894.
"Signed) WILLIAM FRANCIS, J.P"

(*d*) OBSERVATIONS IN REPLY, BY THE COUNCIL'S LEGAL ADVISER.

"(1) The 8th Section of the Dentists Act, 1878 provides that a person who is not domiciled in the United Kingdom, and shows that he holds some recognised certificate (as defined in the Act) granted in a British possession, and that he is of good character, is to be entitled without examination in the United Kingdom to be registered as a Colonial dentist.

"(2) The 9th Section of the same Act provides that where a person who is not a British subject shows that he obtained some recognised certificate (as defined in the Act) granted in a foreign country, and that he is of good character and continues to hold such certificate, is to be entitled without examination in the United Kingdom to be registered as a foreign dentist in the Dentists' Register.

"(3) By Section 10 of the Act the certificate granted in a British possession, or in a foreign country, which is to be deemed such a recognised certificate as is required for the purposes of registration is to be such certificate, diploma, membership, degree, &c, or other title, status or document *as may be recognised for the time being* by the General Council, as entitling the holder to practise dentistry or dental surgery.

"The following facts, in relation to the application of Mr. Merrill for registration are material for the purposes of inquiring whether he satisfies the foregoing statutory conditions.

"(4) In the year 1862 and 1864, Mr. Merrill, being at the time an American citizen, practised dentistry in Canada and Barbadoes.

"(5) In 1886 Mr. Merrill obtained from the Philadelphia Dental College his diploma of D.D.S., and consequently for some years practised as a dentist in New York.

"(6) In the month of April, 1890, Mr. Merrill was registered in the Dentists' Register of the Colony of Victoria, and, at same date, which is not stated in the papers, Mr. Merrill became a naturalised British subject in Victoria.

"(7) As regards the American diploma held by Mr. Merrill in the year 1879, the General Council caused very full inquiries to be made in reference to the courses of study and examinations required by several of the Foreign and Colonial Dental Colleges and Institutions, with a view of ascertaining whether the certificates or diplomas of those institutions furnished sufficient guarantees of the possession of the requisite knowledge and skill for the efficient practice of dentistry, and amongst the diplomas or certificates which were the subject of inquiry were those granted by the Dental College of Philadelphia. The General Council ascertained that in this institution, as in several others, there was no preliminary examination, that two years only of professional study were required, and that the examination in each was conducted solely by the teachers and officers of the institution. The General Council, therefore, having regard to the requirements which are necessary for diplomas in dentistry in the United Kingdom, which comprise a preliminary examination and four years of professional study, felt unable to recognise the certificate of the Philadelphia Dental College as one which ought to entitle the holder to registration as a foreign dentist in the Dentists' Register.

"(8) As regards the registration of Mr. Merrill in the Dentists' Register of Victoria, the General Council have not hitherto been able to recognise that a person who is so registered, but who does not possess any Colonial diploma or licence, is the holder of a certificate which furnishes sufficient guarantees of the possession of the requisite knowledge and skill for the efficient practice of dentistry or dental surgery.

"(9) Mr. Merrill apparently is applying for registration as a Colonial dentist and not as a foreign dentist. The possession of the

foreign diploma, even if it were recognised, would not entitle Mr. Merrill to be registered under s. 8 of the Act as a Colonial dentist.

"(10) The only qualification therefore which Mr. Merrill possesses on which he can found an application for registration as a Colonial dentist, is the fact that he is registered in the Register of Victoria. But as already stated the General Council have not been able to, and do not recognise registration in this Colonial Register as of itself entitling an applicant to be registered under ss. 8 and 10 of the Act.

"March 20th, 1896."

Sir WILLIAM TURNER: After that statement I have to move the following motion:—"That the observations by the Council's legal adviser on the petition of Mr. Alfred Perkin Merrill, be forwarded to Her Majesty's Privy Council as the answer of the Council to his appeal."

Mr. WHEELHOUSE: I beg to second that.

Dr. MACALISTER: I should like to suggest a verbal change, so that it will read—"That the observations prepared by the Council's legal adviser on the application of Mr. Alfred Perkin Merrill, be adopted and forwarded by the Council to Her Majesty's Privy Council."

The resolution as amended was agreed to.

June 9th, 1896.

The following Report was received from the Dental Education and Examination Committee on a communication from the British Dental Association, referred by the General Council to that Committee on November 29th, 1895 (*Minutes*, vol. xxxii., p. 143).

"British Dental Association,
"(*Incorporated June 3rd*, 1880),
"40, Leicester Square, London, W.C.
"*November 25th*, 1895.

"DEAR SIR,—I beg to submit the following matter of urgency to the attention of the Medical Council at its present Session.

"Joseph Stromier, of Glasgow, having obtained the D.D.S. diploma of Michigan University, U.S.A., presented himself, last October, for examination at the Faculty of Physicians and Surgeons, Glasgow, for the L.D.S. Diploma. He submitted as his dental

curriculum that of the Michigan College, and upon that curriculum he was admitted to the L.D.S. examination of the Faculty. He failed in the examination, but it is his intention to present himself again in April next.

"The point I wish to draw the Council's attention to is this—the Faculty of Physicians and Surgeons, Glasgow, *accepted the dental curriculum of Michigan*, a curriculum no longer recognised as satisfactory by the Medical Council, in lieu of their own, and admitted Stromier to examination. In doing so, I venture to submit that the action of the Glasgow Faculty is *ultra vires*, and I beg the Council to take steps, as they may deem necessary, to prevent a recurrence of such action.

"I am, dear Sir,

"Yours truly,

"W. B. PATTERSON,

"W. J. C. MILLER, Esq., *Registrar*." "*Hon. Secretary*.

In answer to an inquiry sent by the Registrar, the following explanatory communication was received from the Faculty of Physicians and Surgeons of Glasgow in reference thereto :—

"Faculty of Physicians and Surgeons,

"Glasgow, *April 28th*, 1896.

"Sir,—I have to acknowledge receipt of your communication of yesterday, with a printed copy of a letter from Mr. W. B. Paterson, Honorary Secretary of the British Dental Association, of date November 25th, 1895, addressed to you as Registrar of the General Medical Council, in which complaint is made regarding the alleged action of this faculty in admitting to the examination for the Licence in Dental Surgery, Mr. Joseph Stromier, inasmuch as by so doing they accepted the Dental Curriculum of Michigan University, such action being stated to be *ultra vires*.

"The facts of the case, as gleaned from the Faculty records, are as follow :—

"(1) By letter of date August 31st, 1895, Mr. Stromier intimated to me his intention of entering for the L.D.S. Examination, at the same time submitting evidence that he had passed a recognised preliminary examination in 1891, and that he had been registered as a dental student by the General Medical Council in January, 1892.

In his letter he applied for exemption from examination in anatomy, physiology and chemistry, in consideration of his possessing the dental degree of Michigan University. On September 3rd, 1895, he was informed by letter that his claim from exemption from any part of the examination was disallowed ; and on September 28th he entered for the first examination only, having duly submitted evidence that he had attended the courses prescribed for the examination. He failed to satisfy the examiners, and was remitted to his studies for six months.

"(2) On March 28th, 1896, he re-entered for the first examination, at the same time entering provisionally for the second examination, that is, conditionally on his passing the first examination. In doing so, as required by the regulations, he submitted the schedule of his entire course of study, of which the period of three years and nine months were certified as attended at the school of Ann Arbor, being that of the University of Michigan, and six months in Glasgow, all the entries being attested by official signature, in the schedule, or by the production of separate certificates. The course of study, as thus certified, was in several particulars in excess of the present requirements of 1882, when he began study. On this occasion he passed both the first and the final examinations, and was enrolled as a Dental Licentiate.

"(3) Mr. Paterson alleges that the action of the Faculty, which has been here stated in detail, was *ultra vires*, but he does not state how it was so. The only resolution of the General Medical Council which may be said to have any bearing on the matter appears to be that contained in vol. xxx. (p. 84) of their minutes, suspending till further notice registration of the certificates of the dental degrees of two American institutions, one of them being Michigan University. But, as I have stated, the candidate in question obtained no advantage at this Board from his possession of the Michigan degree. In this respect therefore there has been no violation of even the spirit of the resolution of the General Medical Council. It is true that the larger portion of his professional education was obtained in the school of that institution ; but the Faculty are not aware that either as regards medical or dental education the General Medical Council have passed any resolution limiting the discretion of the qualifying bodies in regard to the recognition of schools either outside or within the United Kingdom. If any such limiting instructions have

been issued, no copy of them appears to have reach the Faculty ; and the General Medical Council have only to draw the attention of the Faculty to them to secure their being carried into effect.

"I am, Sir,

"Yours obediently,

"ALEXANDER DUNCAN, *Secretary.*

"W. J. C. MILLER, Esq., B.A.,

"*Registrar of the General Medical Council.*"

The Dental Education and Examination Committee have considered the communication from the British Dental Association, dated November 25th, 1895, respecting the case of Joseph Stromier, with the explanatory communication of the case received from the Faculty of Physicians and Surgeons of Glasgow, dated April 28, 1896 ; and they beg to report that they do not find that there has been any irregularity in the action of the Faculty with respect to the candidate named, seeing that he was only admitted to Examination for the L.D.S. on submitting evidence acceptable to that Faculty that he had duly attended the courses prescribed for the examination.

THOMAS BRYANT, *Chairman.*

Mr. BRYANT : There is not much to relate to the Council upon this. There was a certain letter written to us by the British Dental Association, which was referred by this Council to the Committee. It is in respect to the Faculty of Physicians and Surgeons of Glasgow, who have been accused of doing what they ought not to have done, but they gave such a very satisfactory answer that the Committee report as you see by the print. The accusation was evidently made in error, so that I hope the report will be accepted. I move : "That the report from the Dental Education and Examination Committee in regard to a communication from the British Dental Association be received, approved, and sent to the Faculty of Physicians and Surgeons of Glasgow, and to the British Dental Association."

Sir WILLIAM TURNER seconded.

The motion was agreed to.

The REGISTRAR : The next business is an application from Mr. J. D. Whittles (registered as Licentiate in Dental Surgery of the Royal College of Surgeons of England, 1892), who wishes to be

present at the dental examination of the Royal College of Surgeons in Ireland, in the same way that he has frequently been present at the examinations of the English College.

"Mason College, Birmingham,
"*April* 25, 1896.

"DEAR SIR,—You will notice that I have been asking permission to be present at the dental examination (from the enclosed letter) to be held in about fourteen days hence in Dublin, and I should feel grateful if you would send me the necessary permission.

"I have been in the habit of being present at all the dental examinations in London for the last four years, and as I hold a Lectureship at the Birmingham School of Medicine, consider that I am entitled to be present.

"Your kind attention will be greatly esteemed by,

"Yours faithfully,
"J. DENCER WHITTLES.

"W. J. C. MILLER, Esq., B.A., *Registrar*."

"Royal College of Surgeons in Ireland, Dublin,
"*April* 20, 1896.

"DEAR SIR,—With reference to your letter of April 1, I am directed to inform you that our examinations are only public to our own Fellows and Licentiates and visitors accredited from the General Medical Council.

"Yours faithfully,
"ROB. H. WOODS, F.R.C.S.,
"*Sec. of Council.*

"DENCER WHITTLES, Esq., L.D.S.,
"Mason College, Birmingham."

The President desired me to lay it before the Council because he thought it should be answered by the Council and not by the Registrar himself.

Sir WM. TURNER: I submit that this is not a case we have anything to do with. It is a matter entirely within the Institution itself whether it will admit A, B or C to its examination. It has nothing to do with us.

Mr. WHEELHOUSE: I will move: "That the subject is one on which the Council cannot interfere."

Sir WILLIAM TURNER seconded the motion, which was agreed to.

Abstracts and Selections.

THE X RAY AND ITS APPLICATION IN DENTISTRY.

By William James Morton, M.D., New York, N.Y.

Historical.

As far back as 1819 the illustrious Faraday, after pointing out the familiar classification of matter into solid, liquid, and gaseous, advanced the then remarkable hypothesis that a further and fourth state existed, and this he termed "radiant matter." In 1879 Professor William Crookes recalled this speculation and in a series of epoch-making papers and experiments demonstrated that, apparently, matter actually did exist in a fourth state or condition which was as distinct "from the state of gas as a gas is from a liquid."

Up to Crookes's time vacuum tubes whose vacua were comparatively low were in familiar use, they were called Geisler tubes. Crookes increased the vacuum and rearranged the entering electrodes, and thus sprung up the now familiar Crookes tubes. He ascertained by the employment of high vacua these remarkable facts:

That in high vacua the molecules of matter, instead of being so close together that their mass was practically continuance, were so far apart and so few that they might be regarded individually. Such molecules actually seem to have what Crookes termed a "mean free path." That is to say, they were able to be thrown across the vacuum tube from the poles with incredible velocity and great force, moving with but few or no collisions with each other and striking the sides of the glass to cause it to become heated and to exhibit vivid fluorescence. The effect of the projection of the molecules of air may be compared to a hail-storm, or to a bombardment by extraordinary fine shot. Crookes's radiant matter proceeded in straight lines, cast shadows of intervening objects, and could be deflected by magnets.

The work of Crookes has furnished the splendid inspiration for all that has followed in relation to the electric phenomena exhibited in high vacua. Some years later on Hertz restudied the Crookes tube effects, and Lenard, his pupil, discovered that the radiation from the tube was capable of exciting fluorescence outside of the tube, and of showing the presence of opaque objects in closed boxes upon a fluorescent screen. But such purely physical experiments attracted little attention outside of strictly scientific circles. It remained for Roentgen to make the sensational announcement that the bones of the living body might be photographed, so to speak, and at once the radiation from a Crookes tube became a wonder.

The scientific world is yet at a loss for a theory to account for the Crookes tube effects. Roentgen himself modestly termed it the "X, or unknown ray." Whether it is a ray at all is doubted. Opinions are divided largely into two camps, the one considering the X ray to be a vibration, transversal as in the case of light, or longitudinal as partly inclined to by Roentgen; the other, adopting the Crookes, or English view, that it is a stream of electrified particles

moving at a high rate of speed. It is on the whole doubted if the rays are light in any ordinary acceptation of the word. Edison and others think it to be of the nature of sound waves.

And thus the battle and conflict of opinion as to the nature of the X ray progresses. Man chafes under restrictions to his knowledge, and out of this mental restlessness come the great achievements of science and the final ameliorations of hardships and suffering to the entire race.

I will refer very briefly and concisely to the apparatus,—I will not say *necessary* to produce the X ray, but to the apparatus which I personally have found essential to produce it. A great diversity of opinion exists as to what you need. One man will talk of one form, and one of another. I am presenting to you to-night what I have found to be a good working combination. The X ray may be produced by the aid of an influence machine, and one might have been brought here to-night, where it is essential to use it ; but it seems that we must produce our work with the induction coil. I was obliged to devise a tube of my own, which worked very well, because I had no Crookes tube. I put on the cathodic end a disk of aluminum, and on the anodic end also an aluminum disk. The anodic aluminum disc did not intercept the ray, and, more than that, it seemed to direct it and bring it down to a point. I produced some very good pictures of the hands and feet. I do not know but some time we may go backward and make use of this after all. The best form of apparatus is some form of the Ruhmkorff coil. As you use these vacuum tubes their vacuum increases, that is to say, it becomes more and more difficult to induce the current to go by the pathway of the inside of the tube, and after a while the vacuum rises to a point where the current will jump through the air space rather than go through the tube. It is well to get a spark coil of about six-inch spark. This one has a length of about four and one-half inches.

As to the Crookes tube, it seems many of them can now be obtained. I have here some interesting ones made by Hicks, of London. These are of the recent type, known as the focus tube. When we began and the fluorescence played like a stream of water against the tube, there was no definite picture, and everything was blurred. To a certain extent that was obviated by using diaphragms with apertures made in them ; to another extent it was remedied by placing the Crookes tube at a greater distance from the object ; but a greater distance from the object means a vastly increased exercise of power, and to-day we lack the power to do the work as it should be done. I have always believed that Mr. Tesla would be the one to exhibit the Crookes tube or some form of the X ray radiation with extraordinary power, such power as to extend to great distances, and so it has proven. He has produced effects with greater power than any one else in the world, probably. Mr. Swinton, of London, has also produced some very powerful effects ; but even with such limited powers as amateurs like myself possess, we are able now to see through the human body with absolute ease.

I believe these tubes are a step in the direction in which we must all work. They are called in this country "reflecting tubes."

They have two electrodes, one the cathode, a concave mirror, and the other the anode, a flat disk of platinum. The cathodic stream is so arranged that it impinges upon the platinum and intercepts this stream, and the X ray is thrown off in every direction anterior to its plane. I call all these tubes "spatter tubes," simply because the effect is exactly as if you would turn a hose pipe with a strong stream of water against a wall. The water scatters in every direction and some of it comes back. If you look with your fluoroscope behind this little piece of platinum, there is a dark area, showing that the radiation comes off from the plane surface.

I would advise any one who is going to buy the tubes to get the focus tubes. With them you get a most beautiful definition of your object.

When I use the term "fluoroscope" I presume every one is familiar with what is meant, still a word of explanation might be important. As I mentioned some time ago, it was long since observed that fluorescent substances outside of the Crookes tube were excited to activity by the radiation from the tube, but it was not then called the X ray. As soon as the X ray interest spread over the world people tried to find all the different forms of detection, and no one was more energetic than Mr. Edison. We all began with photography, which is only another form of detection of the X ray. It is supposed that the silver on the plate is excited into a state of activity in such a way as to set up the chemical action that is usually set up by light. The fluoroscope is only another detection of this ray. In order to bring it to a point where it could be used in the medical profession, because this X ray seems to be most useful to doctors, Mr. Edison stated the property of the different fluorescent substances. He announced that the tungstate of calcium was the most fluorescent substance he found. Some friends and associates of Mr. Edison at Menlo Park, Messrs. Ailsworth and Jackson, took up the practical manufacture of the screens, and to them we are indebted for the use of this large screen before you.

The crystals of calcium tungstate were at first coarse. As skill has progressed the crystals have been produced finer and finer, until here the surface is almost as smooth as enamel; and there is a purpose in getting it as smooth as possible.

In this connection I wish to read a special bulletin that Mr. Edison sent out from his laboratory when our representative visited him in the interests of our profession. He says:—"I find by manipulating the coil, the break and the rate of break, that the form of the wave can be changed; crystals that fluoresce strongly with one kind of wave are weakened when the wave is changed, while other crystals increase, notably mercury diphenyl, which scarcely fluoresces with one form of wave, but comes out strongly when the wave is changed."

If you give any thought to the effects of the X ray on a photographic plate or a fluorescent screen, you will find that there is a great amount of truth in what Mr. Edison has stated in this brief communication. I often notice in working that I may get a beautiful effect on the fluoroscope and a very poor effect on the bromide of silver plate. Sometimes I think I get a very poor

exposure, but when I develop the plate I find a very excellent development. Sometimes apparently the waves are longer and sometimes shorter. There is a particular ray adapted to certain substances which are to be excited by them or put into a state of fluorescence In that connection the sensitive plate that one uses is of great importance. I have tried nearly all the plates, and am informed by Professor Goodspeed, of the University of Pennsylvania, that Mr. Carbutt, of Wayne Junction, near Philadelphia, is making a plate that is very well adapted to this work. Every one wants to do this work well, to do it quickly, to get good definition and strong negatives. The question of speed largely depends on the plate you use. I have taken different objects and placed them upon a large plate, and, in my interest to see what the X ray was doing, have gotten under the table with the fluoroscope and looked through the plate and the object, and then developed that plate and found absolutely nothing upon it. The trouble, I think, was in the sensitive plate itself. I have found films to be very sensitive to the X ray. That was of particular interest to us, in regard to dental applications, because in taking many of these pictures in the mouth it is important to use the film. For making X ray pictures of living tissue containing teeth, the film is important. The way I devised was to cut a pattern in gutta-percha or cardboard, or anything that the patients could wear in the mouth without gagging too much ; if they gag too much I use the cocain spray. Having cut this pattern, I took it into the dark room and cut the film in the same shape and folded it into three folds of paper, and then ran it into a pocket of guttapercha tissue and adjusted it to the roof of the mouth. The picture could be taken almost instantaneously. I say " almost " instantaneously, because that depends on the workings of your tube. Any area of the mouth could be depicted by the X ray in that simple manner. The use of the glass plate of course would present considerable difficulty.

Sometimes the vacuum of the Crookes tube is good, and sometimes bad. There are times when its force is wondrous, and thirty feet away you can detect the X ray ; and at other times you can get nothing out of it.

You will find that the lithographic prints in publications are very inferior to the photographic prints, and what is more pointed still, the photographic prints are vastly inferior to the negative. The real beauty of the X ray work is only to be found in the negative itself.

Applications in Dentistry.

And now, gentlemen, a few final words as to the applications of what we have seen.

The application of the X ray will, I believe, greatly aid the art of dental surgery. In general surgery it is difficult to over estimate the importance of ascertaining the exact outlines of imbedded bones, of foreign bodies, to differentiate between a dislocation or a fracture, or to ascertain the co-existence of both. The X ray already makes these cardinal issues an open book ; it does more, it locates tuberculous deposits now known to frequently invade the osseous tissue and to be impossible of detention except by exploratory incisions ; it locates also sarcoma and accompanying erosions of the bone within the

narrow cavities, and it is more than possible that, thanks to the labors and the practical mind of Edison, these triumphs of localizing and diagnosticating records upon photographic plates will be supplanted, at least for quick and ready examinations, by the new art of X ray fluoroscopy. It was one thing to note that flourescent substances outside of a tube were excited, it was quite another to find a working fluorescent substance and build it into a practical screen. This Edison did, and the efficacy of this screen and its revelations grow apace ; its definition and degree of illumination increase week by week. Tesla already reports that he has seen through three men, that he has seen the great bones of the body, and seen the heart beat. Again and again I have looked through the human body and seen not only the vertebræ, the ribs, the hip-joint, but also located larger and denser organs like the liver ; nay, more, I have watched the heart in its beatings. Who could guess to what lengths the visual exploration of our interior organization may reach when so much is already possible ?

This enumeration, brief as it is, is a great triumph for the X ray, and these same questions of diagnosis and of localization are equally applicable to dental surgery.

The radiographs presented to you here to-night are but a first step towards taking pictures of the living teeth. They open out to your view a wondrous field for investigation and study and diagnosis. Each errant fang is distinctly placed, however deeply embedded within its aveolar socket ; teeth before their eruption stand forth in plain view ; an unsuspected exostosis is revealed ; a pocket of necrosis, of suppuration, or tuberculosis is revealed in its exact outlines ; the extent and area and location of metallic fillings are sharply delineated, whether above or below the aveolar line. Most interesting is the fact that the pulp-chamber is beautifully outlined, and that erosions and enlargements may be readily detected. A new method of studying pathology in the living subject is laid before you.

To what perfection, gentlemen, may not the science and art of dentistry reach if some of the new things which press upon your attention are fully realised. Already painless dentistry is within your grasp by aid of electricity and simple anæsthetics, and now the X ray more than rivals your exploring mirror, your probe, your most delicate sense of touch, and your keenest powers of hypothetical diagnosis.

Strange to say, both advances are poured forth to you from the fertile lap of electricity. It behoves you to be up and doing in this matter ; and if the seed here sown to-night shall bear fruit I shall be more than glad that it has been my good fortune to have called to your attention the new and wondrous field of investigation opened out to your view by the discovery of the X ray.—*Dental Comos.*

ANSWER TO CORRESPONDENT.

Geo. A. Sullivan, Albany, New York.—The annual meeting of the British Dental Association will be held in London, August 12th, 13th, 14th, 15th. It is the important meeting of the year of British dentists. Cataphoresis has not attracted much attention.

ILLUSTRATIONS OF
MR. DOUGLAS E. CAUSH'S PAPER.

FIG. 7.
Section of tooth where tissue has been slowly deposited. As it is perfectly calcified there are few lacunæ; *a* shows point of re-absorption; *b* a similar excavation with osteoclast in situ.

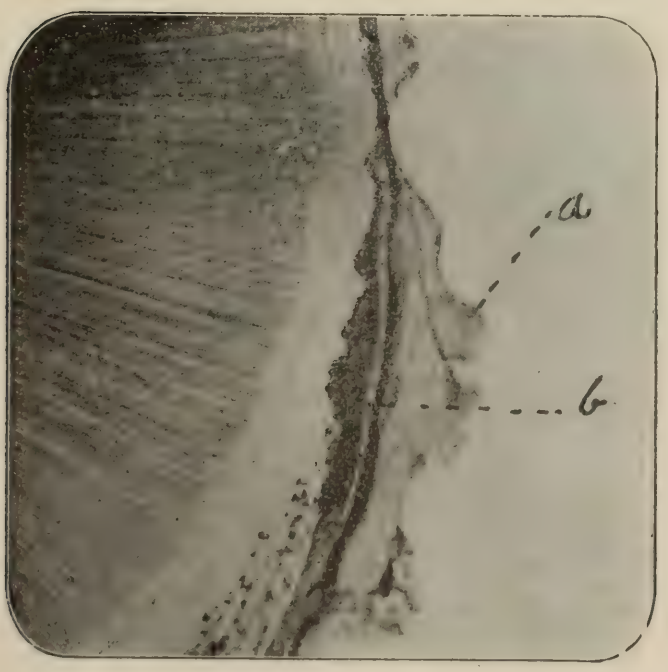

FIG. 8.
This section shows—*a* thickened alveolar dental membrane; *b* new tissue deposited in excavations produced after exostosis has commenced.

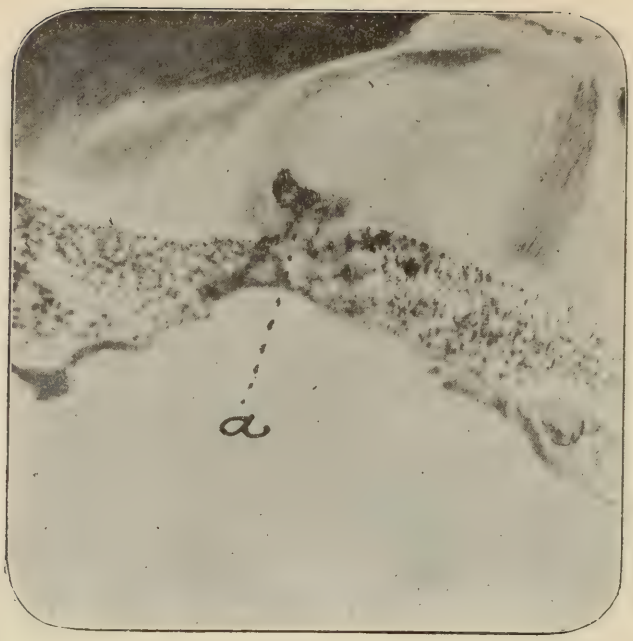

FIG. 9.
This section shows the way in which inostosis is produced; *a* is osteoclasts in situ.

FIG. 9A.
Similar to the last in a later stage with the semi-lunar spaces; *a* filled with cemental tissue; *b* cavity containing softened tissue.

FIG. 10.
This section shows inostosis after exostosis has taken place.

FIG. 11.
This section shows absorption of cementum and dentine by alveolar abscess.

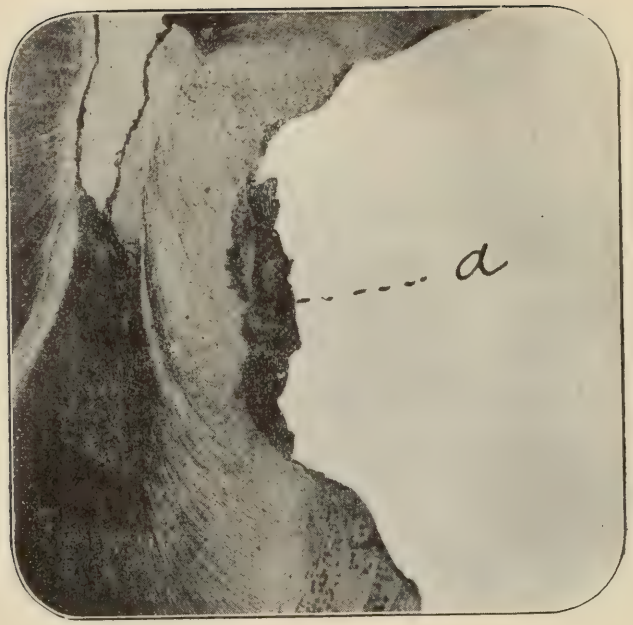

FIG. 12.
Deposition of new tissue at *a* in large cavity produced by alveolar abscess.

FIG. 13.
Shows canal passing through the dentine at right angles to the pulp canal, and lined with cemental tissue.

THE DENTAL RECORD.

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Original Communications.

EXOSTOSIS.

By Mr. DOUGLAS E. CAUSH.

(Continued from page 292.)

Should the deposition of any one portion of the tissue be more slow than that of the surrounding tissue the same thing occurs, we get more perfect calcification of the cementum at that point. It is not an unusual thing to find a large number of lacunæ with their canaliculi formed immediately after the preceding time of rest, these gradually becoming less in number until there is another time of rest, so giving some idea of the way in which the tissue has been developed. Instead of the new tissue being deposited in this way, it is sometimes found that there are osteoclasts again developed in the alveolar dental membrane, and these absorb a portion of the newly deposited tissue previous to a fresh formation, leaving semi-lunar markings upon the outer edge of the tooth. Should the tooth be extracted at this stage of the development and a section made it will appear somewhat as seen in Fig. 7.

If, instead of the tooth being extracted while in this condition it continues in the mouth, after the acute attack of periostitis cementoblasts are again developed in the membrane, and a fresh layer of cementum is deposited. (We have a good illustration of this change as seen in the section Fig. 8.) So these changes may continue for months, or even years, and leave behind them indelible markings in the tooth thus affected.

Instead of all or any of these changes taking place the point of absorption may be very much restricted, or the absorption may commence at that part of the root where the calcification of the original tissue has been very imperfect, and as a result of this a deep yet restricted area of absorption takes place. This goes on until it

reaches the intergranular layer of the dentine, and here, frequently at the point where the absorption has reached the dentine, is a portion of softened or uncalcified tissue, this is rapidly dissolved away by the osteoclasts, and a yet deeper and somewhat semiluna-shaped cavity is produced. As soon as the more dense tissue oppose the osteoclasts they cease their functions, and after a time new tissue, cemental in character, having an abundance of lacunæ and canaliculi, is produced, and the whole of the space previously produced by the absorption is filled with cementum.

The great difference between this and the absorption seen in the earlier stages of exostosis is the definite line of demarcation produced thus, both in the cementum and dentine, as contrasted with the irregular line of absorption as seen in exostosis. Mr. Geo. Henry, of Hastings, was, I believe, the first to draw attention to this alteration of the tissues, and gave to it the name of Inostosis. Fig. 9.

So far as my microscopic slides show, this form of absorption takes place much nearer the neck of the tooth than exostosis usually commences, and I think this may be one explanation of the cause of the restricted area of absorption, all the tissues being more dense near the neck than at or near the apex of the tooth, it is, therefore, only when the inflammation of the alveolar dental membrane occurs over an imperfectly calcified portion of the tooth that the absorption takes place.

I have also a number of slides showing that this form of absorption sometimes takes place after there has been a certain amount of exostosis, the absorption passing through the deposited cemental tissue into the dentine, and in the space thus produced another layer of cementum is deposited, similar in character yet with a perfect line of demarcation, showing that this must have occurred after the deposition of the tissue called exostosis has taken place. In some cases I have no doubt this absorption is the result of a very severe attack of periostitis. Fig. 10.

We must be careful not to confound these markings with those produced by the more acute form of inflammation and suppuration known as alveolar abscess. Wherever there is a chronic abscess near or pressing upon the roots of the tooth we have absorption, and this absorption is, as a rule, more general and covers a larger area than in those cases known as inostosis. In these cases it is not

at all unusual to find not only the cementum absorbed away but the absorption may have gone on into the dentine as in Fig. 11, and in some extreme cases we have found the absorption has not ceased until the pulp canal has not only been reached but even a portion of that has been also absorbed away. Again, in some of these cases, nature appears to have tried to produce a remedy by depositing in these extreme cases of absorption new tissue still cemental in character. Fig. 12.

In exostosed teeth it is not at all an unusual thing to find the canaliculi of the lacunæ of this new tissue anastomosing with some of the finer branches of the tubuli of the dentine, and thus forming a network of minute canals from the alveolar dental membrane to the pulp canal, these canals are I believe used for the purpose of conveying nourishment to the dentine as well as to the cementum, where the pulp is either dead or in that condition that it is unable to supply the necessary nourishment to the tissues; I have also found in many cases, where there has been a large deposition of new tissue, that this new tissue has enclosed within it a number of canals passing in different directions, these canals usually have living membranes, and to all appearances are blood vessels of the alveolar dental membrane; in these cases it would appear as if it were easier for the new tissue to be deposited around the vessels than to either stop them up by restrictions or to get rid of them by the absorption of their walls.

There may also found at times canals of quite another character, passing directly from the pulp canal, at right or acute angles to the canal through the dentine into the cementum; in this case the contents of the canals are similar in character to the pulp itself, and may be the cause of grave complications when the pulp is being destroyed, as it is not at all unusual to find the canals have large openings on the outer side of the cementum allowing the exit of any drugs that may have been placed in a carious tooth for the purpose of destroying the pulp. In some cases I have seen these canals enlarged and a layer of cementum lining the cavity of the pulp and surrounding the canal as in Fig. 13.

To treat of the external contour of exostosed teeth fully would not only be out of place, but it would be quite impossible in a paper of this kind, as the variations are so great, owing to the difference in the shape of the roots, of the amount of tissue deposited, or of

variations of the deposit. Though we have no two teeth in which the new tissue is deposited in quite the same manner, yet there are teeth we may look upon as being in some measure typical in the deposition of the new tissue ; thus, we may have this tissue deposited at or around the apex of the root, as in A, Fig. 14, causing destruction of the pulp by compressing it, and as a consequence though the deposit may be small in quantity yet the pain would be very acute, or there may be a gradual expansion of the tissue at the apex and gradually and evenly spreading in a regular manner towards the crown of the tooth, but diminishing in thickness as it approaches the latter, B, Fig. 14, this may form a cap at the apex of the root or continue to spread until two or more roots of an upper or lower molar are entirely enclosed by the tissue, C, Fig. 14.

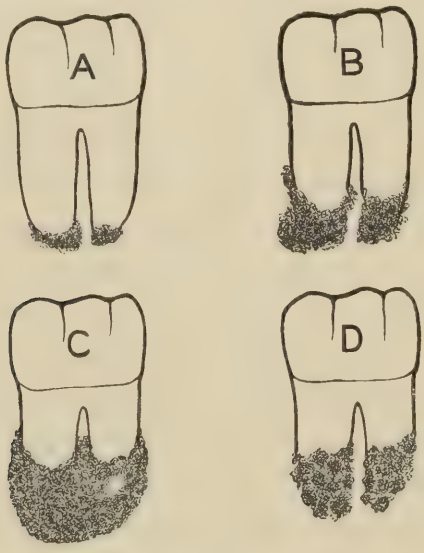

FIG. 14.

"Diagramatic" *a b c* way in which the new tissue spreads externally ; *d* nodular exostosis.

It is a very unusual thing to find the roots of two teeth united by exostosis, though the most common form of exostosis is to find two or more roots of the one tooth united.

I think this may be accounted for by the fact that the changes taking place in the alveolar dental membrane are usually in that portion of the membrane nearest the cementum, the portion of the membrane nearer the alveolus is not so easily acted upon, and is less active than the surface attached to the cementum ; should the alveolus, as a result of the large increase of the cemental tissue be entirely absorbed away between the roots, and as a consequence the

two surfaces touch each other, even at this point there is a double fold of the membrane which is continuously lubricated, and there is a more or less continuous movement over each other during the process of mastication, this, with the continual movement of the teeth in the jaw, prevents any union of two or more distinct teeth in either jaw.

Of course, there may be exceptions to this rule, and occasionally the roots of two adjoining teeth are united by exostosis, but up to the present time I have had no opportunity of microscopically examining any such specimens as none have come under my immediate notice during the nine years I have been examining exostosed teeth, nor have I during that time found any true bony union between the roots of exostosed teeth and the alveoli ; in all the cases I have examined microscopically there has been nothing but a membraneous union as seen in Fig. 1.

There is still another form of exostosis, spoken of as nodular, where we have the surface of the roots more or less covered with nodules of cementum ; these nodules may not be larger than the head of an ordinary pin, or may be as large as a split pea. I have found these nodules from about one-twentieth of an inch to one-eighth of an inch in diameter, they do not appear to be developed in any regular or systematic manner, but apparently the nodules are scattered over the surface of the roots in a most irregular manner, both with regard to the amount deposited as well as to the position of the nodules. In these cases it is unusual to find the original layer of cementum absorbed away so deeply as in some of the other forms of exostosis, frequently there is only enough absorption to roughen the surface of the cementum, these roughened depressions are afterwards refilled, and a certain amount of new tissue built upon the foundation thus laid. It would appear as if in these cases the point of irritation had been very restricted, and the time taken for the absorption probably very short ; but at the same time, the inflammation of the membrane, though restricted, has been very acute, this form of exostosis D, Fig. 14, causes much more pain during the time the changes are taking place than any of the other methods of deposition, excepting in those cases where we get construction of the pulp in the earliest stages, caused by the new tissue forming at the apex of the root, or at that point of the root where the pulp enters the pulp canal.

So far as my examination has shown, teeth are subject to exostosis in the following order, commencing with those most subject to the change: —Third molars ; second bicuspids ; second molars; first bicuspids ; first molars ; sup. canines ; sup. central incisors ; sup. lateral incisors.

In the case of the last three on the list I have found the roots of those teeth where the crown has been decayed down to the gum line more frequently exostosed than in those where only a portion of the crown has been removed by decay, this, with the fact that the roots of those teeth that have no crowns posterior to the canine have usually a large amount of general exostosis, lead one to suppose that it is not at all unusual for exostosis to continue, or, even commence, after the death of the pulp.

In my concluding paper I shall draw attention to certain changes that take place in and around the pulp canals of the exostosed teeth of man and other animals.

CATAPHORESIS.*

Cataphoresis for obtunding sensitive dentine and bleaching teeth has recently been attracting a large amount of attention, and has awakened widespread interest in America, no fewer than seven articles and papers having been devoted to it in the *Dental Cosmos* and five in the *International Dental Journal* during the present year, but little or no notice has hitherto been taken of it in the English dental journals. This is somewhat surprising in view of the latent conviction that electricity is opening up for us a new era of splendid possibilities in every department of human life. Though cataphoresis has only within the past twelve months become a burning question—even in America—it is nevertheless no newly discovered method, for as far back as 1833 a Frenchman introduced iodine in this manner, and in 1859 Richardson used the method ; coming down to later times, articles at distant intervals have appeared in the American journals since 1887.

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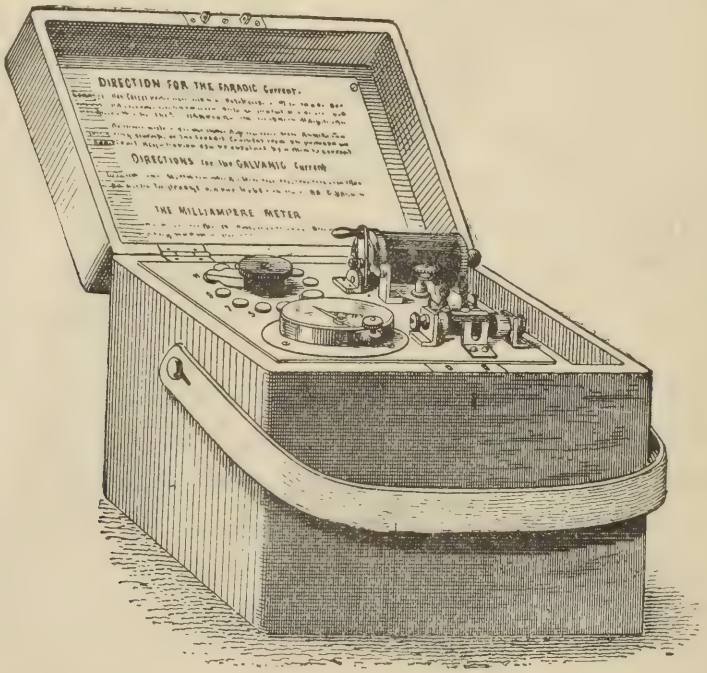
* This article is a compilation from the various articles in the *Dental Cosmos* and *International Dental Journal*, referred to in the first paragraph, to whom the Compiler expresses his acknowledgments. Its object is to give as pithily as possible sufficient information to guide those who wish to try the method.

Cataphoresis, or electrical osmosis, may be described shortly as the passing of a medicinal substance by the aid of electricity through organic tissues in the directions of the flow of the current. Dr. Peterson states (in his article on the "International System of Electro-therapeutics"): "it seems to be a purely physical process, and has nothing to do with electrolysis." The term cataphoresis is derived from two Greek words, "kata" downwards, and "phoresis" from "phorein," to bear, to carry, to bring: cataphoresis then is the flow of fluids from the positive to the negative pole. The method has been employed to a very considerable extent by men of such acknowledged repute as Prof. W. J. Morton, Dr. Louis Jack, Dr. Gillett, and others who have reported quite a long list of successful cases.

Apparatus.—Apparatus which may be used for cataphoresis at other parts of the body is of little use in the living tooth, because the living tooth is much less tolerant of the current. It responds promptly to currents imperceptible in most other tissues. The apparatus must be so arranged that we may begin by applying an imperceptible current, and increase it by minute gradations till we reach a point enabling us to attain our object. This point need not be high; a fraction of a milliampere actually passing through the tooth for a sufficient length of time will accomplish the purpose. If, however, the subject is not too sensitive to the influence of the electric current, one or two milliamperes will do the work more quickly, and even three or four may be used in individual cases without discomfort to the patient. This quantity of current is reached in only a small proportion of cases, however. Note that the quantity of current specified is that actually passed through the tooth, the capacity of the apparatus needs to be much greater in order to force this quantity through the tooth and other tissues.

Battery.—Having regard to the extreme sensitiveness of a living tooth and the fact that the street current is a varying one, Professor Morton prefers a battery. He recommends a Leclanche battery of 30 or 40 cells, but adds, any other good battery will answer every purpose. Mr. Peter Brown, of Montreal, recommends a chloride of silver dry battery of 25 cells, stating that it will last two years and may then be renewed at less than one-third of the original cost. Dr. Louis Jack also recommends the same form of battery, and says, "it is well known that the chloride of silver cell is best adapted

to medical purposes as having an agreeable ratio between the voltage and the ampèrage, the voltage of each cell being one, and the ampèrage between one-fifth and one-fourth. It is always constant, which means there is no polarization, and that it does not

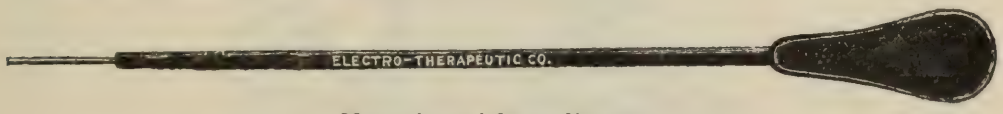


Box, 11 in. × 9 in. × 9 in., containing 25 dry cells, non-short circuiting dial collector, milliamperemeter, current reverser and cords.

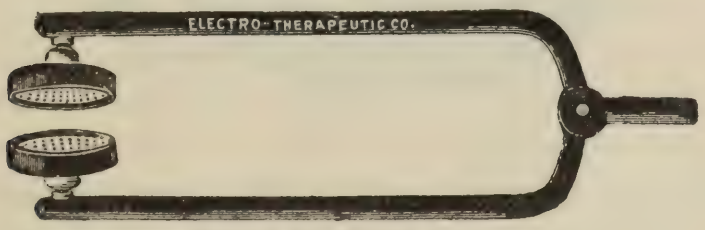
decline in power until nearly exhausted. No fumes are emitted, and there is no 'creeping' of the electrolyte to interfere with the action. Moreover the cells are 'dry.'" Dr. Gillett, on the other hand, uses the 110 volt street current with suitable controller. But the street mains seem objectionable, not only on account of inequality of pressure, but also because of the liability to short circuit, and the danger—a very real one—of severe shock from earth currents.

Electrodes.—Those devised and invented by Prof. Morton consist of an "indifferent," or "dispersing," electrode, and "active" electrodes. The small dispersing electrode is a circular disc of carbon three inches in diameter, covered with two layers of amadou, bound at the edges by an insulated wire pressing into a groove. This is large enough for anæsthetising the gums or sensitive dentine. For large areas of skin a larger dispersing pad electrode, say 6 by 6 inches, should be procured. The active electrodes vary in shape according to the purpose to which they are put, but retain the special device of perforations to hold solution, &c.

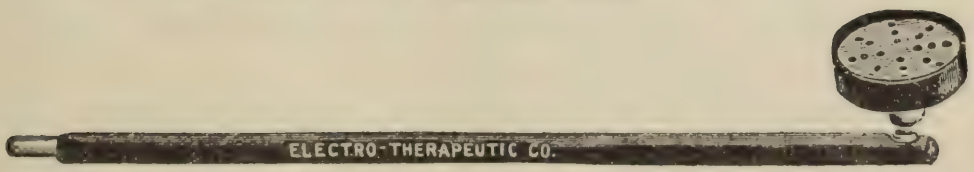
For the skin, flat single plates of carbon or block tin of circular shape suffice. For the mouth in general, a flat electrode resembling a mouth mirror is convenient. For the gums, for use during extraction, implantation, &c., the electrode is made tong-shaped, and, unlike any electrode of this shape formerly constructed, both plates are of the same polarity. The carbon, or block tin, in the active electrodes is one-fourth of an inch thick, and is either perforated freely to about two-thirds of its depth by drill holes one millimeter in diameter, or is perforated completely, and a shallow reservoir provided behind it to hold an excess of solution. The body of the electrode is of ebonite, raised two to three millimeters at the edges of the plates to form a cup, into which is inserted a piece of soft and porous blotting paper, cut to fit exactly, or a soft piece of felt or other absorbent material. For sensitive dentine the active electrode is a small stiff piece of platinum wire, tubular at its end, and perforated from the sides into the tube in order that it may hold an excess of the solution. Around the end of this "applicator" is wrapped a pledget of absorbent cotton. These constitute in the main all the electrodes necessary, modifications for special cases will suggest themselves.



Morton's straight applicator.



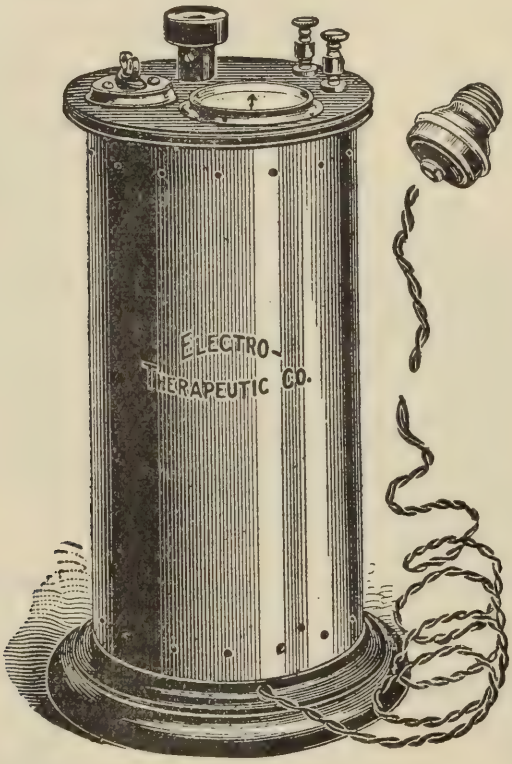
Morton's tong-shaped duplex.



Morton's mouth cataphoric electrode.

Rheostat or Current Controller.—If the current from the street mains is to be used, Professor Morton gives preference to the "Wheeler Fractional Volt Selector." This same apparatus is equally available with a battery current. Its chief utility is in relation to sensitive dentine, when it is of highest importance that the initial voltage employed and current strength attained shall

not cause pain. But in relation to the skin and mucous membrane any ordinary rheostat will answer the purpose. Again, it is quite possible, to one at all familiar with his "galvanic battery," to use the ordinary cell selector to bring into circuit a limited number of cells (thus working with a low voltage), and to regulate the flow of



Volt-selector.

current from this small number of cells by aid of common water rheostats, provided that ample sponge tips break the strength of the first water contact. An instrument like the fractional volt selector, however, saves trouble and annoyance.

Milliamperemeter.—Not only is it necessary to regulate the voltage employed, but also it is equally essential to have an instrument to record the rate of the flow of the current attained. This of course varies according to the voltage, or, what is more important, according to the resistance, which in this case is the tissue. This rate of flow, termed "current strength," is measured in amperes, and in medical and dental work in thousandths of an ampere, namely milliamperes. A very small fraction of a milliampere causes pain in sensitive dentine. No reasonable idea of "dosage," nor means of

comparison with other cases, can be had without the record of a milliamperemeter. It is a constant guide to the administrator. Any good milliamperemeter will suffice, but its scale should be large and easily read. An instrument recording from one up to ten milliamperes is preferable. The following case shows the advantage of a milliammeter. A clamp was attached to a lower first molar outside the dam ; a current of three-tenths milliampere was indicated in the meter. A few minutes later, on glancing at the milliamperemeter, a current of three and one-half milliamperes was indicated. This showed a short circuit somewhere ; it was found in a hole in the rubber dam, made by the point of the clamp.

Solutions and Fluids.—Aqueous solutions of from 4 to 30 per cent. of hydrochlorate of cocaine may be used. Professor Morton, by combining guaiacol and anhydrous hydrochlorate of cocaine, has found what seems to be a new compound rather than a solution. To secure uniformity of action (for some guaiacols are far more irritating than others), the solution of compound is termed guaiacocaine. It is a 10 per cent. mixture of hydrochlorate of cocaine in pure guaiacol ; this percentage may, if desired, be increased to 30 per cent. This solution, as above given, answers every purpose for producing perfect anæsthesia of dentine and of the skin, but for use upon mucous membrane it should be diluted to at least one-half, or otherwise slight and superficial destruction of tissue may ensue. He uses for dilution a 10 per cent. solution of cocaine in glycerol, mixing it with guaia-cocaine in equal parts. Professor Morton makes the following remarks in respect to the combination of guaiacol and cocaine :—"In my experiments upon soft tissues, as well as upon dentine, I find that guaiacol to which cocaine is added enables me to reduce the time ordinarily required to produce anæsthesia about two-thirds, and, what is still more important, enables me to reduce the current strength of electricity required also two-thirds. The important feature of guaiacol in soft tissues is that it unites chemically with the cocaine and thus prevents quick absorption into the general circulation and consequent toxic effects. To prove this assertion, take a 10 per cent. solution of hydrochlorate of cocaine and shake it for a considerable time with an equal bulk of water. One-eighth of the cocaine only will be found to have gone to the water, and seven-eighths to have remained with the guaiacol. This is a very remarkable fact, and it bids fair to open the way to the

adoption of electro-guaiacol-cocaine anæsthesia as really a practicable and useful procedure in minor surgery, since aqueous solutions on large electrodes might allow too much absorption."

Mr. Peter Brown writes of guaiacol-cocaine solution, that in his experience no better results were obtained by this combination ; it was also ascertained that guaiacol was not a preservative of cocaine, and the solution decomposed. The odour of guaiacol is also very objectionable, but Dr. Wendell Phillips states the odour may be overcome by combining the guaiacol with oil of pine. A saturated solution of cocaine Mr. Brown regards as the best agent to employ, made immediately before using by saturating one-sixth or one-eighth grain with enough water to dissolve it, and absorbing it on cotton sufficient to fill the cavity under treatment.

Technique.—Skin.—Using aqueous solutions of cocaine, the skin must first be thoroughly washed with soap and water. When guaiacol is employed this is unessential.

Mucous Membranes.—No preliminary preparation of the mucous membrane is required. As to the active electrodes, the solution is first dropped into the perforations until they are full ; the absorbent material is then fitted to the shallow ebonite cup or wrapped about the applicator, and a liberal supply of the solution dropped upon it. They are now ready for use. The flat electrode is applied directly over the spot to be anæsthetised and pressed with some firmness against it, as for instance, on a cheek affected by cancrum oris. In the case of the tongs electrode, some care is requisite to secure a proper adjustment and to secure uniform action. It is well, after the electrode is in place, to pack in absorbent cotton, not too wet with solution, to fill up inequalities of contact, or to bridge over (in certain cases) the gap between the blades. For dentine, the cavity is first filled (a rubber dam should be used) with a pledget of absorbent cotton dipped in the guaia-cocaine solution (avoiding a surplusage and yet not too dry) ; the applicator itself should then be dipped in the solution until it holds all it can, and a small layer of cotton wool be twisted about its end. During treatment the current may be turned off, possibly twice, and the pledget in the cavity be freshly dipped in the solution, or if the operator uses his own applicator, this pledget may remain in situ and the fresh supply be furnished by removing and dipping the applicator itself into the solution ; or, better still, a few drops of fresh solution may be from

time to time dropped on to the tip of the applicator by aid of a pipette, thus avoiding entirely, what is certainly objectionable, any interruption of the flow of the current. The dispersing electrode may be held in the hand, and placed by the operator upon the cheek, or beneath the lower jaw, or upon the chest or back, or, in short, anywhere at a reasonable distance from the active electrode. The latter, the active electrode, is to constitute a positive pole, and the former a negative pole. To determine the polarity, apply a few drops of a saturated solution of iodide of potassium to a piece of paper and test the two terminals of the cords; free iodine will appear at the positive terminal and be recognised by its colour. Or test in the same manner by aid of a piece of litmus paper wet with water; the positive terminal will turn the paper red, the negative will turn it blue. Everything now being ready, the connections tested and polarity having been carefully determined beforehand, the current may be "turned on" most gently and gradually.

In the case of sensitive dentine, skill, carefulness, and experience are essential. The first onset of the current may at the best cause a slight burning pain. To avoid this contingency, it is well to give the solution five minutes' time to effect superficial anæsthesia prior to applying current. The applicator is adjusted, and the current, which cannot be too gradually applied, is then brought into circuit. The patient will then feel a slight burning sensation, which in a moment will subside, when more current may be added. Each accretion of current during the first five minutes will cause the same sensation. Thus the treatment is to be followed up step by step, consulting the patient as to the slight pain, until, in about five or seven minutes' time, it will be found that the current strength may be largely increased without causing any sensation whatever. At this time Prof. Morton carries the current up from two to two and a half milliamperes, and, after two or three minutes, at this current strength, considers the dentine sufficiently benumbed to endure operative procedures without pain. A point of prime importance is to avoid movements or removal of the applicator during the current flow; for, as is well known, a "steady" current produces no reaction of motion or sensation, while a "varying" current produces these reactions most unpleasantly to the patient.

With these hints in mind, and with a little experience, not only dentine, but the contents of the pulp cavity, and even the tissues

outside of the tooth, may be effectually anæsthetised via the pulp chamber. And it may be mentioned, in passing, that not only may anæsthetic substances be thus employed, but also any other remedy, germicidal, antiseptic, escharotic, etc., which it is desired to apply to the tissues above named.

Hints.—(1) Dr. G. A. Maxwell relates an unpleasant experience: A lady patient, who held the electrode in her left hand while not more than 15 volts of current were being applied, complained, after the operation, of severe pain in the finger, and removed her wedding ring, when quite a blister was discovered on the back of her finger. As a longer time than usual was required for the application, possibly the action under the finger retarded the action in the tooth. There should be no rings on the hand in which the electrode is placed.

(2) Do not pass the current through metal fillings.

Illustrative Cases.—Patient of extremest hyperæsthetic state. Experiment 1.—Deep crown cavity in second superior right molar, almost to the horns of the pulp of the buccal root. Very sensitive, especially as it approached the horn of the pulp. Electro-guaiacol-cocaine anæsthesia, seven minutes in two applications. Result, perfect anæsthesia to hand excavation. Patient experienced no pain from the current. Experiment 2.—First right superior bicuspid, posterior approximal and crown cavity. Had been attempted to prepare the tooth at a previous sitting, but on account of the extreme sensitiveness, work had been abandoned before the cavity had been entirely excavated; the bottom of the cavity was covered with asbestos paper, over which was packed a filling of gutta-percha. On removal of the filling, after having been in place about six weeks, the tooth was exquisitely sensitive to the slightest touch.

Electro-guaiacol-cocaine anæsthesia. The first approaches of the current (not noted on the milliamperemeter) gave severe pain, which gradually subsided, and each subsequent increase of current caused pain. Three applications of cotton were made. After seven minutes of about one-tenth of one milliampere, Dr. Morton was able to carry the current up to two-thirds of a milliampere without pain. Complete anæsthesia.

(Taken from the Report of Meeting of First District Dental Society, State of New York.)

Dr. H. W. F. Cady: It seems to be my duty to make a few remarks on this subject. You heard Dr. Phillips speak about the

beautiful experiment made in his office. I was the patient on whom the experiment was made. I had a cavity in the buccal surface of a third molar, which I could not allow anything to touch. Putting my finger nail into the cavity would cause excruciating pain, I was a little shy of having cocaine used, because I have always been very sensitive to the effect of it. I remember once having placed a four per cent. solution on the tip of my tongue, and in a short time it produced a very irregular action of my heart; in fact, the heart seemed to miss every third beat, and I feel sure that the hypodermic injection of cocaine would kill me. Dr. Gillett performed the experiment on this sensitive cavity in the third molar. He placed a pledget of cotton, saturated with a ten or twenty per cent. solution in the cavity, which was so sensitive that even the cold (it was a cold solution) irritated it very much. He applied the current, and the effect was marvellous. I could feel the vibrations of the current on the tooth. It was similar to the flickerings we notice in the electric light in the street. When Dr. Gillett would ease the current a little, the pain was not so great. The pain was similar to the blowing of cold air into the tooth from an air syringe. I could feel the current, and it was quite painful when it was applied with force. In about fifteen minutes the cavity was obtunded to such an extent that the doctor went in with an excavator where I could not allow him to touch it before, and excavated with a great deal of force. It had the same sensation as when one trims a finger nail, and did not hurt me at all. I believe that cataphoresis will revolutionise the practice of dentistry, and one of the best ways for a doctor to prove it is to have it tried on himself, if he has a sensitive tooth. I think in a short time all dentists will have to have this apparatus in their offices.

Mr. B., aged twenty, highly nervous, presented a first left superior bicuspid anterior approximal cavity. History of toothache for two days, on examination pulp was found exposed; the dam was applied and cavity wiped dry. At this time the tooth was giving severe pain. A pledget of cotton, saturated with the cocaine solution, was applied, and the current turned on. In less than one minute the pain had ceased; the current was allowed to pass through for fifteen minutes. At the end of this time the application was removed and the pulp was found completely anæsthetised; it was removed with broach and drill, and the cavity immediately filled.

Mr. H., aged eighteen, approximal cavity in central incisor, exceedingly sensitive, could not bear the slightest touch of excavator or bur. At this time a water rheostat was being used, and the current was derived from a ten volt dynamo; by reducing the speed a current of five volts was attainable. This was the voltage of the current first used on this case. With the rheostat set at its highest resistance the patient could not stand the current, giving marked evidence of pain on the first contact. Later, a dry current controller was procured, and the current taken from a storage battery of ten cells. This battery was provided with a cell selector or switch board, by which the voltage could be varied from two to twenty volts. The same case was then treated; the current had to be first reduced to the pressure from one cell or two volts, then again reduced by the rheostat. This current was easily tolerated by the patient, and was increased, after ten minutes' application, to ten volts. It was found necessary to treat this tooth for thirty minutes before the dentine was anæsthetised. Six cavities were filled for this patient, and each one of them required the same treatment.

Miss M., cavities in both superior left bicuspids. After the dam was applied to these teeth only, a clamp was put on the first molar. To this clamp was soldered a wire having two branches from its end; these were tipped with platinum. After cutting away the edges of the cavities and placing the cocaine in them, the two ends of the wire were arranged so as to have a tip in each cavity. By this means both teeth were treated at once, and much time saved.

A FURTHER prosecution under the Dentists Act has been undertaken by the British Dental Association at Cardiff. The defendant was Templar Malins, of Woodville Road, Cardiff, who carried on business as a chemist at 107, Woodville Road, and exhibited outside his shop the words, "Popular Dentistry." A member of the Dental Association had been given at the shop a card bearing defendant's charges for extracting teeth with and without gas. The facts were admitted by the defence, and in mitigation, Mr. Jackson urged that there was no desire on the part of Malins to make his clients believe that he was a fully-qualified dentist. Defendant was fined £5 and costs, or in default one month's imprisonment.

THE DENTAL RECORD, LONDON: AUG. 1, 1896.

THE NEW REGULATION FOR THE L.D.S.ENG.

THE new regulations for dental students who may register after January 1st, 1897, passed by the Council of the Royal College of Surgeons of England at its meeting on July 9th, present, perhaps, more radical changes than have previously been made. It has long been felt that the Dental Examination of the English College was inferior in arrangement to that of the other British Colleges, for, while they have for many years divided the examination into parts, the English board has contented itself with making the one examination more complicated and, in some senses, more unsatisfactory. An examination which, in theory at least, pretends, at one and the same time, to test a man's knowledge in surgery, anatomy, dental theory and practice, operative and mechanical, is bound either to be a hollow sham in whole or in part, or else to present an absolutely impassable barrier to the ordinary student. Nor can we pretend that the new regulations will remedy this condition of affairs. It is true the examination in Dental Mechanics is to be separately taken in conjunction with a new subject, dental metallurgy; but as this need not be passed till within six months of the final it can scarcely do much to ensure a more prolonged period of preparation for this latter examination, indeed, is more than likely to limit the average student's work to precisely this period. In our opinion the interval between the two examinations should have been at least twice as long. It is possible, perhaps we may even say probable, that many may take this first examination at an earlier period, but it must not be overlooked that the introduction of a Preliminary Science Examination, which we presume, though this is not stated, must precede the professional examinations, will

tend to delay the preparation for the theoretical portion of the first of these. It is true this may and really should be taken during the three years of pupilage, but we believe that it will be difficult for many to obtain the certificates required under Section II. unless many more institutions are recognised than is now the case. Thus, though we welcome the steps which the Council have seen fit to take, we cannot regard the matter as finally settled: the final examination remains, as it has always been, a farce, in that it pre-supposes and on paper requires an adequate knowledge in general subjects, while the condition of the curriculum and the mixed nature of the examination render the attainment of this almost an impossibility. This examination must be divided; General and Dental Anatomy should precede the surgical subjects by at least six months. Nor need this require any alteration of the existing requirements nor increase of expenditure. Whether the examiners take one man in four different subjects or two men in two different subjects does not appear to an ordinary mortal to make any difference.

With regard to the additions to the curriculum it is rather early to pass comment. In themselves they appear useful, but the extent of the usefulness depends largely on the synopses which have yet to be published. Incidentally the whole of the alterations raise the question of lengthening the period of study. To take full advantage of this curriculum two years' hospital work seems insufficient.

News and Notes.

Wm. Rushton, L.D.S.Eng., has been appointed to be Dental Surgeon to the National Dental Hospital.

J. Hilditch Matthews, L.D.S.Eng., has been reappointed House Surgeon of the Birmingham Dental Hospital.

THE Annual Distribution of Prizes of the Charing Cross Hospital, took place on the 15th ultimo. The Dean, in the course of his report, stated that 86 students had joined School during the past year, of whom 20 had been "general," 21 "dental," and 43 "occasional." The average daily attendance had been about 180. Mr. Justice Vaughan Williams presided and delivered an interesting address, comparing and contrasting law and medicine. In the list of awards we are glad to notice the names of several dental students.

ANNUAL MEETING OF BRITISH DENTAL ASSOCIATION.

PROGRAMME OF PROCEEDINGS.

Tuesday Evening, August 11.

9 p.m.—Conversazione at the Whitehall Rooms, Hôtel Métropole, Music, &c.

Wednesday, August 12.

9.30 a.m.—Meeting of the Representative Board in the Council Chamber of the Examination Hall.

11 a.m.—First General Meeting in the Theatre of the Examination Hall. Presidential Addresses.

Reports and business.

1.20 p.m.—Adjournment.

The London members will entertain the Provincial members and ladies at luncheon at the Hôtel Métropole.

2.30 p.m. to 5 p.m.—Reading and discussion of Papers.

9 p.m.—Reception by the President of the Association and Mrs. Canton at the Royal College of Surgeons of England, Lincoln's Inn Fields.

Thursday, August 13.

9.30 a.m.—Annual Meeting of the Dental Benevolent Fund in the Council Chamber of the Examination Hall.

10.30 a.m.—Second General Meeting in the Theatre for the reading and discussion of Papers.

Microscopical Section in Theatre. Papers. &c.

1 p.m.—Adjournment.

The same arrangements for luncheon as on the previous day.

2 p.m. for 2.30 p.m. precisely.—Demonstrations at the Examination Hall. [Second floor suite of rooms.]

4 p.m.—Adjournment.

5 p.m. to 7.30 p.m.—Garden party given by Mr. and Mrs. J. Howard Mummery at Manor House, Southall, Middlesex.

Friday, August 14.

10 a.m.—Excursion for Ladies to Knockholt Beeches at invitation of Dr. and Mrs. Walker.

10 a.m. for 10.30 a.m. precisely—Demonstrations at the Examination Hall.

1.20 p.m.—Adjournment.

The same arrangements for luncheon as on the previous day.

2.30 p.m.—Third General Meeting. Papers. Discussions. Concluding business.

7.15 p.m.—The Annual Dinner at the Whitehall Rooms, Hôtel Métropole.

9 p.m.—Ladies' Entertainment in the Whitehall Drawing Room.

Saturday, August 15.

Excursion by saloon Steamer "Queen Elizabeth," at 10 a.m., from Westminster Pier for a short trip down river to view the Tower Bridge, the Tower of London, Customs House, and shipping in the Pool. At 10.30 a.m. to Twickenham and Richmond, where luncheon will be served at 1.45 p.m. at the Star and Garter Hotel. Returning to Westminster at 7.30 p.m.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

New Regulations for the License in Dental Surgery.

A Quarterly Meeting of the Council was held on July 9th, the President (Mr. Christopher Heath), being in the chair.

Mr. Bryant, Mr. Davies-Colley, and Mr. Pick were introduced and made a declaration in the terms of the oath prescribed by the Charter of 1800, and took their seats as members of the Council.

The third, and final, report of the Committee on the Dental Surgery Regulations was presented and approved. The report recommended the adoption of the following regulations, and that they should be made applicable to all candidates who may register as dental students on or after January 1st, 1897.

Regulations.

I. There shall be a Preliminary Science Examination and two Professional Examinations for the License. The Preliminary Science Examination shall consist of chemistry, physics, and practical Chemistry. The First Professional Examination for the License shall consist of mechanical dentistry and dental metallurgy; and the second of dental anatomy and physiology, dental pathology and surgery, including operative work, human anatomy and physiology, and surgery, including pathology. (Candidates will be required to show a general knowledge of the anatomy of the whole human body.)

II. Candidates will be required to produce certificates of having received instruction at an institution recognised for the purpose in chemistry, physics, and practical chemistry before entering for the Preliminary Science Examination. (This instruction may be taken prior to the date of registration as a dental student.)

III. Candidates will be required to produce the following certificates before entering for the First Professional Examination, viz.: 1. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of mechanical dentistry under the instruction of a competent practitioner or under the direction of the superintendent of the mechanical department of a recognised dental hospital where the arrangements for teaching mechanical dentistry are satisfactory to the Board of Examiners in dental surgery. In the case of qualified surgeons evidence of a period of not less than two instead of three years of such instruction will be sufficient. (This instruction may be taken prior to the date of registration as a dental student). 2. Of having attended at a recognised dental hospital and school: (*a*) a course of lectures on dental metallurgy; (*b*) a course of practical dental metallurgy; (*c*) a course of lectures on dental mechanics; (*d*) a course of practical dental mechanics, including the manufacture and adjustment of six dentures and six crowns.

IV. Candidates will be required to produce the following certificates before entering for the Second Professional Examination, viz.: 1. Of having attended at a recognised dental hospital and school: (*a*) a course of dental anatomy and physiology; (*b*) a

separate course of dental histology, including the preparation of microscopical sections ; (*c*) a course of dental surgery ; (*d*) a separate course of practical dental surgery ; (*e*) a course of not less than five lectures on the surgery of the mouth. (These lectures may be given either at a recognised dental hospital and school, in which case the lecturer must be a qualified surgeon practising surgery, or they may be given at a recognised medical school and may form part of the course required by Section IV., Clause 3 (*d*). 2. Of having attended at a recognised dental hospital or in the dental department of a recognised general hospital the practice of dental surgery during two years. 3. Of having attended at a recognised medical school—(*a*) a course of lectures on anatomy ; (*b*) a course of lectures on physiology ; (*c*) a separate practical course of physiology ; (*d*) a course of lectures on surgery ; (*e*) a course of lectures on medicine. 4. Of having performed dissections at a recognised medical school during not less than twelve months. 5. Of having attended, at a recognised hospital or hospitals, the practice of surgery and clinical lectures on surgery during two winter sessions. 6. Of being twenty-one years of age. (The certificates of professional study will be required to show that students have attended the courses of professional study to the satisfaction of their teachers.)

V. Candidates may present themselves for the Preliminary Science Examination before entering at a dental school on production of the certificates required under Section II. This examination will be identical with Part I. of the First Examination of the Examining Board in England.

VI. Candidates may present themselves for the First Professional Examination for the License after the completion of six months' attendance at a recognised dental hospital and school, on production of the certificates required under Section III.

VII. Candidates may present themselves for the Second Professional Examination on production of the certificates required under Section IV., after the completion of four years' professional study from the date of registration as a dental student and after the lapse of not less than six months from the date of passing the First Professional Examination.

VIII. Synopses of the examination in chemistry, physics, and practical chemistry, and dental metallurgy will be issued with the regulations.

FEES TO BE PAID BY CANDIDATES.

The fee for the diploma of the license in Dental Surgery is twenty guineas, and must be paid in the following manner :—

Preliminary Science Examination, each admission				£3	3 0
First Professional	„	„	„	2	2 0
Second „	„	„	„	5	5 0

The balance, if any, of the total fee of twenty guineas to be paid on the completion of the examinations.

After other business a letter was read from the President and Honorary Secretary of the British Dental Association asking the Council to permit the association to hold a reception at the College on August 12th. Permission was granted.

Mr. J. H. Targett was re-appointed Pathological Curator for the ensuing year.

The election of President then took place, and Sir William McCormac was elected ; and Mr. N. C. Macnamara and Mr. J. Langton were appointed Vice-Presidents.

THE DENTAL HOSPITAL OF LONDON.

A CONVERSAZIONE, which was also the occasion of the Annual Distribution of Prizes, was held on the 24th ultimo, at the Royal Institute Galleries, Piccadilly, Sir JAMES CRICHTON BROWNE presiding.

The DEAN read his report, in which he spoke of the continued success of the School, and referred to the various changes in the appointments, specially alluding to the election of Mr. James Smith Turner as Consulting Dental Surgeon in the place of the late Sir John Tomes, and the acceptation of the Lectureship on Dental Anatomy by Mr. Charles Tomes.

Sir JAMES CRICHTON BROWNE distributed the prizes as follows :— *Saunders Scholar*, Mr. R. L. Young. *Ash's Prize*, Mr. T. W. Thew ; Certificate of Honour, Mr. A. R. Heath. *Dental Mechanics*, 1st prize, Mr. F. J. Padgett, Mr. R. L. Young ; 2nd prize, Mr. A. R. Heath ; Certificates of Honour, Mr. T. C. Myers, Mr. P. R. Cooper, Mr. H. Dunlop, Mr. J. H. Robertson and Mr. J. C. Douglas.

Metallurgy, 1st prize, Mr. A. R. Heath; 2nd prize, Mr. R. L. Young; Certificates of Honour, Mr. T. C. Myers and Mr. F. W. S. Metcalfe. *Operative Dental Surgery*, 1st prize, Mr. R. L. Young; 2nd prize, Mr. J. Humphries; Certificate of Honour, Mr. A. R. Heath. *Dental Anatomy*, 1st prize, Mr. T. W. Thew and Mr. A. R. Heath; 2nd prize, Mr. R. L. Young; Certificates of Honour, Mr. T. H. Miller, Mr. H. Westron and Mr. W. W. James. *Dental Surgery*, 1st prize, Mr. R. L. Young; 2nd prize, Mr. N. Miller; Certificates of Honour, Mr. A. R. Heath, Mr. T. H. Thew, Mr. E. H. J. Smart, Mr. H. Westron, Mr. E. Joseph, Mr. J. L. Roper, Mr. J. C. Douglas and Mr. W. W. James. *Students' Society Prize*, Mr. W. F. Forsyth, Jun. *Prize presented by the President of the Students' Society for the best Casual Communication*, Mr. F. J. Padgett.

Sir James Crichton-Browne then delivered the following address: Ladies and Gentlemen,—It has been to me a great satisfaction to respond to the invitation of the Staff of the Dental Hospital of London to take part in these interesting proceedings, and to present the prizes to the deserving students in the school connected with the hospital, and in doing so I am sure it is not necessary for me, as is often done on an occasion like this, to remind the students to whom prizes have been awarded that these present successes are but incentives to further efforts, for I am a student of physiognomy, I have seen in their faces as they have passed this platform sufficient indication that they are not likely to stand still or rest on their laurels, but are determined to push forward, and are more likely to require counsels of restraint than words of exhortation. Nor is it necessary that I should endeavour to console those students whose names do not figure on the prize list this evening, by reminding them, as is often done on occasions like this, that it is impossible for everybody to be a first, second or even third where a great number are engaged in competition, for it is indeed my conviction that it is possible for everyone to be first, second or third, not perhaps in any one particular race, but in some race. I mean by that, that every man and woman has some gift, quality, or endowment which, properly cultivated and used, will secure to him or her success at some point in the course of life, and that best of all prizes, the consciousness of not having lived in vain, and, therefore, I would suggest to the students who have not been successful, that their reward is only

postponed, it will come to them a little later on if they will but persevere and use their opportunities. I would say to all the students here, whether prize winners or not, that they are taking upon themselves great responsibilities and obligations, for they are entering on an honourable profession—a profession that is both ancient and progressive—the dignity of which they must uphold. The dental profession is an ancient and rapidly progressive one. That it is an ancient profession is undoubted, for, if I recollect aright, the laws of the Twelve Tables of the 5th century before Christ, provided for the care of the teeth bound with gold, and made it lawful that the gold in this connection might be burnt or buried with the body of a deceased person, and only a few years ago an Etruscan skull was found with a set of enamel teeth artificially fitted in it. That the dental profession is a progressive one, and a rapidly progressive one, cannot be doubted by anyone who has his eyes open or has any knowledge of the subject. The number of dentists has increased prodigiously, and dental aid, which was at one time restricted to the affluent, is now sought by all classes of the community. And not only is the number of dentists increasing, but their status and qualifications have advanced in a more than proportionate degree. Up to 1878 your profession was comparatively a lawless one, and was open to the just and the unjust, the competent and the incompetent, but now, although it is still impracticable to prevent the practice of dentistry by unworthy and unskilled persons, you have at any rate by your Register given the public the means of distinguishing between the white sheep and the black, and if the public still chooses to employ the black it is their affair, and they must take the consequences ; and the satisfactory reflection is that year by year, gradually, by the efflux of time, the character and position of your profession are being raised. The old school is dying out and the new school is taking its place. Now I do not mean to say anything disrespectful of the old school, for I know that it included a great number of able and accomplished men, who did admirable work in their day and generation, and helped to promote the welfare and advance the status of the profession; but I know that it embraces also a large number of imperfectly educated and empirical practitioners, and it is certainly a matter of congratulation that the younger dental practitioners who are now joining the ranks are thoroughly prepared for their

work in all departments, and have a sound preliminary and scientific education. Well, now gentlemen, for it is the students I am addressing to-night, it is for you, if you value your profession, to raise its standard more and more ; it is for you to cut it adrift from trade associations and to approximate it more and more with the medical profession, of which it is a branch. It is for you to banish quackery in all its protean forms and advertising and false pretences and unscrupulous competition from your ranks, and to cultivate that spirit of moderation and magnanimity and dignity and generosity that distinguishes a profession from a trade. Much, very much, no doubt, has already been done in this direction, and taking the recognised body of your profession in this country to-day, I would affirm that it is unsurpassed, nay, I would say it is unequalled in skill, attainments, or in probity, by the dental profession of any other country in the world. It may be admitted for the moment that our brethren in America have a certain genius for invention and contrivance, but I will not for one moment allow that we have not in England, engaged in dental work, as great mechanical skill, as much judgment, as much honesty of purpose as are to be found amongst dental practitioners in the United States of America or in any other part of the world. We, of course, welcome our brethren from America—those of them I mean who are duly qualified—and there are, no doubt, many able and conscientious men among them, and we give them a fair field and fair play, but at the same time I unhesitatingly declare that the popular notion that there is some sort of magic about " American Dentistry " is a popular myth, and the sooner it is exploded the better. It is unfortunately the fashion with us Britishers just now to depreciate ourselves and to predict the ruin of our industries, but for my part I still believe in English brains and English hands, and am confident that—

"Nought shall make us rue,
If England to herself do rest but true."

I still prefer an English made watch to a Swiss one, or even a Waterbury (laughter), and I trust the day will come when no patriotic Englishman will be content to walk about with American made teeth in his mouth. But in order to encounter foreign competition in dentistry as in other industries, it is essential that we should perfect our own work, and therefore I have said to you students a great responsibility lies with you ; you are to be the

gladiators to exhibit in the future your prowess in the ivory amphitheatre of the mouth, and you must diligently prepare yourselves in order that you may acquit yourselves brilliantly in that arena, and, gentlemen, these responsibilities are certain to grow, for the importance of dentistry is day by day becoming more and more recognised, and I do not hesitate to affirm that dentistry is becoming a question of national importance, and if England is to retain her place in the world she must look to her teeth as well as her ironclads. There is conclusive evidence, which I need not quote to you, that our teeth in these modern times are more fragile, delicate, and prone to decay than were the teeth of our ancestors a few generations ago. There is convincing evidence that dental caries is working more widespread havoc, greater ravages, than we have previously had any knowledge of, so that we must view the future with some apprehension. I do not entertain the idea that in the progress of evolution our race is destined to lose its teeth and be left with only gums ; but I do believe that very serious and deplorable consequences will ensue if the teeth are neglected, and therefore I so often urge the importance of care of the teeth in the young. It is in conservative dentistry your greatest achievements in the future will take place. I admire the exquisite nicety with which you supply dental losses, but the mouth that contains artificial teeth, no matter how artistic or deceptive they may be, is but a whited sepulchre after all, and in the future I am convinced it will be your chief mission to preserve to us the teeth with which we have been endowed by nature. I am constantly advocating in the most earnest manner the regular periodical examination of children's teeth by the dentist, and the apotheosis of the hand tooth-brush in the nursery. Every child should be sent to the dentist at least twice a year to have its teeth examined, children with delicate teeth apt to decay much oftener. To young people more particularly I would say—

> "Brush thy teeth faithfully night and morning,
> That their days might be long in thy head."

I hold that that is an eleventh commandment, and it is also a commandment with promise. We are always hearing of model and exemplary parents, well you have an infallible test ready at hand. Look at their children's teeth. If these are regular, clean, sound, and healthy, then the encomium on the parents is well deserved ;

but if, on the other hand, the teeth are irregular, dirty, decayed, then the parents are imposters and have been negligent in their duty. On a very recent occasion, when speaking on behalf of the East London Church Fund, Lord Salisbury pointed out as a curious circumstance that in this country our great objects of philanthropy and benevolence fail to secure sufficient support unless we associate our appeals for them with entertainments such as a dinner, a ball, or a bazaar. Lord Salisbury seemed to deprecate this state of matters. He deplored the fact that before exercising charity we should have to eat a bad dinnner and listen to worse speeches, or buy things one does not want at ridiculously high prices. But for my part it seems to me that the association of beneficence with entertainment is not altogether to be condemned, and does not arise entirely from selfish motives. There is still in the blood of many of us in this country a strong puritanical leven, which leads us to look with some suspicion on vain and frivolous amusements, and it satisfies tender consciences in which this leven works to combine our amusements with unquestionably good and laudable objects. A man who would hesitate to go to a ball *per se* goes without reluctance to a ball that is to benefit a deserving hospital, and takes the young folks with him, and the *sortilége* of the raffle is innocently employed to support missionary effort. We are an intensely practical people. It is said we like to take our pleasures sadly. I am sure we like to take them usefully, and from a business point of view, and to feel that while we are recreating ourselves we are advancing civilization and helping our fellow creatures. Then we are also an intensely domestic people, and it requires powerful and combined attractions to draw us out of our home-shells for social enjoyment; and it is not a bad thing if our charitable instincts are made use of to draw us together, and so promote friendly intercourse. The friendly intercourse at a dinner, ball, or bazaar raises an emotional tone and opens the flood gates of charity, which, again is, as it ever is, twice-blessed, blessing not merely the institutions that receive the subscriptions, but also the exhilarated subscribers who bestow them. Lord Salisbury mentioned specially, dinners, balls, and bazaars, as charity squeezing machines, but I mean to add another entertainment to the list and to press the conversazione into the service of beneficence. I mean to improve this opportunity, and, aided by the pictures around, the music and the refreshments, to book your

sympathies for the Dental Hospital of London, under the auspices of which we are assembled here this evening, and which is in need of your kind assistance. I am not going to hold a pistol to your heads and demand your money. I am not going to send round a collecting box or subscription list, or even read out a list of provocative donations, but I will venture to remind you that this excellent metropolitan institution has entered on an important and necessary work for the public benefit, and I will ask you, as opportunity offers, to bring its requirements under the notice of your opulent and open-handed friends. The Hospital wants funds with which to acquire an enlarged site, on which to erect new buildings in which to carry on its truly useful work, at present much cramped and restricted by want of room. The hospital looked at from Leicester Square has a somewhat imposing frontage, but, to quote Goldsmith, it is "all ruffle, and no shirt." It is all elevation and no depth, and I can testify from personal examination that its present accommodation is altogether inadequate and unworthy of our chief London Dental Hospital and School. A sum for the necessary extension has I understand been already subscribed, chiefly by the Staff of the Hospital and in the provinces. London has yet to speak, and she only requires to be awakened to the *nécessité* of the case, and when she raises her voice the Dental Hospital will speedily rear aloft its new buildings. It is for you to awaken London. The minor ills of life make up in multitude what they lack in magnitude, and tooth-ache causes a larger volume of suffering than many much graver maladies. For one leg that is amputated one hundred thousand teeth are extracted, and if for no other reason than the service it renders in alleviating toothache this Dental Hospital of London merits public support. I would conjure all of you, who have at any time suffered from toothache, by the memory of your pangs to contribute, so that others may be saved from like suffering. The Hospital is not merely a hospital but a great school of dentistry, and its improved accommodation will improve its teaching powers, and so in the long run we shall all benefit by having more experienced and efficient dentists supplied to us. (Loud cheers.)

Mr. Storer Bennett proposed, and Mr. James Smith Turner seconded, a vote of thanks to Sir James Crichton Browne, and the remainder of the evening was very agreeably spent in listening to an excellent programme of music and theatricals under the direction of Mr. Schartau.

Abstracts and Selections.

CHLORATE OF POTASH AS AN ANTISEPTIC AND GERMICIDE FOR THE MOUTH.

By Dr. P. H. Unna, in *Notes and Remedies.*

Translated from *Monatshefte f. Praktische Dermatologie*, XVII. Band, 1893.

In 1884 Professor Miller first published in the *Deutsche Medicinische Wochenschrift* the results of his experiments as to the action of various antiseptic agents on bacteria cultures taken from the cavities of the mouth.

These tests interested me very much, mainly because my attention had previously been called to the constant activity of the schizomycetes in the formation of mercurial stomatitis. Having noticed that Miller's tables, which had formerly been generally referred to, made no mention of either chlorate or permanganate of potash, I suggested to the author the advisability of subjecting to an examination this class of oxydizing substances, particularly chlorate of potash, permanganate of potash and peroxide of hydrogen, in his future experiments. The idea that the bacteria of the mouth, accustomed to the continuous deoxydation taking place, might possibly be rendered less harmful by the employment of oxydizing agents, guided me.

Professor Miller was kind enough to entertain my proposition, and the following year published a number of new tables, all of which contained the three ingredients spoken of. It was noticed, however, that peroxide of hydrogen alone directly interfered with the growth of the fungi of the mouth; its destroying properties being second to that of corrosive sublimate and nitrate of silver. Permanganate of potash acted much weaker, and surprisingly weak was the action of chlorate of potash, mentioned at the end of the list of antiseptics. The latter is detrimental to the growth of schizomycetes only when used in a solution exceeding the proportion of 1 to 8.

The apparently unfavourable showing of Professor Miller's experiments is evidently responsible for the little importance at present attached to chlorate of potash in the manufacture of preparations for the preservation of the gums and the teeth, and I am confident that modern antisepsis in treatment of the mouth is fully in accordance with the principles set forth in the valuable and well known handbook of Miller.

On page 226 Miller says:—"It is noteworthy that such useful agents as chlorate of potash and permanganate of potash possess such subordinate antiseptic properties; like iodoform, the favourable action of these remedies does not particularly depend upon their antiseptic value."

Notwithstanding the conclusion drawn from Miller's tables, I was still so fully convinced of the specific value of chlorate of potash in diseases of the mouth that I was reluctant to discard my favourite remedy. My own conclusion was that, if the efficiency of chlorate of potash as an antiseptic was to be enhanced, a much higher concentration would have to be used.

From that time on I discarded all solutions and employed pure chlorate of potash in the form of a tooth-paste containing 50 per cent. of the salt.

In this manner I achieved much better results than before, not only in mercurial stomatitis, but also in all diseases of the mouth occasioned by the formation of schizomycetes.

During the past eight years in which I have employed chlorate of potash in this modified form I never had occasion to look for a better cleansing agent for the mouth, tonsils and teeth. Naturally, I fully agree with Miller that the efficacy of this remedy does not solely depend upon its antiseptic value.

It is my opinion that it possesses marked tonic properties acting favourably on mercurialized gums and imparting increase circulation. In many other affections of the mouth and tonsils the property of chlorate of potash of favouring secretions is particularly commenable.

To obtain this result, the pure chlorate of potash must be used; a small quantity is spread on the tooth-brush, applied to the teeth and gums and rubbed to a paste. After rinsing the mouth with clear water a somewhat salty but refreshing taste remains.

I know of no other preparation that will remove so quickly and effectually the fœtor oris, which is most apparent after meals and

upon awakening in the morning. A number of cases in which this fœtor proved sufficiently objectionable to enlist medical aid were promptly cured by the application of chlorate of potash after the patients had been treated for internal ailments.

Chlorate of potash, being a neutral salt, has absolutely no detrimental effect on the teeth ; if used in the concentrated 50 per cent. form, it will promptly check the growth of the fungi for a long time, and in many instances destroy them entirely.

Chlorate of potash having been declared a poisonous chemical, it is safer to employ it in the form of tooth-paste ; thus the possibility of an accident is excluded.

It has been demonstrated that the daily use of chlorate of potash tooth-paste is the very best prophylactic against caries of the teeth and affections of the tonsils, including diphtheria.—*Western Dental Journal.*

DISEASES OF THE UPPER AIR PASSAGES.

By St. Clair Thomson, M.D., M.R.C.P., F.R.C.S.

In the year 1867 the late Dr. Wilhelm Meyer, of Copenhagen, was consulted by a very deaf, but otherwise healthy, country-girl aged twenty. Since childhood she had been a mouth-breather. The nose was small and the alæ collapsed, but neither its bony walls nor its mucous membrane in any way obstructed the free passage of air. Examination of the mouth showed no obstruction in the pharynx, for the tonsils had already been removed. Evidently the obstruction to nasal respiration must be situated in the naso-pharynx and it occurred to Dr. Meyer to pass his forefinger up behind the soft palate and explore that region. Strange to relate, such a simple and obvious procedure—as, with our present knowledge, it appears to us—had never entered the mind of any one previously. He found the post-nasal space full of adenoid vegetations, and their removal was soon followed by the restoration of the nasal air-way. Since that date the pathology and treatment of these growths have made considerable progress, and they are found to be of such common occurrence that we are very frequently asked by our patients if they form a new disease ! One of the last publications of their original discoverer was on the subject of the universality and antiquity of

adenoid vegetations (*Hospitals-Tidende*, February 6th and 13th, 1895.) Dr. Meyer collected statistics and information "from China to Peru," and, from a large mass of evidence, he was able to conclude that hypertrophy of Luschka's tonsil occurs in Europe, Asia, and America in varying frequency, a warm climate appearing to favour adenoid growths less than a cold one. Among the Esquimaux they are of common occurrence, and the adenoid facies is not unknown in the tropics. The physiognomy indicative of naso-pharyngeal obstruction consists in the habitually open mouth, the laterally compressed nose, resulting from the permanent inactivity of the alæ, and a sort of veiled look about the eyes, due chiefly to an elevation of the under lid. This "veiled look" is thus accounted for :—From the circular muscle of the eye to the orbicularis oris there pass bands of small muscles, which when the mouth is kept closed, hold the lower lid downwards in a slight degree of tension. When the mouth is habitually kept open, however, this tension is relaxed, and the lower lid tends to move a little upwards. Another objective symptom of the affection, and one that forces itself on even the most unobservant of the laity, is the altered tone of the voice, the so-called "dead" speech, the absence of resonance, and the faulty enunciation of the letters *m* and *n*.

With regard to the antiquity of adenoid vegetations, Dr. Meyer had considerable difficulties to contend with in proving their prevalence in former times, before the existence of such a condition was known or even suspected. The Greek authors give no suggestion of it, although it might be thought that such satirists as Aristophanes and Juvenal would not have missed the opportunity of making fun of the nasal pronunciation. Post-nasal obstruction appears to have escaped so many-sided a man as Hippocrates. We can, therefore, only pick out from cases the description of individual symptoms now recognised as those of hypertrophy of the pharyngeal tonsil. The other source of evidence is portraits and busts. Here we must be careful to avoid certain sources of error. For example, portraits which are intended to express emotion, especially religious ecstasy, and those of people with a short upper lip or with projecting teeth, might lead us to imagine that the subjects were mouth-breathers. The exclusion of these and other sources of error reduces the available material down to very narrow limits, but a few positive instances are sufficient to establish the fact of the existence

of adenoid vegetations in more or less remote periods. Satisfactory evidence shows that the sculptor Canova (1755—1822) must have had adenoid vegetations ; and going still farther back, the Emperor Charles V. (1500—1558) most probably also suffered from these growths. The artists of the Renaissance have often depicted a typical and unmistakable adenoid facies in their paintings and sculptures. The remains of antiquity present few evidences of the existence of hypertrophy of Luschka's tonsil among the ancients, and this is possibly in part due to the tendency of the Greeks to idealise bodily forms. Still, the author found three typical physiognomies amongst the busts in the Vatican. One is a young lady of the upper classes, as evidenced by the drapery and the carefully dressed hair. The face is regular, with good features, but is somewhat disfigured by the partly open mouth—looking as if air were being drawn in—the veiled look, and the half-stupid, half-resigned expression. Dr. Meyer's investigations show that adenoid vegetations are found among the inhabitants of at least three continents, and that there have been sufferers from the affection during the greater part of the historical era.

An interesting debate at the Laryngological Society of London on "Foreign Bodies in the Upper Air and Food Passages" accentuated many points of practical interest (*Proceedings*, vol. iii., 1896.) Such accidents are always alarming and are frequently most serious, for, as the late Mr. Durham said, "life is in peril so long as a foreign body of appreciable size is retained in any part of the respiratory tract." These accidents do not occur with sufficient frequency in the practice of any one practitioner to give him the experience which will formulate a line of conduct ; it is therefore particularly advantageous to collate the recorded experiences of others, and from them lay to heart the principles which should guide us. In the nose a one-sided discharge should always suggest the presence of a foreign body, particularly in children, in whom a satisfactory diagnosis can rarely be made without recourse to a general anæsthetic. If the probe detects a foreign substance, it should be removed with forceps or crochet, care being taken, with a finger in the naso-pharynx, to prevent it from falling backwards. While some speakers approved gentle syringing down the patent nostril—say, by the interrupted current of a Higginson's syringe—so as to drive the body out from behind, others had succeeded in certain cases by a similar use of

Politzer's method of air inflation. Dr. Renaud has shown (*Revue de Laryngologie*, No. 20, 1895) that symptoms simulating typhoid fever may be caused by a button in the nose, and that a cherry stone may during seven years mislead several doctors into a diagnosis of ozæna. When the intruding body is lodged in the pharynx the first principle is to make a careful examination with the eye, the probe, and the finger before employing the coin-catcher or umbrella probang, or risking the danger of blindly pushing the substance downwards. In the majority of patients complaining of a fishbone in the throat, generally nothing is to be discovered, and their sensations are as rule nervous, or referable to the scratch in the pharyngeal wall. Still, it is possible that many bones escape our detection, and that the cessation of symptoms coincides with the absorption of the bone at the end of from two to four months. In one case, where a needle could not be found in the throat, it was discovered at the autopsy a month afterwards in the tricuspid valve. Even when the patient states that something is lodged in the wind-pipe, the post-nasal space should be carefully explored, as sensations in that region are frequently referred to the larynx. When an individual feels that a portion of food has lodged in the glottis he should lean forwards over the back of a chair, gently draw in a full inspiration, and then with a forcible expiration the intruding body can often be expelled. In adults, when the situation of the foreign body in the larynx has been diagnosed, its removal with forceps may be attempted if we are prepared for immediate tracheotomy in case of need; if the symptoms are too severe or spasm is set up, it is wiser to do tracheotomy first. In children, examination with the mirror is apt to fail, and then we may try to localise the body with the finger and remove it with forceps, or we may find it necessary to do tracheotomy before attempting anything. The custom of inversion and succussion for a foreign body in the trachea or bronchi is fraught with much risk, and it is wise to be prepared for immediate tracheotomy before entertaining the plan. When there are any symptoms of a foreign body in the trachea or below it, tracheotomy should be performed and a tube worn until it is certain that the body has been entirely expelled. Among foreign bodies which may be encountered in the nose we must not forget the possibility of having to do with pieces of gauze or cotton-wool left there during previous treatment. In the trachea we must bear in mind the ingress of vomited matter

in anæsthesia, the possibility of tissue falling into the larynx in the operation for adenoids, and the fact that intubation tubes may get loose and fall into the bronchi. The importance of seeing that patients who have to wear a tracheotomy tube permanently renew their cannula at least every two years is shown by Dr. C. Billot (*Annales des Maladies de l' Oreille et du Larynx*, No. 3, 1896), who has collected records of nineteen cases in which the tube became detached from its plate and fell into the air-passages. When a foreign body has lodged in the œsophagus we should be very careful about using any force, either in extracting it or pushing it down, remembering that in many cases the lesser danger is non-interference, and that when the symptoms are not urgent a certain amount of disintegration will take place if we have to do with a bolus of food. Even when the umbrella probang fails to bring up an offending piece of food, as it often does, its use is generally a satisfaction to a nervous patient.—*The Practitioner.*

COCAINE.

By Samuel A. Hopkins, M.D., Boston, Mass.

Ever since the discovery of anæsthesia the idea of a local anæsthetic has taken firm hold of the professional mind, and no amount of failure has been able to shake our belief that some day or other the ideal local anæsthetic will be forthcoming. It must be safe, it must be easy to administer, and it must be quick in its effect.

We need a safe local anæsthetic. There is perhaps no greater need in modern surgery and dentistry. The mental anguish, as well as the actual suffering entailed by our daily operations is appalling. It makes the profession of dentistry the most trying and exhausting one known. The pain which we are obliged to give is not only injurious to the health of the patients, but it limits our usefulness, and even affects the estimation in which our profession is held by the community at large. So much, therefore, is to be gained by the use of a local anæsthetic that the temptation is very great to try everything that may promise an alleviation of pain, and we are loath to give up anything that seems even in a moderate

degree to give that alleviation, although its use may be attended by grave risks. Indeed, we sometimes deceive ourselves, so great is the desire to save pain, and are almost persuaded that any risk is justifiable to gain such an end.

This, I am afraid, has been the history of the use of cocaine in the dental profession. It is a sufficient comment on its doubtful efficacy in dentistry that after so many years of experimentation it should still be necessary to publish articles in our dental journals describing its use and its limitations, and the fact that you are willing to listen to me to-night indicates that grave doubts still exist in your minds as to its unrestricted use in dentistry being justifiable.

In order to get at the facts concerning the use of this drug I have gone over very carefully a very large amount of literature on the subject, and have looked up some of the records of the cases where serious results are reported. I am indebted for valuable information to Dr. T. W. Hays, who, in March, 1894, before the Cincinnati Academy of Medicine, read a most interesting paper on the physiological action of cocaine, citing numerous authorities.

The symptoms of cocaine-poisoning differ materially in different individuals, and there is probably a disposition or diathesis existing in some individuals which renders them exceedingly susceptible to the drug. Great difference exists in regard to the time it takes for poisoning effects to appear. This may vary from thirty seconds to three hours, and the time necessary for recovery also varies greatly. Sometimes recovery is almost immediate, and, on the other hand, it may take months, and then leave the patient in a very anæmic condition. The sex, age, or condition of the patient does not seem to have any particular influence on the effect. Strong or weak, young or old, all may be quickly affected. Neither are habitual users of the drug, those who have formed the cocaine habit, entirely free from the dangers of acute poisoning.

The size of the dose and the method of its administration do not seem to control the effect. There is, however, seemingly a peculiar susceptibility when the drug is applied or injected in the vicinity of the fifth nerve or its branches. Woffler, who favours the use of cocaine, states that in most of the cases that have come under his observation where serious or fatal results have followed its use the injections were made in some parts of the head. He claims that

five per cent. solution may be used with impunity in other parts of the body, but a solution of not greater strength than two per cent. can safely be used in the region of the head.

In a general way, the symptoms of cocaine-poisoning may be briefly described as follows : There is an excitation of the mind, and associated with it an expression of anxiety which may amount to a fear of approaching death. A feeling of warmth steals over the patient, which may be followed by a chill. The respiration becomes fearfully rapid, and later becomes laboured. The pulse-beat increases to a very marked degree, and the pulse runs up to 150, or even higher. Respiration becomes more difficult, and the heart grows weak, while the mental disturbance is increased so that ideas do not follow each other in proper sequence. If the drug has been administered in the mouth, the tongue becomes numb and speech is affected ; not always, however, to such a marked degree as might be expected. If the poisonous effects continue, there seems to be more general anæsthesia, and the organs so affected have a decided feeling of cold. Sometimes an irritation along the spine or back of the neck, a tickling or itching sensation, is present. The hands are closed in a convulsive manner ; the fingers, legs, and arms become stiff and tetanic. The muscles of the face partake of the convulsive movements, and the expression is agonizing to the last degree. In some cases death occurs while in this tetanic condition. Sometimes, however, instead of the convulsive symptoms, complete relaxation takes place. If recovery occurs, severe nervous disturbances may remain for an indefinite time.

The symptoms I have described as belonging to cocaine poisoning are subject to wide variation. Indeed, no two cases seem to give exactly the same train of symptoms. In going over the records I have been astonished to find how many cases of poisoning are reported. Mannheim reports five cases of poisoning from the subcutaneous use of the drug, and also nine cases in which it was dropped into the eye ; two where it was used in the ear ; larynx, three ; mouth, two ; gum, two, &c. Four drops of a two per cent. solution used by injection produced poisoning in an old lady, who did not recover for four days. Three drops of a three per cent. solution was followed in one case by marked restlessness, which disappeared in four days. 0.05 grain in one case and 0.04 grain in another injected subcutaneously into the eyelid caused intoxication

lasting many hours. Dr. Hays, among other cases, mentions the fact that he himself was poisoned by cocaine injected into the gum. It is but fair to state that the dose was large, but the poisoning was almost instantaneous.

The March number of the *Centralblatt* mentions a fatal case of poisoning following an injection into the urethra. In the October, November, and December, 1890, numbers of *Therapeutische Monatsschrift* is given a complete list of the reported cases of poisoning up to that date. The percentage of fatal cases is enormous. Of 176 cases recorded, 10 were fatal. Enough has been said of the general poisoning effects to show that the drug is one to be used with great caution. We do not yet know what its dangers may prove, nor have we yet found a physiological antidote. Digitalis, atropine, the nitrite of amyl, and nitro-glycerin have been suggested, but the efficacy of these drugs is still a matter of doubt.

I found it a much more difficult matter to get any definite reports of serious results following the use of cocaine in dental practice. This was, of course, to be expected, as most of these cases occur in private practice, and cannot be reported without injury to the reputation of the practitioner. Consequently, we get only meagre accounts of the unsuccessful cases, or of those cases which are attended by fatal or alarming symptoms. Each successful case is, however, quickly reported, much to the glorification of the operator, and the temptation to follow in his footsteps leads to many an accident.

Appreciating this difficulty, I wrote to a number of leading New York dentists, asking for their experience in the use of the drug. I also asked, "What should be considered the maximum dose for hypodermic injection into the tissues of the mouth?" This last question has never been answered, nor can I answer it myself.

The greatest courtesy was shown me, however, and I received a large number of replies to my letter, but I will not attempt to read them, as I have promised to be brief. A large number of those who so kindly answered my letter frankly said they were unwilling to risk hypodermic injections in any strength. A few alluded to the alkaloid, isoatropyl-cocaine, and its dangers, and all expressed the feeling that great caution should be used in administering the drug hypodermically. Dr. Delafield, under whom I had the pleasure of studying at

the College of Physicians and Surgeons, wrote that he thought it should never be used hypodermically. My own experience seems to bear out this opinion, so far as it relates to injections into the tissues of the mouth.

I have myself had the scare, and although several years have now passed, it sends a cold chill down my back whenever I recall my experience. One case I shall never forget of a man in apparently perfect physical condition, for whom I had to perform an operation upon the gum between the lower first and second molars, which necessitated giving great pain. My syringe was carefully sterilized, and ten minims of a 4 per cent. solution were taken into the syringe ; two minims remained after the operation, and at least two minims were absorbed by the napkins with which I surrounded the parts, so that it is safe to say that the results following were produced with a dose of not over six minims. The gum was relaxed and somewhat torn, and undoubtedly a part of the dose got into the mouth and may have been swallowed. Be that as it may, in about ten minutes there was a seeming excitation of the mind, and all the symptoms which I have previously described soon followed. I was obliged to get my patient on to a bed, and send for his physician. By the aid of stimulants—brandy and coffee—the patient gradually recovered, and was able to be driven to his home in three or four hours.

In another case, that of a young woman, the patient left the office in apparently good condition after an operation in which the drug had been used, but complained that while in the car on her way home she experienced difficulty in breathing, with palpitation of the heart, and had to exert all the power of her will to get to her house. She did not recover fully for several days. In this case not over four minims of a 4 per cent. solution were used.

A similar case to the above was that of a vigorous young man, who was a student. He likewise did not feel the effects until on his way to Cambridge ; but as he had access to several convenient bar-rooms on his way out, he was able to get sufficient strength to reach his rooms. In this case not over three minims of a 4 per cent. solution were injected, and none escaped into the mouth. While the after effects of this case were not serious, a terror of similar results was produced that made him willing to submit to the most painful operations rather than have me make use of the drug again.

I have found hundreds of cases of cocaine poisoning reported in various medical journals, both in this country and abroad, and shall be glad to give these references to any one who wishes to investigate this subject further.

Suggestions of new methods for doing away with the danger have appeared from time to time during the past fifteen years, and in the December number of the *Dental Digest* an article from the pen of a careful observer suggests the combination of cocaine with morphine and atropine.

Whether we have any safe or reliable substitute for cocaine in the various combinations that are suggested from time to time has not yet been determined. There is, however, a substance which deserves more than passing notice on account of the high character and scientific standing of the men who have made the investigations concerning it. Dr. A. P. Chadbourne, of Boston, in 1892, before the British Medical Association, read a valuable paper on an alkaloid which had recently been isolated by Giesel from the leaves of a small-leafed cocoa plant of Java. The chemical constitution and properties of this substance were studied by Liebermann, who proved that it was benzoyl-pseudo-tropein. Chadbourne gave it the name of tropa cocaine, and under that name it is now sold by the leading manufacturers of drugs.

In his paper, a careful study of which I would recommend to any one who contemplates using this drug, Dr. Chadbourne relates a series of carefully performed experiments with tropa cocaine, using cocaine of equal strength upon the control animals. I cannot, of course, give these experiments in detail, but the conclusions drawn, which were amply supported by the evidence, were as follows:

1. Tropa cocaine is less than one-half as toxic as cocaine.

2. The depressing action both on the cardiac motor ganglion and the heart muscle, especially the latter, is much greater with cocaine.

3. Local anæsthesia, both of the eye and of the skin, is much more complete with tropa cocaine, and is possibly of longer duration.

4. Solutions of tropa cocaine are moderately antiseptic, and retain their strength for at least two or three months, while cocaine solutions begin to deteriorate in as many days.

Experimentation on the human subject confirmed the above conclusions and seemed to demonstrate that tropa cocaine was twice as strong and half as toxic as cocaine. There is, however, one possible source of error in using tropa cocaine, viz., the possibility of obtaining an impure sample of the drug. Dr. Chadbourne, in his experiments, procured one sample that was much more toxic than the others; not more toxic than cocaine, however. But after purification by recrystallization the difference disappeared.

It is also rather expensive, and the supply of small leafed coca plants is naturally limited. One other difference might be considered an objection. Cocaine has a contractile action on the small blood vessels, which tends to arrest hæmorrhage; tropa cocaine has no such action.

After writing the above, I took the liberty of calling upon Dr. Chadbourne, and asked him if he had seen any reason to modify his views on the subject of the two drugs. He assured me that the experience of those who had made use of tropa cocaine only tended to confirm the conclusions he had drawn from his experiments. In the course of our conversation he gave me an important point in the treatment of cocaine poisoning, which I have not seen referred to elsewhere. He found that with the animals experimented upon a much larger dose of cocaine could be used if the temperature of the room were lowered, and the animal recovered from the toxic effects more quickly when the body temperature was lowered by exposure to cold. This suggests that an ice pack or exposure to the cold air in winter might give considerable relief in these unfortunate cases of cocaine poisoning. He also confirmed the statement I have already made, that an injection in any part of the head is more liable to be attended by toxic symptoms than in other parts of the body.

I do not wish to be understood as advocating the hypodermic injection of this new drug into the gum for the extraction of teeth, or other operations. I merely wish to affirm that if a local anæsthetic is to be used in this way that there is some scientific basis for experimentation with tropa cocaine, and it will probably be found much more effective and a thousand times safer than any of the nostrums that are offered to the public as substitutes for cocaine.

One other method of local anæsthesia I must refer to, as it is now before the public, supported by men of recognized skill and

intelligence, namely, the use of the electric current in connection with cocaine and guaiacol, or cocaine alone. For a more detailed account I would refer you to Dr. W. J. Morton's article in the January number of the *Dental Cosmos*, to Dr. Gillett's article in the February number of the *International Dental Journal*, and to other more recent articles, which will repay careful study.

I have seen cocaine used by cataphoresis a sufficient number of times to convince me that it has a place in dental practice, and I mean to use this method for obtunding sensitive dentine in extreme cases. It is, however, too cumbersome to be used as a routine method. There is usually more or less pain, sometimes a good deal of nervous apprehension attending its use, and in some cases it fails to make any appreciable difference in the sensitiveness of the tooth. This may be due to faulty manipulation. The dam should always be in place when this method is applied, as I am not convinced that cocaine used in this way is less poisonous than when used in the ordinary manner. Two possible improvements have suggested themselves to me—one would be to have the obtunding done by an assistant, and thus save fifteen minutes of your valuable time, for the loss of time is a serious objection to this process ; and the other would be the substitution of tropa cocaine.

The suggestion has recently been made that the incisors may be rendered insensible to the touch of the instrument by placing pellets of cotton saturated with a 10 per cent. solution of cocaine in the nostrils. I have seen this tried with entire satisfaction, but I hesitate to endorse the method from the danger of forming the cocaine habit. Doubtless you know that snuffing cocaine up the nose is a particularly delightful form of indulging in the cocaine habit and one that is easily acquired. Singers sometimes acquire the habit by using the drug to dry up the secretions and get temporary relief while singing. Neither the morphine nor the alcohol habit compares with the cocaine habit in the undermining influence on the mind and body. For this reason I should discourage the use of cocaine by this method.

Another method of producing local anæsthesia with cocaine was suggested by Dr. Schleich, of Berlin, who recently published a monograph on the subject. Briefly, it consists of an almost infinite number of injections of an almost infinitesimal amount of the drug. The injections are made, not subcutaneously, but intracutaneously,

and the technique is somewhat as follows :—Beginning always in the healthy skin, and holding the syringe almost parallel with the skin, the needle is introduced, great care being taken not to push it through the skin. The fluid will distend the skin and raise a white, bloodless wheal. This area is instantly anæsthetic. Keeping within this area, you introduce the needle near its edge and produce another œdematous white spot. In this way you can gradually anæsthetize a foot of territory. The anæsthesia lasts about twenty minutes, and infiltration can be repeated if necessary. In dealing with inflamed tissue it is always desirable to encroach upon it gradually from the surrounding healthy tissue. In operations requiring deep incisions the gradual process should be adopted in getting at the seat of the disease.

The strongest solution used contained only two-tenths of one per cent. of cocaine, and the weak solution contained only one-hundredth of one per cent. of cocaine, with a little salt solution added. Indeed, it is pretty evident that the anæsthesia comes more from pressure on the terminal nerve filaments than from the drug itself, since it can be shown that a two-tenths-per-cent. salt solution injected in the same way will produce anæsthesia ; not, however, without severe irritation. Chemists are prepared to furnish tablets made according to the formula of Schleich, and this is, perhaps, the best form in which to obtain the drug for this method of administration. How general this method will become no one can predict, but I know of the successful removal of a good-sized abdominal tumor, several operations for varicocele, the opening of a felon, and a lot of minor operations. The mouth hardly offers the best field for the practice of this method, but in a general way it is not without interest.

I cannot close this paper without a reference to the wholesale extraction of teeth by ignorant or unprincipled practitioners, who advertise the painless extraction of teeth by the use of so-called obtundents. For several years past we have been receiving from time to time in our mails advertisements of obtundents which are to be used by injection. In almost every instance the advertiser claims that no cocaine is used, and tempting offers of exclusive territory and dazzling riches to follow the use of this particular preparation are held out to the unwary. By reference to an article in the May (1893) number of the *Dental Cosmos* it will be seen that nearly all of these preparations contain a large percentage of

cocaine. This article is by Dr. Edward C. Kirk, of Philadelphia, who had a number of these so-called local anæsthetics chemically examined in the Philadelphia College of Pharmacy. There were ten different preparations, all of which had been widely advertised, and in almost every case the impression had been given, if it had not been positively stated, that the preparation contained no cocaine. It was found on analysis that every one of the preparations, with the exception of Barr's, which was merely an alcoholic solution of peppermint and cloves, contained cocaine, and many of them in such large amounts as to be dangerous even in small doses.

Unfortunately, the use of these preparations seems to be increasing. Of course, no self respecting man could be guilty of violating the code of ethics of his profession by manufacturing and advertising such nostrums. It is well understood that the profession has a right to any discovery or improvement that may be made by one of its members, and each man in the profession is under distinct obligation to give to the profession any knowledge that he may have acquired that will benefit his practitioners.

It seems to me that it is equally a violation of the code to use and recommend any nostrums that may be put upon the market. In this particular case there is an additional reason for taking a high stand, as a disguised danger is more to be dreaded than an open one. It would be well if we could bring about such legislation as would make it a criminal offence to deceive the public by flooding the market with such nostrums, but I am not sanguine about our power to institute reforms by legislative action. We have to combat not only the inertia of political bodies, but the opposition of uneducated and unprincipled practitioners as well. Every peripatetic tooth-puller eagerly avails himself of these preparations, reckless of the danger, and while it would be a great gain to humanity to exterminate this species of dental practitioner, I can see only one way to accomplish it, and that is by a crusade of education and the creation of a higher and better public opinion.

It is the duty of every man in the profession to use his influence in warning the public against these fearful traps laid for the unwary. Every means in our power should be used to expose the charlatans who, for a fee, are willing to subject a patient to any risk, and who are doing irreparable injury by the wholesale extraction of valuable teeth. We must check this evil if we wish to uphold the dignity of

our profession and preserve our self-respect. How we can handle this problem best it is difficult to know ; but with high ideals and a high appreciation of our calling we can carry on an aggressive warfare that will eventually result in the extermination of nostrum manufacturers and irresponsible practitioners.—*International.*

LIQUID SILEX.

By H. H. Burchard.

The solution known by this name, or as soluble glass, chemically the sodium silicate (Na_2SiO_3), is quite as effective a medium to prevent the adhesion of plaster to vulcanite as is tin foil, but certain precautions are necessary to procure the best results. The material should be kept in a moderately warm place, and tightly stoppered. As soon as its viscidity becomes greater than that of a thin syrup, throw it away and buy a new bottle. Should it lose its perfect clearness discard it. The writer finds that about one-third of the four-ounce bottles in which it is sold is useful ; the remainder is usually so deteriorated as to be worthless. Dilution with hot water and warming the solution restores its appearance, but for dental purposes not its virtues. The model, after investment, and also the teeth and entire investment are freed of adherent wax by pouring over them a stream of *boiling* water. The excess of water is absorbed by means of bibulous paper. As soon as the wet appearance disappears from the plaster it is ready to receive the silicate, not before.

A camel's-hair brush, having a fine point and no loose hairs, is dipped in the solution and the surplus wiped off the brush. The plaster surfaces, all of them, are painted lightly with the silex, carefully avoiding contact with the porcelain or platinum pins. By means of the fine point on the brush the matrix of the rim is painted between the teeth ; in coating the cap side of the investment, much care is required to prevent touching the teeth. Small wisps of bibulous paper are quickly and gently passed over the painted surfaces until there is but a thin glaze covering every part of the plaster. The pieces should be set aside for at least fifteen minutes, to permit thorough hardening of the silex. After vulcanizing the flasks should not remain unopened over night, for if salt (sodium chlorid) has been used to hasten the setting of the investment, the

surface of the vulcanized plate will be covered by a hard and tenacious gloss ; if opened as soon as cold the plaster and silex part from the vulcanite, without even washing, leaving a smooth, glazed surface equal to that found under tin foil.

The mechanic may be certain that the lack of good results is due to either carelessness or faulty silex.

This is an important matter, as unquestionably many or most of the ills attributed to the wearing of vulcanite plates are due to roughness upon their palatal surfaces.—*Cosmos.*

FILLING ROOTS.

By A. E. Matteson.

I want a tough guttapercha. Eucalyptol is sufficient to lubricate the surface of the guttapercha and allow it to pass easily in a fine root canal, and I venture to say that any canal which can be opened can be filled with guttapercha. I mean the guttapercha we now use for base plates—red guttapercha. If the canal is open, is dried and flooded with either the volatile extract of eucalyptol or oil of cajeput, it can be filled. My method is to cut it in square strips lengthwise, the way in which it has been rolled, that would make a square rod, then, holding it over the lamp or flame, gently twist and draw it. You can draw it down to the fineness of a hair, and as it is twisted it forms a cone screw. This can be cut off in sufficient lengths such as you will want, one-quarter of an inch, heat the end of the broach and catch on the end of the guttapercha point and carry it to its place. The difference between that and soft white guttapercha is, that the latter will invariably curl up, and this will do it if you are not rapid. It can be carried up in the cavity and the screw allows the surplus to flow back, and another cone is then pressed to its place and the softened part is returned toward the opening. The reason why I prefer this red guttapercha is that we frequently have occasion to crown these teeth, and with any tooth which has to be crowned where the root canal has been filled with either white guttapercha or with any of the cements it is almost impossible to tell when you are drilling out the canal whether you are drilling the tooth structure or the cement. There is no difference in the colour. With the red guttapercha it is different, for when your shavings show you are cutting white you are cutting tooth structure instead of the filling. This is for the purpose of crowning where you wish

to open in the canal for the purpose of inserting a post. I have experimented with this a number of times in showing my friends how I fill root canals, and have taken teeth and had my son cleanse out the canals. They are generally pretty dry. I filled them, and in taking them up afterwards found some cracks in them which could not be discovered till after they were filled. They would show red guttapercha, and any filling material that will fill those cracks is good enough to fill the roots.

I have experimented with glass tubes made as near the form of root canals as it is possible to do, have had them inserted in plaster and filled them in that manner, and then opened them. I believe any canal that can be opened up can be filled with guttapercha in this manner.

I will say to those who fill root canals with chloropercha that there is danger of pumping it back and getting air in the canal, and in the experimental cases that I have filled in this manner I have invariably found there were bubbles.—*Items of Interest.*

DOSAGE EXTRAORDINARY.

When Chunee, the celebrated Indian elephant, fell sick, it was decided that he was suffering from constipation, and after thirty-two hours of coaxing, he was induced to swallow his first dose, which consisted of 24 pounds of salts, 24 pounds of treacle, 6 drachms of calomel, 1½ drachms of tartar emetic, 6 ounces of powdered gamboge, and a bottle of croton oil. This produced no more appreciable results than an ordinary bun would have done. Six pounds of beef marrow with 4 drachms of calomel was then administered, but absolutely without result; and Chunee became so violent that it was decided to destroy him. But all attempts to get him to take the dose, consisting of 40 drachms of arsenic, with ½ drachm of corrosive sublimate and a lot of strychnine, were unavailing; and the aid of expert marksmen and finally of the military had to be called before he could be disposed of. It took 260 rifle balls to kill him. And behold! at the autopsy it was found that Chunee had been driven mad with a toothache. One of his enormous tusks was extensively decayed, and the diseased tooth, a specimen of *mal aux dents* on a very large scale, is preserved with the skeleton of the beast at the South Kensington Museum.—*The Dental Headlight.*

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Original Communications.

A CASE OF SEPTICÆMIA, THE RESULT OF ALVEOLAR ABCESS.

(*Lately under the care of Dr. Washbourn, at Guy's.*)

Communicated by L. STRANGWAYS HOUNSELL.

Sydney R., a lad of 13, first complained of toothache on Friday, March 27th, and his face commenced swelling on the 28th. He was able to go about as usual, but on the 29th, the swelling increasing, he came to Guy's Hospital (Dental Out-patients), on Monday, the 30th. His face appeared much swollen and œdematous on the left side, which extended to the orbital region. With some difficulty his mouth was opened sufficiently to observe that the upper first permanent molar was carious, and that pus was oozing between the gum and its neck. It was removed without difficulty, being very loose, and a considerable quantity of pus flowed from the socket. The patient seemed relieved and was sent home, with instructions to keep warm and quiet. Shortly after reaching home he appears to have become delirious, and he was therefore put to bed. Later in the evening he became unconscious and lost voluntary control over micturition and defecation. Upon learning from his father his condition, arrangements were at once made to admit him as an in-patient in the Clinical Ward at mid-day.

From the presence of internal strabismus, he appeared to be suffering from meningitis, which was subsequently found to be congenital, but eventually septicæmia was diagnosed. His pulse registered 156, and his temperature was as high as 104·5°. The pupils were dilated and muscular twitching of both the sterno mastoids was present, the facial muscles and others of the neck were also affected, and at times those of the extremities. The face was swollen and œdematous, on the left side the hard palate also was affected, and blood and pus were oozing from the socket of the

extracted molar. A probe passed into the cavity did not appear to penetrate the antrum, and there was no nasal discharge. The neighbouring lymphatic glands on the left side were much enlarged.

The patient remained in much the same condition during the night, but next morning the muscular twitching was less marked, and at 10 p.m. the temperature fell to 100°. From the morning of the 2nd the patient continued to improve, and in the afternoon an antral syringe was used to thoroughly wash out the cavity, and it was then seen that the second upper left molar was loose, and under the circumstances it was removed, affording a freer drain and precluding the possibility of the patient swallowing it whilst still semi-conscious. The tooth was examined, and found to be perfectly polished and completely denuded of periosteum, being bathed in pus and exudation from the wounds. Under a treatment of injections of anti-streptococcus serum the patient made remarkable progress, and was eventually sent out with nothing worse than a little necrosis of the alveolar portion of the left superior maxilla.

He continues to attend the dental out-patient department, and it seems probable that the bone will separate as far forward as the canine. The partially erupted wisdom was also removed; still it is probable that the little patient will only have the loss of his teeth to remind him of his visit to Guy's Hospital.

At the June Meeting of the Odontological Society, during the discussion which followed a paper on "Some Points in Connection with the Bacteria of the Mouth," read by Dr. Washbourn, assisted by Mr. K. W. Goadby, of Guy's Hospital, in reply to remarks by Dr. Durham on serum, Dr. Washbourn said (referring to the above) that "A very interesting case had come under his notice; a boy who shortly after the removal of a tooth was taken with severe symptoms of septicæmia and with cerebral symptoms. He felt quite sure the boy had commencing meningitis, and that it was probably a streptococci infection. A little of the pus from the tooth was examined, and streptococci were found, but unfortunately the virulence was not tested, nor were a series of cultivations made in order to see whether it was the streptococcus longus, or some of the streptococci from the mouth, which had accidentally entered the tubes. The case was treated with serum with most remarkable results, and very soon after the injections the boy got better and ultimately completely recovered."

Previous History.—When eight years of age he suffered from a slight concussion—no fits since. Had measles. Family history good. There therefore appears to be no other explanation of the disease than as a result of the infection from the carious molar. The chief point of interest in this case is the rapidity of the course of the disease, only three days intervening between the commencement of the swelling and the appearance of symptoms simulating septic meningitis. The antrum not being affected the poison must have been absorbed by the lymphatics into the blood stream, the glands remaining swollen throughout the previous symptoms. It behoves us therefore to warn our patients of the possibility of fatal or grave consequences which may arise from continued neglect of an alveolar abscess, there being little doubt that the little patient's life was only saved by his prompt admission to the hospital, and the subsequent successful treatment he underwent.

News and Notes.

THE DENTAL HOSPITAL OF LONDON, Leicester Square, has received a donation of £200 from the Baroness de Hirsch towards the amount required for purchasing a site and building a new hospital.

DURING the July Examinations the following gentlemen passed the First Professional Examination for the License in Dental Surgery of the Royal College of Surgeons, Edinburgh :—Thomas Percy Wolston Watt, Ceylon ; William Joseph Low ; Arthur Capper, Huyton ; Harry Eugene Field, Birkenhead ; Francis Radley King, Newcastle ; Andrew Walker Mouat, Leith ; William Black Alexander, Edinburgh ; George Hills Watson, Edinburgh, and John Alexander Kennedy.

THE following gentlemen having passed the Final Examination were admitted L.D.S. Edinburgh :—Lloyd Thomas Lavan, Jersey ; William Jones, Edinburgh ; Charles Linnaus Routledge, Exeter ; Thomas Roger Dove Walkinshaw, Newcastle ; Bernard Smith, Huyton ; Theodore Stancombe Rendall, Torquay ; William Edward Stewart, Dundee ; James Wallace Bell, Edinburgh ; Richard Mason, Edinburgh ; Alfred William Wellings, Salop ; Alexander Shennan, Houghton-le-Spring ; and Matthew Rodway Leeming, Salford.

THE DENTAL RECORD, LONDON: SEP. 1, 1896.

THE BRITISH DENTAL ASSOCIATION MEETING.

OUR present issue departs somewhat from its ordinary lines. The coincidence of a resumé of the proceedings of the recent British Dental Association Meeting and our educational number account for this. We suppose our provincial readers will not cavil at our saying that the meeting of the British Dental Association in London invests this annual event with great importance. It is not that there is anything lacking in the hospitality or in the intellectual power of provincial centres, but that, London happening to be the capital of the Empire, all roads lead thereto. So it follows that meetings held in London are sure of a large and representative gathering. Hence, in a measure, the success which attended this last gathering. It is difficult to pick out from the doings of such a meeting the points by which it will be remembered in future years; sometimes it is an educational matter, sometimes a political move, and at others some scientific fact or practical method by which we call to mind such and such a meeting. Perhaps the attentive, eager groups which surrounded each demonstrator may suggest that from these much was learnt. The high order of the scientific papers of the Microscopical Section shows that the number of workers in this field is increasing, and that the starting of such a section was a great idea. But above and beyond everything one bears away from such a meeting the feeling of the great moral and social gain which the Association has wrought. Members meet members, not as rival practitioners, but as friends; facts, which but a few decades ago would have been wrapt about with secrecy, are now freely disclosed and explained. The gain from such a change, both to the profession and to the public, is immense. We learn at these meetings to

respect our fellow practitioners, who, but too often in the privacy of private practice we might have known only through their failures. It is this respect in which we learn to hold each other which is the surest proof that the public do and will respect us.

BRITISH DENTAL ASSOCIATION.

The Annual Meeting of this Association was held in the Examination Hall, Victoria Embankment, on Wednesday, August 12th, 1896.

Mr. W. Bowman MacLeod, retiring President, in the chair.

Mr. MacLeod, in the course of a brief valedictory address, spoke of the steady advance which had been made since 1878 in the consolidation of professional interests and the consequent elevation of the status of the profession. It was, however, not time yet to relax their efforts in that direction, or cease from taking advantage of every opportunity which might enable them to perfect their educational training, to render more perfect and uniform the pass standards of their licensing bodies, and devise some amendment to their Act which would restrict or prohibit the practising of dentistry by untrained persons. The machinery at their command was not yet sufficiently powerful to reach those desirable ends, nor would it be so until they could secure, amongst other things, direct representation on the Medical Council.

Mr. MacLeod then vacated the chair, which was taken by the new President, Mr. F. Canton.

The President, after offering a cordial invitation to the association, observed that there was no teaching University in London, neither were the medical schools in London endowed with chairs, nor were there teachers, with a few exceptions, dignified by the title of professors, and yet he ventured to say that both schools and teachers were second to none in the influence which they exerted in the teaching of medical and surgical practice. Whether the advent of the great boon to the London students of a teaching University was at hand, or only in the distant future, they might take it for granted that it would come, and when that time occurred it would be for the executive of the association to see that the dental

profession received that recognition to which it was entitled. They must ever keep in view the advancing requirements of dental practice. Their profession was perhaps a little more difficult to deal with than some others, as they had a mechanical and surgical side as well as a more purely scientific one. One of the objects of the association should be to see that neither one side nor the other preponderated. To hit the happy medium was not an easy matter. Practically their curriculum was a five years' one, and he should like to see it declared as such, and the suggestion he should throw out was that the third year of the three devoted to dental mechanics should be devoted to hospital work, with a view to maturing and utilising the knowledge and skill required in the workroom. In that way one of those arbitrary and unsatisfactory divisions of their profession would be bridged over gradually and even unconsciously. Two very important subjects of their training might, he thought, be improved on, and those were dental histology and dental *materia medica*. The first especially should have a separate and well-organized department to itself in all their schools and include the elements of bacteriology. He believed that by having a declared five years' curriculum instead of four, and by having two examinations for the dental diploma, it would not be putting any extra strain on the student, but, on the contrary, would give him the extra time which was required by the average student to enable him to pass with greater ease. Their Act of Parliament did not prohibit advertising, which was the great misleader of the public. It had been suggested that possibly it might be of assistance to the public if they adopted the system of the Stock Exchange and made it known "That no member of the British Dental Association is allowed to advertise." That, however, would entail some alterations in their bye-laws, but as those changes would be of a utilitarian rather than of a sentimental character they might repay the necessary trouble by being profitable. That might enable the public to make a few more enquiries before consulting a dental practitioner. There were, of course, many respectable practitioners who were not members of the association, and it was to be regretted that such was the case. He could not help feeling strongly that it was the duty of every professional man to do his utmost to assist in the elevation and cultivation of the profession to which he belonged.

Mr. MUMMERY, in proposing a vote of thanks to the retiring President, alluded to the excellent way in which that gentleman had fulfilled the duties of the Chair.

Mr. BREWARD NEALE seconded the motion, which was carried by acclamation.

Mr. TOMES proposed a vote of thanks to Mr. Canton for his address.

Mr. SMITH TURNER seconded the motion. The motion was unanimously adopted.

Mr. MACLEOD and the PRESIDENT briefly acknowledged the vote of thanks.

The TREASURER then read his Annual Report.

Mr. STOREY moved, and Mr. LAWRENCE READ seconded, the adoption of the Report, which was agreed to.

The HON. SECRETARY (Mr. W. B. Paterson) read his Annual Report.

Mr. BRUNTON moved, and Mr. LEE RYMER seconded, the adoption of the report.

Mr. BLANDY referred to the paragraph in the report relating to dental advertising. He said, that at one of the meetings of the Representative Board it was proposed that legal opinion should be taken as to the powers of the General Medical Council to enforce their decision. It was a peculiar motion, seeing that it was for the General Medical Council itself to decide on the legality of its own proceedings. A resolution was passed by a large majority to obtain legal opinion, and good cases were afterwards produced to go upon which had been prepared with great care and submitted to the General Medical Council. At a subsequent meeting of the Board, however, it went back upon its decision asking for legal opinion, and refused to present cases. He had himself been put upon the Board because he had taken up the advertising question from so early a date as the Birmingham meeting. He had gone on with the matter ever since, and had succeeded in getting the support of the whole of the General Medical Council. He had seen Sir Dyce Duckworth on the subject, who had urged him to bring the matter forward. He had also interviewed another member of the Council, who could not understand the refusal of the Representative Board to take the matter in hand, and recommended him (Mr. Blandy) to persevere in his action, even if it led to the formation of another

society. He was, however, unwilling to produce a split. The Association was a splendid one, numbering 930 members. No doubt they were all anxious to promote the interests of their brother dentists, but many of them were too cautious, and were willing to stand still and leave their provincial brethren to be worried by advertising men. Mr. Oliver, of Cardiff, had taken the bull by the horns and formed a little Association consisting of 20 or 30 dentists, who had each guaranteed £10. They had thus formed the nucleus of a National Defence Union. He did not think it was any use to bring forward another resolution at the Representative Board. He was not fond of running his head against a wall, and he should not do it again. He felt no animosity towards any members, but he thought it was his duty to speak out. If the members generally refused to act, he, and others who were acting with him, would do their utmost to bring the question before the General Medical Council.

Mr. Smith Turner wished to know if the gentlemen in Cardiff had made any prosecution for advertising, because, if they had not, Mr. Blandy's claim to their support was a mistaken one.

Mr. Quinlan said that in Cardiff they had not interfered with advertising, but had simply prosecuted non-registered practitioners.

Mr. Oliver said that the Association at Cardiff was not a separate body from the British Dental Association, or in any way opposed to it. The body was formed for the purpose of more effectually carrying out prosecutions under the Dentists Act, and its members were perfectly loyal. Of the 22 members who had joined the Society, several had become members of the Association, and others were asking to be proposed. He believed that if the Association fulfilled the objects and desires of the members of the dentists' profession in South Wales they would all join, and he felt sure that the same thing applied to all the dentists throughout Great Britain. If the Association neglected the requirements and felt wants of the great mass of dentists it could not be expected that they would attach themselves to it. The Association had done good work, and was, perhaps, right in being cautious, but there was such a thing as an excess of caution. There was a time for all things. There was a time to be cautious and a time to prosecute the war in an energetic manner. The enemy was all around them, and the Association was by its constitution incapable of grappling

with the thousands of cases cropping up. Local associations were therefore required in every part of the kingdom to carry on the work. That was the only way by which the great evil of the unregistered practitioner could be satisfactorily dealt with. The result of the combination in South Wales had been that seven convictions had been already obtained. The fault that he found with the British Dental Association was that it had funds at its disposal but did not use them for that purpose. The *raison d'être* of the Association was the prosecution of such men as he had mentioned, and if it would perform its duty manfully he believed there would be no association in the kingdom so strong as the British Dental Association. He was quite sure that the requisite funds would be forthcoming. It was their duty to protect the public when it was swindled, to protect the great body of practitioners, and also the coming men of the profession, who were looking to them and asking what they had done to pave the way for the younger generation. A resolution had been sent up from the Western Counties Branch recommending the Association to assist and encourage the formation of local centres thoughout the kingdom, and he hoped that that resolution would be acted upon.

Mr. West wished to know why the consideration of the question of advertising had been withdrawn by the Representative Board.

The President said that the resolution that had been reported to the members had been adopted after a careful discussion. The matter had been referred to the solicitors, and when it came back to the Board, it was thought, in consequence of the information brought before it, that it would be unadvisable at present to bring the question of advertising before the General Medical Council.

Mr. Coxon thought that some reasons should be given for the conclusion arrived at.

Mr. Smith Turner said the members could hardly expect an explanation of the minutes of the proceedings of the Representative Board. Many things were there done that it would not be expedient to publish. If they could not trust their representatives they should turn them out ; he, for one, was perfectly ready to go.

Mr. Coxon was aware that Representative Boards could not always state the grounds for their actions, because questions of libel might arise. Still, he should be glad to know why the matter under discussion had been shelved.

Mr. CUNNINGHAM thought that the Association ought to know more of what was going on on the Representative Board, and how the members voted on the different questions brought before them. On the present occasion, however, he supported the Secretary's Report, because he thought it was unfair to ask questions from the authorities which they could not do justice to, either on the one side or the other.

The motion for the adoption of the report was put and carried.

The PRESIDENT said he was quite sure that any members of the Board would be happy, privately, to give any gentleman any information he might desire.

On the question of the meeting of 1897—

The PRESIDENT said that a cordial invitation had been received by the Association from the Irish Branch to hold its next meeting in Dublin, and it had been recommended that Dr. Theodore Stack should be the President, the meeting to be held in August, the precise date to be fixed by the Board later on.

Mr. CORBET said that if the invitation were accepted (which he proposed) he believed the Association would have a hearty and hospitable reception.

Mr. ANDREWS seconded the motion, which was unanimously adopted.

Dr. STACK thanked the members for electing him as President for the next year, and promised them a hearty welcome in Dublin.

The PRESIDENT announced that as the result of the ballot for ten members of the Representative Board the following gentlemen had been elected :—Messrs. L. Matheson ; S. Bennett ; W. E. Harding ; R. J. Lennox ; G. Cunningham ; Dr. Corbet ; T. Gaddes ; J. Walker ; F. W. Richards and W. Helyar.

The Sixth Report of the Schools Committee on the teeth of children was then read.

The following resolution, recommended by the Representative Board, was also read : " That the British Dental Association regrets that there is no mention of teeth or dentistry in the recent Report of the Departmental Committee of the Local Government Board on Poor Law Schools, although its attention has been called to the matter by statistics and by the evidence of the Local Government Board Inspector ; that this Association is strongly of opinion that the importance of the care of children's teeth, especially those of

the wage earning classes and the poor, should receive immediate attention by the Boards of Guardians and other authorities; and further, that all such school dental appointments should be made upon similar lines to those regulating medical appointments, and therefore subject to the inspection of the Local Government Board."

Mr. SMITH TURNER moved the adoption of the School Committee's Report. It showed, he said, that the matter in question was going on slowly but surely. It was not desirable to do things by rushes. On the whole, he regarded the report as extremely encouraging, and hoped that it would be unanimously adopted.

Mr. REDMOND seconded the motion.

Mr. STOREY said that in the districts of two Boards of Guardians in his town, honorary dentists had been elected who were both advertising men, and had undertaken to do the duties without fee or reward and without any regulations as to the amount of work to be done. He was sure that that was far from the intention of the Association or the Committee. Mr. Spokes had shown him a copy of the book or chart in which particulars were to be kept, and which had been approved by the Local Government Board Inspector. It would be placed by the Governor of the Board of Guardians in the hands of the honorary dentists, who would be required to keep an exact record of all the operations done. He suggested a similar course of action in other towns, with a view of preventing such honorary appointments.

Mr. OLIVER thought the question was one of national importance. He wished to know what powers Boards of Guardians had in regard to the payment of dental practitioners attending their schools. If they had no such power, machinery should be brought to bear so that such appointments should become general. As far as he had had the question of fees brought before him, he thought they were adequate for the work required to be done. All school children should have their teeth seen to regularly three times a year, and as thoroughly cared for as in the case of patients seen in private practice.

Mr. MAITLAND said that the Guardians had power to make a representation on the subject, which might be accepted or refused.

Mr. HEADRIDGE thought that the subject should apply only to the Boards of Guardians, and not to schools generally. There were

large numbers of children under the care of Boards of Guardians who were entirely without a dentist. They had only the ordinary surgeon to attend them, and their teeth were pulled out in the most clumsy fashion.

The motion for the adoption of the report was carried.

Mr. SMITH TURNER moved the adoption of the resolution following the report.

Mr. DENNANT seconded the motion, which was unanimously adopted.

The meeting was then adjourned.

Wednesday, August 12th.

AFTERNOON MEETING.

Mr. F. CANTON, President, in the Chair.

A Paper was read on "Some Experiments in Bridge Work," with lantern illustrations, by Mr. G. CUNNINGHAM, M.A.Cantab, L.D.S.Eng., D.M.D.

Mr. MAITLAND asked the author how his work, with its various complications, compared in speed with the older fashioned system.

Mr. HUNT asked to be enlightened on the subject of the experimental results in ordinary average cases. He was not himself partial to bridge work.

Mr. MATTHEWS was disappointed that the author had not touched upon the subject of "bridge-plates" as substitutes for "bar-corners," as mentioned in the printed abstract.

Mr. WYNNE ROUW thought the author had sacrificed almost entirely the æsthetic principle to that of use. Both, he thought, should be combined. No attempt appeared to have been made to contour the crown which did not take more time than blocking out the crown. A judicious admixture of the two might, he thought, have been adopted in some of the cases mentioned. With regard to the cantilever system it seemed to mean continuing the crown for the masticating surface over a space not occupied by teeth. In some of the models shown there appeared to be no other support for the continuation of the masticating surface. From his limited experience he thought that ledges so left formed a very favourable site for the collection of large masses of food, which could not be dislodged with ordinary efforts.

Mr. Breward Neale asked whether the author had found in the cantilever cases that the life or usefulness of the bridge was less than in a case supported definitely at each end.

Mr. C. O'Duffy said he had seen scores of bridges with their abutments on unprotected teeth, and the results, if not fatal, had been always injurious. He would never insert one without both ends of the bridge being attached to these crowns. The result he had noticed had been decay of the abutting teeth or else displacement by the pressure of masticating.

Mr. J. Dennant presumed that bridge work cases were only successful when they were specially selected. He should be glad to know something as to the percentage of failures in the direction say of periostitis in connection with teeth supporting the bridges.

Mr. Reinhardt said he had noticed that several of the cases shown had abutments or supports which were evidently living teeth. He had put crowns on living teeth by trimming up their enamel, and he had inferred that the patient would rather be seventeen years without the crown than have another one done.

Mr. G. Whittaker did not agree with the author in leaving such a large space underneath. He did not see any harm in having gold and porcelain teeth well pushed against the gum in preparing the crown. He had found that after a few years there was not much absorption, and in several cases none whatever, and he did not see the food lodging underneath. The gum became a hard, corny substance, and undoutedly the mucous membrane was very hard underneath. That was much more satisfactory than having a hollow space where food could lodge. He was in favour of small bridges. A few years ago he would have hesitated to destroy a nerve in say a central tooth if there were a good set of teeth with one central tooth perhaps knocked out, but lately he had been in the habit of destroying the nerve, although it was a perfectly sound central tooth, crowning it, and adding a tooth to it, and he thought that far preferable to using a large plate.

Mr. Beadnell Gill would be glad to know if the author had chosen fortuitous cases in which he brought not a crown but a mere rest on to a natural and healthy tooth. In the case of teeth that they might do what they liked with, and that could not very well produce decay, the system might be a good one, but those cases were very rare, and he feared would become still more so. With regard

to cutting down teeth which still retained their vitality or their pulp, he agreed that patients generally did not appreciate that proceeding. If Mr. Cunningham could show any method by which he could treat the more delicate mouths in which the necessity for applying bridge work most frequently arose, he should be very glad to hear it. He doubted if, after some years of experience, even Mr. Cunningham would recommend the frequent application of bridge work to the average class of mouth met with in general practice.

Mr. W. R. Humby said he should like some further information as to the irregularities in the manufacture of platinum-iridium. The author had stated that there was not a definite composition of iridium and platinum. There was a great need of a pure material, and the actual composition of gold and platinum ought to be known. If Dr. Cunningham had an analysis of the platinum he should be very happy to see it.

Dr. Cunningham, in reply, said that with regard to the question of speed there could be no doubt that the new work required more time and a greater exercise of mechanical skill than the ordinary methods. As to the "experimental results," they related, as stated in the abstract, to the character of suitable cements, so far he had not found out any particular cement which he was prepared to recommend as the best. The phosphate cement varied greatly, and those of the same makes often produced different results. The real factor in contour was to be found in coronal contours, which gave a good masticating surface. With regard to the length of life of cantilevers, his own life had been too short to come to any conclusion on the subject. A cantilever need not press on another tooth, and very often there was a great deal of useful wear where there was no other place to lean upon. His experience in regard to decay did not coincide with that of Mr. O'Duffy. He could give many instances in which, after several years, there was absolutely no decay when the patient took reasonable care of the appliance. He had had very little trouble with periostitis. In answer to Mr. Reinhardt, he might say that many of his patients, after going through their purgatory, were satisfied with the results. As to food collecting in the hollow spaces, that was not the case, because they were so hollow and clear that they were easily cleaned. He was glad to hear Mr. Whittaker's remarks about resting the appliance on the gum. He had spoken of the gum underneath being cornified. He

(Mr. Cunningham) knew other places where the mucous membrane disappeared and there was a raw ulcerated place. That was a matter to be tested by experience. He could not say whether his cases were "fortuitous," they were the best at his command.

Mr. Sidney Spokes, M.R.C.S., L.D.S.Eng., then read a paper entitled "Notes on Fracture and Hypoplasia."

The author suggested that the term Hypoplasia should be adopted for enamel defects instead of the misleading name of Erosion. Dr. Barton had come to the conclusion that the faulty development of enamel was mainly caused by errors in feeding during the first years of life, but the author did not propose to say much as to the etiology of Hypoplasia ; all were probably agreed that the defect was due to interference with the child's nutrition, and possibly several factors existed, any one of which might bring about the disturbance. The author gave statistics of 1,904 children from a Public School, Poor Law Schools, and Poor Law Ophthalmic Schools. Hypoplasia was present in 147 cases, distributed as follows :—

258	College Boys	...	12 or	4·6%
841	Poor Law Boys	...	60 „	7·1%
103	Ophthalmic Boys	...	17 „	16·5%
622	Poor Law Girls	...	47 „	7·5%
80	Ophthalmic Girls	...	11 „	13·7%

Must it not be assumed that the college boys were not subjected in early life to the same extent to the causes which produced Hypoplasia ? There might be some temptation also from the table to establish a relationship between eye affections and hypoplastic teeth, but the circumstances hardly warranted that, and the discrepancy must remain unexplained. In twelve instances the bicuspids shared in the defect, and although some denied that any later teeth were affected. Burten, of Würzburg, had recorded three cases where the second molars were affected, and Witzel claimed to have observed Hypoplasia of the third molars. No one could have many instances of Hypoplasia without noticing that the regularity of the tide-mark did not always coincide to the usually accepted ideas. Although 27 cases were found in which the upper laterals had escaped, the following were also noted :—Upper canines escaped : centrals and laterals affected ; molars escaped : molars alone affected. In the cases tabulated, instances of teeth modified in form (suppression of cusps) by syphilis, but not ridged or fitted as in ordinary

Hypoplasia, were not included. Six cases were met with where molar crowns were "modified," one with the upper centrals so affected, and two cases of the true Hutchinsonian type. In four other cases diagonised as subjects of hereditary syphilis the incisors and molars generally were modified and in one the incisors were peg-shaped, with the left upper central and right lower lateral incisors notched. Other cases of enamel defect, not included in the figures, were those where a single bicuspid had deficient enamel. It had been suggested that a local rather than a constitutional origin should be looked for in such cases, and a plausible explanation had been found in the shocking state in which abscessed temporary molars were sometimes seen, but curiously enough in none of the 37 instances met with did the records show that the molar which preceded the bicuspid was abscessed. On the other hand, there were seven or eight instances in which abscessed temporary molars were followed by bicuspids with perfectly sound enamel. The distribution of the faulty bicuspids was 8 in the upper jaw, and 29 in the lower, the right second bicuspid providing eleven instances, and the left second bicuspid nine. Out of 250 infants there were 15 cases where Hypoplasia affected the temporary teeth, whilst among the older children with permanent incisors and molars, but also with temporary canines and molars present, there were 10 instances of hypoplasic temporary teeth. Whatever the cause, it must occur *in utero*, and the author suggested that the prolonged attacks of vomiting in pregnancy, which sometimes appeared as late as the seventh month, might so interfere with the nutrition of the mother as to affect the developing teeth of the fœtus.

Mr. Smith Turner said he should have been glad if Mr. Spokes could have told them what the patients were suffering from in the Ophthalmic Hospital. Was it only ophthalmia entirely or were other eye diseases included? Frequently bicuspids had brown stains on the pit of the enamel—perhaps only one in a full set of teeth, but in those cases the dentine was stronger, and always able to take care of itself.

Dr. Greevers thought that the cases in which the bicuspids were concerned must be exceptional. In his experience they were sometimes affected, and he knew of a family in which all the seven children had hypoplastic teeth, all the bicuspids being likewise affected. One should be careful in pronouncing as to hypoplastia.

His experience had been, in following cases from very early childhood, that where only one bicuspid was affected it was generally due to the eruption of the teeth. The temporary molars had suffered from chronic periostitis, and he had found that they wanted roots, and either an abscess had been there or some inflammatory condition. He had sometimes fancied that he had detected a hypoplastic condition of the temporary teeth, but he had found on inquiry that the children, to keep them quiet, had been given to suck a composition of bread and sugar put into linen bags, and in those cases hypoplasia was well imitated. The children in England were better off than those in Holland, for in an orphan asylum which he had there visited, he had found the large majority of children with hypoplastic teeth; and even in the higher classes of society in Amsterdam he had found a large majority of children whose teeth were in that condition.

Mr. HARTLEY said that one cause of the hypoplastic condition had been held to be the visitation on the child of some disease of an eruptive character during the first few years of its life. He had, however, made inquiries on the subject, but had never been able to ascertain such to be the case. It had also been considered to be due to artificial feeding, but he had met with cases of hypoplasia where the child had been suckled up to the ninth or tenth month. He had found the children in the better classes, especially girls of an anæmic character and of a phthysical tendency, to be extremely marked with a hypoplastic condition.

Mr. BETTS said that in his experience the parents of the children generally acknowledged to a rather severe attack of illness of some kind. In one marked case under his care it was stated that during the first six months of life the child could take no milk food at all.

Mr. SPOKES, in reply, said he could not state what the children were in the hospital for. A large proportion were in for contagious ophthalmia, having been sent from the different parishes in the metropolitan area. The sound dentine of defective bicuspids was a thing generally recognised. It was easy to differentiate between a hypoplastic condition and an ordinary erosion caused by sugar food and acid secretions; but, no doubt, indirectly by giving a child starch at too early an age that condition was set up. There were now ten thousand cases waiting for investigation if some one could be found to do the work. A number of cases on board the

Exmouth training ship had been investigated by Mr. Paterson, who had accurately recorded the particular condition of hypoplasia in every child.

General Meeting, *Thursday morning, August 13th.*

Mr. F. Canton in the chair.

A paper was read by Mr. A. J. Woodhouse, entitled—

"Reminiscences of 54 Years in the Dental Profession."

He recalled some of his early recollections of fellow dentists, and said that in his younger days the great proportion of those who practised had no professional education, and, indeed many, little education of any kind. Modes of practice were jealously guarded, each working as a hermit in his cell. In Exeter, where he was in practice, dentists made most of their own instruments. The first dental depôt was started by Claudius Ash, in a small house in Broad Street, Golden Square. Before the days of the engine there was nothing but the file and the enamel chisel for dividing teeth, and these were freely used. The engine introduced by Morrison caused some trouble. He had to defend a patent action brought by the inventor of a sheep shearing and horse clipping machine. Wedging teeth was quite unknown, and until 1849 the syringe was not used, the loose fragments being removed with cotton wool and an excavator. The materials for hard stopping were gold and tin, precipitated silver and mercury and Sullivan for amalgams. The adhesive gold stopping was comparatively modern. It was invaluable in certain cases, but was often used when the old fashioned stopping would be much more suitable. The great objection to amalgams made from precipitated silver was that they stained the teeth black, and were not very hard, but they did not shrink, and often lasted for years. Conservative dentistry had greatly advanced of late years, and teeth were now preserved which formerly would have been ruthlessly removed. The dental pharmacœpia had also wonderfully developed. Anæsthetics were invented during his pupilage. They were an inestimable boon to both patient and operator. When he began practice in London, in 1848, he did all his mechanical work himself, often working till two in the morning. Mr. Woodhouse's paper concluded with some friendly advice to the younger members of the profession.

The PRESIDENT said the members were greatly indebted to Mr. Woodhouse for his excellent and interesting paper.

Mr. ROBBINS said that Mr. Woodhouse had had a unique experience, and few could tell such a tale of hard work and great success.

Dr. GEORGE BRUNTON also thanked Mr. Woodhouse for his agreeable and instructive reminiscences.

Mr. C. S. TOMES, M.A., F.R.S., M.R.C.S., L.D.S., then read a paper entitled "Notes on Dentinal Tubes and their Relation to other Channels and Spaces in Dentine," with Lantern Illustrations.

After some remarks by Mr. J. H. MUMMERY—

Mr. F. J. BENNETT asked how it was that the enamel, the densest structure in the body, and highly rigid, covered one highly elastic? Mr. Tomes's remarks on interglobular, or lacunæ, spaces might, perhaps, find confirmation in febrile conditions, such as scarlatina. Where interglobular dentine was formed it was possible to regard it, as Mr. Tomes suggested, as a reversion to an earlier condition.

Mr. CAUSH thought that the remarks of Mr. Bennett appeared to him to confirm Mr Tomes's theory. If there was no possibility of elasticity between the enamel and the pulp every time there was the slightest undue pressure it must necessarily be conveyed to the pulp.

Mr. TOMES, in reply, said that the question of the deadness of certain portions of the dentine had occurred to him only that morning. He was looking under the microscope at a specimen of Mr. Charters White, in which he had filled the tubes of the dentine of various teeth with stained collodion. It went to show that the tubes in the transparent zone in caries were permeable to some extent by collodion. He had suggested that Mr. White should set to work and see what was the condition as to permeability in the dentinal tubes of a rodent's tooth, and he had agreed to do so. As to the secondary dentines with lacunæ spaces and various irregularities in them being the form in which vascular dentine ceased to be vascular and became tubular dentine, there was possibly something in the idea. In places where there had been a little difficulty in the formation of the regular dentine, a dentine of that kind was formed. Mr. Caush's explanation as to the rigidity of a whole tooth was, he thought, a true one. In the room upstairs there might be seen prisms of enamel from a young elephant's teeth in their natural

condition, and from the same teeth—which had been calcined in a strong red heat in a muffle furnace—and there was no material difference between the two. A dead inelastic tissue had to be carried in continuity with a highly sensitive tissue like the pulp and periosteum, and they bridged between the inelasticity of the one and the sensitiveness of the other by a tissue of intermediate elasticity. Mr. Caush had not mentioned that if the whole tooth were as inelastic as the enamel, not only would the shock be conveyed to the pulp, but the whole tooth would probably split right down to the pulp under a strain which at present it bore quite well.

A paper was then read by R. T. Stack, M.D., F.R.S.I., L.D.S. Eng., entitled—

"Touch Bulbs in Dentine."

In connection with this subject several lantern slides were shown, and the paper took the form of explanations of the pictures presented. The author said he thought there was some warrant for assuming that the definite formations which appeared near the ends of the dentinal tubules when they had entered the enamel might fairly be set down to have a connection with the sense of touch. The first slide showed the processes of odontoblasts, having been pulled out from the dentinal tubules, and tracing that somewhat further, they came to the ramification and inter-communications of the dentinal tubules, and finally, to those definite endings in the enamel which appeared in a more or less bulbous shape. On reflecting what a wonderfully delicate sense of touch there was on the surface of the enamel, it would not be surprising to find a special development of the nerve endings at the inner side of the enamel, or, as far as possible, produced into the internal structure of the enamel. There were between the enamel and the dentine, and between the cementum and the dentine, and in the substance of the dentine itself in certain cases of defective development, spaces of a different character, more irregular in shape, both in the cases of the granular layers under the cementum and the enamel, and spaces also irregular, but in the main with an irregularity capable of explanation, in the inter-globular space of defective development. In young teeth, where the calcification of the dentine was not complete, there were spaces very much of the same character as those of the inter-globular spaces. In the case shown of a young tooth, the space in all probability

would have become entirely obliterated if the tooth had grown. One or two specimens were shown where a somewhat similar space was found towards the outer surface of the dentine close to the cementum. With regard to a later slide, the author thought the definite fusiform space could be traced into absolute connection with the large cement corpuscle, and would seem to point to some interchange of nutrient material between the cementum and the dentine. Further slides pointed rather to a general force communication between the cement corpuscles and the dentinal fibrils. With regard to the expansive bulbs in the under surface of the enamel, there was a great difference between the smooth outside surface of the enamel—on which no bacterium should be able to find a footing— and the inner surface, hollowed out, a very haunt for bacterial invasion. With regard to the somewhat similarly shaped spaces in the surface of the dentine close to the cementum communicating freely with the cemental corpuscles, he would ask was it yet established how far the dentine of a tooth from which the contents of the pulp chamber had been removed might be considered to be a dead tooth, or how far nutrition in the sluggish form required by the dentine might not be carried on in the collateral plasmic circulation through the cement corpuscles and the fusiform dilatation in the dentinal tubules.

Mr. Caush said that in staining he had found in many cases that there had been an absolute intercourse between the tubuli and the spaces found especially in the newly deposited tissue of dentine. He had been able to obtain stains passing right through into the enamel, even in the ground sections.

Mr. Tomes said that Mr. Mummery had a lantern slide of Dr. Dentry which probably he might show. The specimen showed a body very much of the form of many familiar nerve end organs, but it had a big hole in the dentine. It was obtained from the dentine of a temporary tooth. Mr. Mummery and himself had been looking at hundreds of dry sections of temporary teeth, and had never found anything like it. There was a little doubt about accepting the view that nerve end organs were common, or existed at all in the principal nerves of the dentine. If they were there he thought they would have a greater regularity. The occasional finding of a space which looked like a nerve end organ was not enough to prove that it contained a nerve end organ unless the thing had ceased to be functional and was in process of disappearance.

The whole physiology of dentine, and particularly of those outer layers, was very much unknown, and there were difficulties in the way of accepting Dr. Stack's or any other views.

Mr. MUMMERY exhibited Dr. Dentry's specimen.

Mr. F. J. BENNETT thought they should pause before attributing to many of the specimens shown by Dr. Stack a highly nervous condition.

Dr. STACK, in reply, said he had no "views" on the subject. He had tried, however, to show that the spaces were of a sufficiently regular character to warrant the assumption that they contained developments of the fibre. But when he said that the enamel had no doubt a delicate sense of touch, he did not mean to convey the impression that the enamel itself was sensitive. He meant that with a tolerably thick enamel on the top of the tooth there was a provision by which it could feel the minutest thing on it, and he could hardly conceive that that could be the case without some specially developed nerve on the inner surface. He did not lean to any particular view as to how the sensation was conducted.

Dr. E. H. ANGLE (St. Louis, U.S.A.), in the course of his paper (with Lantern Illustrations) on "Treatment of Certain Irregularities of the Teeth," described his special splints, and illustrated their use by descriptions of special cases.

Mr. CAMPBELL, in expressing his thanks for Mr. Angle's paper, said his experience with regard to protruding upper teeth was that there was a great tendency for the protrusion to return.

Mr. J. SMITH TURNER regretted that the subject could not be more fully considered.

Dr. ANGLE said he had only given a smattering of what might be said on the subject. If the members would go to St. Louis and stand by his chair they would be heartily welcomed, and he might be able to give them some points which would make the subject a little clearer.

MICROSCOPICAL SECTION.

Thursday Afternoon, August 13th.

Mr. C. S. TOMES, in the chair.

Mr. J. H. MUMMERY exhibited several slides showing certain pathological conditions in an elephant's tusk.

Mr. D. E. CAUSH, L.D.S.I. then read a paper (with Lantern Illustrations) on "Exostosis."

The CHAIRMAN thought the point of greatest interest was the great frequency of alternating actions of absorption and re-deposition.

Mr. HENRY proposed a vote of thanks to Mr. Caush for his interesting paper. He did not quite follow the author, who, in showing one of his earlier slides, seemed to imply that external inflammation excited action upon the internal lacunæ, causing enlargement and alteration of structure.

Mr. HOPEWELL SMITH asked Mr. Caush his opinion on the formation of inostosis, and if the structure was similar to that of exostosis?

Mr. CAUSH said he thought that the reason why they had inostosis was that exostosis commenced in most cases (except nodular exostosis) very near the apex of the tooth—where the tissues were, comparatively speaking, soft—where the granular layer was much larger and the tissue of a softer character than that nearer to the neck. The nearer they got to the neck the more dense the tissue, therefore, when there was a resulting inflammation they had a general absorption preceding exostosis. So far as he had microscopically examined the structure of inostosis he saw no difference between it and exostosis. He had found exostosis near the crown, but never at the root of the teeth.

A paper by Mr. HOPEWELL SMITH on "Some Dental Lesions induced by Caries," was withdrawn owing to lack of time in which to read it.

Mr. F. J. BENNETT exhibited a series of skiographs on teeth.

The CHAIRMAN suggested that a vote of sympathy should be passed to their President, Mr. Arthur Underwood, whose absence had been due to the illness of his wife.

Mr. HENRY said he should be happy to propose the motion.

Mr. F. J. BENNETT seconded the motion, which was unanimously adopted.

A vote of thanks was also accorded to readers of papers.

The CHAIRMAN said that Mr. Arthur Baker was the President of the Section for next year, but it would be desirable to elect also a President for the following year.

Mr. HOPEWELL SMITH proposed Mr. F. J. Bennett as the President elect for 1898.

Mr. CAMPBELL seconded the motion, which was unanimously adopted.

On the motion of Mr. HOPEWELL SMITH a vote of thanks was accorded to Mr. C. S. Tomes for presiding, and the Section adjourned.

Friaay, August 14th.

Mr. F. CANTON, President, in the Chair.

A paper on "The Mechanical Factor in the Eruption of Teeth hitherto Unrecognised," was read by Mr. T. E. Constant, M.R.C.S., L.R.C.P., L.D.S.Eng. Briefly stated, Mr. Constant's idea was that the pressure of the blood on the vessels under the teeth was the cause of the teeth moving into place.

Mr. C. S. TOMES thought Mr. Constant's idea a very possible one, and it had certainly been overlooked, but the circumstances under which it occurred were perhaps a little more complex than might be supposed from Mr. Constant's presentment of it. Blood pressure was equally distributed in all directions so long as the tooth was surrounded by vascular tissue, and an erupting tooth before it got clear of the gum had blood pressure in front as well as behind. It was, perhaps, Mr. Constant's idea that in the tissues in advance of the tooth, in the gum for instance, the blood pressure was kept in hand by the walls of the vessels, whereas in the tissue which he had often emphasized as gelatinous, and the tissue which was underneath it, the blood vessels had possibly less muscular tissue of their own walls, and so the blood pressure was bottled up in comparatively rigid tubes and let loose to act on the so-called gelatinous tissue underneath the tubes. He did not know whether that was Mr. Constant's idea, but there was something necessary to enable them to form any idea of a blood pressure under a tooth overcoming a blood pressure above. As Mr. Constant drew his diagram, it seemed to suggest that the arrangement was, with a good many exceptions, like the arrangements of a hydraulic press in which there was one little tube containing water, the pressure expanding out into a big chamber, and the same pressure existing over the whole area, so that the effective force was much greater. But he was not in a position to discuss the question at a moment's notice.

Mr. CONSTANT, in reply, said that Mr. Tomes's suggestion had occurred to him as a very strong objection ; but in the jaws that he had examined he had been struck by the great difference between

the surroundings of the tissues overlying the tooth and the tissue underlying it. He had been speaking of the purely mechanical aspect of the eruption. He was aware that while the root was going up there was a physiological process going on, and also another process, of which little was known, which was removing the superimposed tissue, so that it was only necessary to have a slight force constantly acting from below to cause the very slow gradual eruption that took place. The intermittent pressure given by the blood was highly favorable to such eruptions. If there was any insuperable objection to the idea he had brought forward he should be glad to be informed of it, as he had no wish to perpetuate a fallacy.

Mr. H. Rose threw on the screen photos of a case of extreme open bite. It was, he said, that of a girl of 19, all of whose teeth he extracted in order to give her a masticating surface. Her teeth in front were nearly three-quarters of an inch apart. The extraction, under gas and ether, took place on July 9th, and on August 7th he placed in the girl's mouth a temporary case by which she was making very good progress, both in regard to mastication and appearance. The patient would be in attendance, and he thought it would be acknowledged that the case, though treated from a purely mechanical aspect, was a fairly successful one.

Concluding Business Meeting.

The President said the next business was the alteration of the bye-laws in accordance with the resolution passed at the Edinburgh Meeting. The Representative Board had made the following recommendations :

Bye-Law XV to read :

"The Representative Board shall consist of the President, President-Elect and Vice-Presidents of the Association, and of at least forty Members, including the President and Vice President of the Board, the Treasurer, the Hon. Secretary, and the President and Hon. Secretary for the time being of each Branch of the Association, *and of Members elected by the Branches, and Members elected by the Association.*"

Bye-Law XVI. to read :—

"After the Members of the Representative Board, elected by the unincorporated body called by the same name, at a meeting held on March 3rd, 1879, have held office for two

years, *ten members* of the Board, selected by the members of the Board, shall retire annually. The vacancies thus created shall be filled up by the Members of the Association by *general ballot* from such of their number as have been nominated by not less than six Members of the Association; such nominations must be received by the Hon. Secretary not less than 30 days before the Annual General Meeting. In addition to its representation by the President and Hon. Secretary, *each branch shall annually elect one Member* to the Representative Board, who shall hold office for one year."

Bye-Law XVII. to read :—

"In order to carry out the election of the ten Members of the Representative Board elected annually by the Association, the Hon. Secretary shall issue voting papers to the Members of the Association as soon as possible after the nominations of candidates for election have been received, returnable ten clear days before the Annual General Meeting, and the voting papers so returned shall be examined by the President of the Representative Board in the presence of the Treasurer and Honorary Secretary, who shall have power to ask any other Member or Members of the Association to assist in counting the votes, or to take the place of an absentee, the result of the ballot to be announced at the Annual General Meeting.

"All Members of the Representative Board elected either by the whole Association or by branches, shall hold office from and after the termination of the Annual General Meeting at which their election is announced.

"All retiring representatives shall be eligible for re-election."

Alterations consequent upon the foregoing bye-laws as agreed to :—

Bye-Law XVIII., as at present known, will be cancelled, and new Bye-Law XVI. will take its place. The present Bye-Laws XVI. and XVII. will become XVIII. and XIX. respectively.

Mr. BLANDY moved, and Mr. KING seconded, the alterations proposed be adopted. The motion was carried.

The PRESIDENT said the next matter for consideration was the resolution sent up from the Western Counties Branch : "That the Representative Board of the British Dental Association be invited

by this Branch to encourage and assist in the formation of local centres for the purpose of more effectively carrying out the provisions of the Dentists Act." At the meeting of the Board there were no Western Counties gentlemen present to explain the resolution, and the Board was a little undecided as to what it meant. It was accordingly decided to submit it to the meeting for consideration.

Dr. HUNT apologised for the absence of Western representatives. He was not prepared to speak on the subject as he did not represent the branch.

Mr. REES-PRICE thought that as no representative was present the subject had better be dropped altogether.

Mr. WOODIWISS moved that the resolution be referred back to the Representative Board.

Mr. HUSBANDS seconded the motion.

Mr. SMITH TURNER said that Mr. Oliver had gone into the matter very fully at the opening meeting, and if the members would tax their memories a little they would have no difficulty in knowing what the branch meant and what its objects were.

The resolution was adopted.

The PRESIDENT said he was sorry to inform the members that the Treasurer, Mr. Betts, had resigned, much to their regret, and that it was necessary to elect a successor.

Mr. NEALE moved a hearty vote of thanks to Mr. Betts on his retirement for his very able management of the financial affairs of the Association.

Mr. SPOKES seconded the motion.

The motion was carried by acclamation.

Mr. BETTS acknowledged the vote of thanks.

Mr. SMITH TURNER proposed that Mr. William Hern be elected Treasurer.

Mr. MAITLAND seconded the proposal, which was unanimously adopted.

The PRESIDENT said the President of the International Dental Congress in Nancy had kindly sent a telegram of congratulation and good wishes, and that a suitable reply had been forwarded.

Dr. GEO. CUNNINGHAM asked if, in the reply, any expression of sympathy had been sent at the loss sustained by the National Society in the death of their first president, M. Paul Dubois, who, it would be remembered, was at the Brighton meeting.

Mr. Coxon, in seconding the motion, said he could testify to the courtesy extended by M. Dubois to all the members who attended the Congress at Paris.

The motion was then agreed to.

Votes of thanks were then passed to the Committee of Management of the Examination Hall ; the President and Members of the Royal College of Surgeons ; the President and Members of the Metropolitan Branch of the British Dental Association and other London Branches ; the Readers of Papers and Demonstrators ; the Members of the various Executive Committees, and to the Earl of Ellesmere.

The minutes of the business meetings were read and confirmed.

The proceedings then terminated.

The Demonstrations.

"Impression taking with Guttapercha," by J. H. Badcock, M.R.C.S., L.R.C.P., L.D.S. Eng.

"The Rönten X Rays as applied to Dentistry, by means of Photography (and possibly by means of Fluorescent Screen)," by C. A. Clark, L.D.S.I.

"On Filling Teeth with De Trey's Solila Gold," by J. Charters-Birch, L.D.S.I.

"The Various Methods of Attaching the Newland-Pedley Crown," by E. C. Dimock, L.D.S.Eng.

The root was ground down to a trifle below the gum margin, the nerve canal reamed out, and the pin fitted in it. The artificial crown being next selected, it was placed on the pin in the root. Then the part of the pin beyond the face of the root, not being in a proper direction, it was bent backwards to the required angle. The crown was fitted to the root, as one fits a tube tooth to a plate. The pin and crown were then fixed with phosphate cement. Other methods of fixing crowns shown in specimens :—*Specimens—a.* Prepared roots, showing the straight pins and also the forked pins, for the bifurcated roots of first bicuspids in position. *b.* Central root fitted with a crown and fixed with phosphate cement. *c.* Bicuspid crown fitted to root, the crown being fixed to the pin by Lennox's fusible metal. *d.* Bicuspid crown fixed to root with phosphate

cement, with an amalgam joint, without any attempt at accurate fitting of crown (quick method). *c*. Anterior root fitted with a gold ferrule cap and pin, to which the crown was attached with sulphur.

"A Small Bridge to carry a Lateral Incisor"; and also "The Morrison Crowning System," by W. M. GABRIEL, M.R.C.S., L.D.S. Eng.

"Filling Cervical Cavities with Gold by the help of the Herbst Needle," by W. R. HUMBY, L.D.S.Eng.

The rubber dam is adjusted in the usual manner, in the present case exposing eight of the anterior teeth; the dam secured by clamps on the first bicuspid on either side. The rubber is carried up between the teeth by a thread, the tooth to be stopped is thus in view, and it only requires the Herbst's needle to be applied—so that the gum and dam may be held out of the way—that our work on the cervical portion of tooth may be proceeded with. The needle in use is one made from a broken bur, the latter being ground to a fine point on the side of a carborundum wheel by gentle pressure and rotation; the latch end is broken off and any roughnesses at fracture smoothed away. The point is inserted beneath the free edge of the dam and passed upwards until the needle point has passed by the seat of caries, and the sound cement is felt to have been reached. Until now, the direction of the point has been upwards and backwards; when the true position is believed to be attained the direction is changed so that the needle stands out at right angles to the cement, the position to be retained throughout the operation. Securing the needle is very simple: one of the fingers of the left hand is placed on the projected rounded end of the needle, while the forefinger and thumb of the right grasp the middle, so as to release the left hand from its hold on the needle; the left hand thus being free, it is used to stretch the dam forward and draw it over the end of needle, the rubber, by its contraction towards the teeth, pulls the needle into firm contact with the cement. According to Dr. Herbst, this is the only hold the needle requires, but in consequence of a tendency to displacement, it is better to have a clip—such as are used for fastening neckties—passed under the rubber from the upper surface and made to grip the needle through the rubber. The clip is thus presented edgeways to the patient's face; to prevent local pressure a piece of domed metal is attached to edge of clip by soft soldering. This addition resting against the lip secures the needle

in position, and leaves both hands free during the greater part of the operation. If the mallet or disc is used, it is better to give the needle a little support by gently pressing it, but this precaution is only occasionally required. The advantages are : the entire absence of pain ; the very rapid adjustment of dam and needle, averaging two minutes ; the entire freedom from any obstruction to cavity ; no laceration of gum and no blood is drawn, the only evidence of any operation being a small red mark where the side of the needle rested against the gum margin, and there is no need for any ligature. Blocks would be required to describe the shape of the cavity, retaining point drills, etc.

"A Method of Repairing Bridge Work by Soldering within the Mouth," by H. BALDWIN, M.R.C.S., L.D.S.Eng.

"A Method of Treating Absorbed, Undeveloped, or Perforated Roots by Sponge-grafting," by G. BRUNTON.

"Electro-guaiacocaine-cataphoresis : its Application to Extraction, Sensitive Dentine, and Exposed Pulps," by H. B. EZARD, L.D.S. Edin.

The idea of driving medicaments into tissue electrically is by no means new. Indeed, it is said to date back to the early fifties. Some eight years ago I covered a large field of experiments with a view of discovering a method of electrically injecting cocaine into sensitive dentine (searching for that Utopia of dental surgery—a reliable obtundent). I had to suspend my experiments at that time owing to the fact that I could not procure or manufacture a method of reducing a current to zero—this being absolutely necessary, as tooth matter is sensitive to one-eigth of a volt and sometimes less. My attention was strongly recalled to the matter by a paper by Dr. W. J. Morton, of New York (Professor of Diseases of the Mind and Nervous System and of Electro-Therapeutics), which was quoted in *The Electrical Review*, of July 26th, 1895, on "Bleaching Teeth with H_2O_2 by means of Electro-Cataphoresis," and again by a paper by him in *The Dental Cosmos*, of January, 1896. In this latter paper I saw that the Electro-Therapeutic Company, of New York, had devised the very current controller for which I had so long and vainly sought. After much correspondence and (seemingly) a curious hesitancy on the part of the company to supply the instrument, I managed to procure the Wheeler Volt Selector which I now show you. The milliampere meter is not a necessary part of

the apparatus, and I use it simply to indicate the amount of current passing and of estimating the amount of leakage. Now, as to current, I do not favour the street supply, for, as I have already mentioned, a sensitive tooth will feel the minutest fluctuation. I prefer a primary or secondary current as being absolutely steady. Without doubt the most easily managed primary battery for dental purposes is my modification of the Poggendorf cell (see Proceedings of British Dental Association, August, 1895), but I find it more simple to use the "Gardner Plant" with 7 E.P.S.Co.'s. L type storage cells as a governor, keeping the cells fully charged. From this source you have a constant current of 15 volts (about) always ready for use. Dr. Morton gives as his formula, an 8 per cent. of cocaine hydrochlor in guaiacol. I have, however, obtained better results with a 20 per cent. solution. Guaiacol when electrolised has an abominable and penetrating odour. I have therefore concocted the following formulæ, either of which is more fragrant. Guaiacol c. cocaine 20 per cent.—of the above two parts, Otto of Roses one part ; or guaiacol c. cocaine 20 per cent., two parts of this to one part heliotropine. These are the positive solutions. The negative or sponge solution is —solution sodium chlorate 20 per cent. Now as regards the practical working of the apparatus. Join the wires from the Selector to the batteries. You have now to find the positive pole. The most simple method is to moisten a piece of white blotting paper (which has been saturated with iodide of potassium) and place it across the terminals, turn the knob until the dial indicates 10, in about one minute the positive pole will turn the paper a dark brown. To this screw you attach the application wire, to the other the negative or sponge wire. The subject of the present demonstration is a lateral incisor—pulp unexposed and fully alive. I propose to anæsthetise the pulp through the thick layer of carious dentine, expose it and remove it. The surrounding parts are first dried, and then protected by a napkin or dam, and any metallic filling is varnished with shellac varnish or guttapercha solution. In this case there will be a good deal of current leakage, as the two centrals are metal-backed pivots. The sponge electrode is saturated with the salt solution, and is held tight in the patient's hand. A small pledget of wool saturated with guaia-cocaine *cum rosa* is placed in the cavity, the indicator is placed at zero, and the needle applicator placed against the pledget. The current is now turned on very

gently, and without a jerk, the patient's lower eyelids being carefully watched, as they give the immediate indication of the current being felt. On that indication the current is to be slackened, say one third of a volt, and left stationary for a minute, and in this way you proceed until the patient is unconscious of any increase or cessation of current. The time necessary varies from seven to 47 minutes, depending largely on the condition of the patient and the initial current which can be borne without pain. (The pulp took 42 minutes to cataphorise and remove.) I do not recommend you to try it for extraction, for although the extraction is painless, the guaiacol has too strong an escharotic action on the mucous membrane. It appears to me that the great utility of this guaia-cocaine cataphoresis is in such cases as this, viz., for immediate treatment of exposed putrescent and aching pulps. Suppose a case presents itself with pulp exposure possessing the distinct phosphatic odour—isolate it with dam—cataphorise it (this, as a rule, only takes seven minutes) excavate thoroughly, and cover it with a transparent celluloid cap (the advantage of these transparent caps is that you can see the actual exposure) and fill right off. I know it is heresy to publish such a treatment in defiance of "the books," but I argue that if you mummify and embalm the pulp, and then seal it up, you cannot have any more trouble, and such has been my practical experience with this treatment for six months. I hope many more of our profession will advance along the same line and give the results of their experience at the Dublin meeting next year.

"The Chief Essentials for Success in Administering Anæsthetics for Dental Operations, with Special Reference to the Subject of Posture," by Fredk. Hewitt, M.A., M.D.Cantab.

"Plaster Impressions of the Mouth in Easy and Difficult Cases," by W. A. Hunt, M.R.C.S., L.R.C.P.Lond.

"Nerve Extraction," by E. Preedy, L.D.S.Eng.

Mr. Edward Preedy removed pulps from recently extracted teeth mounted in various positions in a Fergus' headpiece. The instruments used were Donaldson's Canal Cleansers, and the special points illustrated by the Demonstrator were :—*a*. Direct access to the canals so as to permit of the free rotation of the instrument. *b*. The use of the cleanser, cut down to about one inch in length and thickened with sealing wax to form a handle in order to allow their

being rotated in distal cavities and those difficult of access at the back of the mouth.

"The Büttner Crown in Conjunction with the Downie Furnace," by J. H. BADCOCK, M.R.C.S., L.R.C.P., L.D.S.Eng.

"On Continuous-gum and Crown-and-Bridge Furnaces, and a New Porcelain Crown," by J. H. GARTRELL.

"Putting a Porcelain Facing on a Live Honeycombed Incisor," by PETER HEADRIDGE, L.D.S.I.

"Porcelain Crowns, using the Downie Furnace," by WILLIAM HERN, M.R.C.S., L.D.S.Eng.

"A Method of Preparing and Inserting Dove-tailed Porcelain Inlays in Incisor Teeth," by F. R. HOWARD, L.D.S.Eng.*

"Fitting a Dowel Crown to a Living Front Tooth, Working to a Model, and using, if practicable, one of Ash's New Crowns," by A. JONES, L.D.S.I., and R. P. LENNOX.

"Crowning, using the Downie Furnace," by W. J. MAY, L.D.S. Eng.

"The Röntgen Rays," by J. H. MUMMERY, M.R.C.S., L.D.S. Eng.

"Filling Teeth with Gold, and Tin and Gold," by H. W. NORMAN.

Gold and tin contour filling in a bicuspid : the cavity being cut in form of double wedges, the tin cylinders were placed in a layer at cervical edges, firmly welded, and the filling finished off in the usual manner with gold foil. The tin was not trimmed up till after the cavity was filled.

"Filling Posterior Interstitial Cavity in a Bicuspid with De Trey's Solila Gold, using a Matrix," by G. NORTHCROFT, L.D.S.Eng., D.D.S.Mich.

"Platinum and Porcelain Crowns," by H. ROSE, L.D.S.Eng.

"Crowning Front Teeth Without Pins in the Root-Canal using only Band, Porcelain Front and Downie Body at Back," by G. O. WHITTAKER, L.D.S.Eng.

"Plastic Filling by the Aid of the Ferrule Matrix," by GEORGE CUNNINGHAM, M.A.Cantab., L.D.S.Eng., D.M.D.Harv., and E. C. DIMOCK, L.D.S.Eng.

In the demonstration of plastic contour filling by the aid of this matrix, it was shown how quickly and easily the latter can be

* The substance of this Demonstration will appear in an article in our next issue. - EDITOR.

applied, and the largest compound cavity converted into a simple one. A number of the matrices should be kept ready for use, arranged in graduated sizes in box or boxes, with about two dozen partitions. Thus, when fitting one of these matrices, if the first one is not quite correct in size, try it on the measured mandril, and select another, smaller or larger, as the case may be, till one be found to fit. The matrices are made from the Herbst or any German silver strips of about No. 2 thickness. A sheet of this metal should be taken and cut up into strips of different lengths and depth ; then, each of these strips should be bent into a ferrule with an overlapping joint, and soldered with soft solder over a spirit lamp. From one to two hundred of these can be made in a day. When the edge of the cavity to be filled is deep under the gum, the matrix should be cut freely away at its cervical edge to fit the gum, except that part of it which corresponds to the cavity ; thus a flange can be left at any required position. The matrix should be left on the tooth until the next appointment, when it should be carefully removed and the filling polished. The matrix may also be used for gold contour fillings, and also for measurement in crown or bridge work. Immmediate root filling, taper screw posts, adjustable holder for pulp canal cleansers, the Kirby amalgam balance and mixer, and the use of a contour amalgam of known ingredients were included in this demonstration.

"The Hydraulic Swager," by C. D. GRUNDY.

"A Simple Method of making Richmond Crowns," by VERNON KNOWLES, L.D.S.Eng.

"A Series of Preparations showing a Method of Strengthening Vulcanite Plates," by C. R. MORLEY, L.D.S.Eng.

"Making a Furnace for Baking Porcelain," by WILLIAM RUSHTON, L.D.S.Eng.

"Open Bite," by J. F. COLYER, M.R.C.S., L.R.C.P., L.D.S.Eng.

"The Mechanical Factor in the Eruption of Teeth Hitherto Unrecognised," by T. E. CONSTANT, M.R.C.S., L.R.C.P., L.D.S.Eng.

Mr. SIDNEY SPOKES, M.R.C.S., L.D.S., exhibited in the Theatre models showing the results of the immediate regulation of teeth.

STUDENTS' SUPPLEMENT.

Registration of Dental Students.

The registration of dental students shall be carried on at the Medical Council Office, 299, Oxford Street, W., or at the Branch Offices, 1, George Square, Edinburgh, and 35, Dawson Street, Dublin.

Every dental student shall be registered in the manner hereinafter prescribed by the General Medical Council.

No dental student shall be registered until he has passed a preliminary examination, as required by the General Medical Council,* and has produced evidence that he has commenced dental study.

The commencement of the course of professional study recognised by any of the qualifying bodies shall not be reckoned as dating earlier than fifteen days before the date of registration.

Students who commenced their professional education by apprenticeship to dentists entitled to be registered, or by attendance upon professional lectures before July 22nd, 1878 (when dental education became compulsory), shall not be required to produce evidence of having passed a preliminary education.

Candidates for a diploma in dental surgery shall produce certificates of having been engaged during four years in professional studies, and of having received three years' instruction in mechanical dentistry from a registered practitioner.

One year's *bonâ fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted as one of the four years of professional study.

The three years of instruction in mechanical dentistry, or any part of them, may be taken by the dental student either before or after his registration as a student ; but no year of such mechanical

* Exception may be made in the case of a student from any Indian, Colonial, or foreign university or college who shall have passed the matriculation or other equivalent examination of his university or college, provided such examination fairly represents a standard of general education equivalent to that required in this country.

instruction shall be counted as one of the four years of professional study unless taken after registration.

Forms of registration may be obtained at the office of the General Medical Council. No fee is required for registration as a student.

Resolutions of the General Medical Council in regard to the Registration of Medical and Dental Students.

Preliminary Examination.

1. Subject to such exceptions as the Council may from time to time allow, every dental student shall, at the commencement of his studentship, be registered in the manner and under the conditions prescribed by the *Standing Resolutions* of the Council.

2. No person shall be allowed to be registered as a dental student unless he shall have previously passed a preliminary Examination in the subjects of general education as hereinafter provided.

3. It shall be delegated to the educational committee to prepare and issue, from time to time, a list of examining bodies whose examinations fulfil the conditions of the medical council as regards general education.

4. Testimonials of proficiency granted by educational bodies, according to the subjoined list shall be accepted, the Council reserving the right to add to or take from the list.

5. A degree in arts of any university of the United Kingdom, or of the Colonies, or of such other Universities as may be specially recognised from time to time by the medical council, shall be considered a sufficient testimonial of proficiency.

List of Preliminary Examinations held in Great Britain which are Recognised by the General Medical Council for Registration of both Dental and Medical Students.*

Victoria University.—Entrance Examination in Arts; Preliminary Examination.

* With few exceptions the Council will not in future accept any Certificates of Pass in Preliminary Examination in General Education, unless the whole of the subjects included in the Preliminary Examination required by the Council for Registration of Students of Medicine have been passed at the same time; but this rule shall not apply to those who, previous to January, 1892, have passed a part of any Preliminary Examination recognized by the Council.

University of London.—Matriculation Examination.

University of Oxford.—Responsions; Moderations; Local Examination (Junior and Senior).

University of Cambridge.—Previous Examination; General Examinations; Local Examinations, Junior, Senior, and Higher.

University of Durham.—Preliminary Examination in Arts, for Graduation in Medicine and Science; Examination for Certificates of Proficiency.

University of Wales.—Matriculation Examination.

Universities of Edinburgh, Glasgow, Aberdeen, and *St. Andrews.*—Preliminary Examination for Graduation in Science, or Medicine and Surgery; Local Examinations (Junior or Senior Certificate); Examination for Degree in Arts.

University of Dublin.—Public Entrance Examination; General Examination, at end of Senior Freshmen year; Examination for Degree in Arts.

Royal University of Ireland.—Matriculation Examination.

Oxford and Cambridge Schools' Examination Board.—Lower Certificate; Higher Certificate.

Royal College of Preceptors.—Examinations for a First or Second Class Certificate (1st or 2nd Division); Preliminary Examination for Medical Students.

Royal College of Physicians and Surgeons of Ireland.—Preliminary Examination.

Intermediate Education Board of Ireland.—Junior, Middle, or Senior Grade Examination.

Educational Institution of Scotland.—Preliminary Medical Examination.

Pharmaceutical Society of Great Britain.—Preliminary and Minor Examinations (*pro tanto*).

Scotch Educational Department.—Leaving Certificate in each grade and in Honours.

A list of Examinations recognised by the General Medical Council, held at Colonial and Foreign Universities and Colleges may be obtained from the Medical Council.

Regulations of the Various Examining Bodies for the Diploma in Dental Surgery (L.D.S.).

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
1—Preliminary Examination	Compulsory on all who commenced their Professional Education after July, 22nd, 1878. Must be registered as a Dental Student at the office of the General Medical Council, 299, Oxford St., London, W.	Compulsory on all who commence their Professional Education after August 1st, 1878. This differs slightly from that required by the English College.	Compulsory on all, except those who have passed one equivalent examination.	Compulsory on all who commenced the Professional Education after August 1st, 1878.
	Must be duly registered.	Must be duly registered.	Must be duly registered.	Must be duly registered.
2—Age at which the Candidate may present himself	Twenty-one.	Twenty-one.	Any age, but diploma cannot be granted until he is twenty-one.	Twenty-one.
3—Duration of Professional Education ...	Four years subsequent to registration,	Four years.	Forty-five months. (Four Academic years)	Four years.
4—Courses of Lectures, &c., to be attended at a recognised School:—		*** For students commencing after October, 1890. (3.)		
Anatomy	A Course of Lectures during not less than six months or one Winter Session...	One Winter Course. (Six months.)	One Course.	One Winter Session.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Physiology	One Course. (Six months.)	Six months.	One Course.	One six months' Course.
Practical Physiology (separate from above)	Three months' Course.		One Course.	
Chemistry	Instruction in, which must include Practical Chemistry and Physics.	Ditto (held to embody Metallurgy).	One Winter Course.	Ditto.
Practical Chemistry	One Course.	Three months.	One Summer or Winter Course (including Metallurgy).	Three months (includes Metallurgy).
Materia Medica	Instructions in Chemistry, Practical Chemistry and Materia Medica need not be taken in the general hospital and may be taken before registration. *** Attendance at Class Examinations obligatory.	Three months.		Ditto.
Dissections and Practical Anatomy	Twelve months.	One Course of Twelve months (Practical Anatomy).	Two Winter Courses (including Dissections and Demonstrations.	Twelve months (Dissections).
Metallurgy	One Course.		Included in Chemistry Lectures.	One Course.
Surgery...	Six months, or one Winter Session.	One Course.		One Course.
Medicine	Six months, or one Winter Session.	One Course.		One Course.
Practice of Surgery, and Clinical Lectures	Two Winter Sessions.	Six months (at a recognised Hospital.)	Two Sessions of nine months each.	Not less than six months.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Dental Anatomy and Physiology, Human and comparative	Two Courses.	One Course. Twenty-four Lectures.	One Course.	Twenty-four Lectures.
Dental Surgery& Pathology	Two Courses.	One Course. Twenty Lectures.	Two Courses.	Twenty Lectures.
Dental Mechanics	Two Courses. *** Attendance at class Examinations obligatory.	One Course. Twelve Lectures.	Two Courses.	Twelve Lectures or Demonstrations.
Practical Instruction in Mechanical Dentistry ...	Three years under the instruction of a competent Practitioner, or under the direction of the Superintendent of the Mechanical Department of a recognised Dental Hospital, where the arrangements for teaching Mechanical Dentistry are satisfactory to the Board of Examiners in Dental Surgery. In the cases of qualified Surgeons evidence of a period of not less than two instead of three years of such instruction will be sufficient. This instruction may be taken prior to the Date of Registration as a Dental Student.	Three years under a Registered Dental Practioner, or in Mechanical Department of a recognised Dental Hospital whose arrangements are held to be satisfactory to the College (4).	Not less than three years under a Registered Dentist in acquiring a practical familiarity with the details of Mechanical Dentistry.	Three years under a Registered Practioner. Attendance at Hospital (6).

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Practice of Dental Surgery in a recognised Dental Hospital, or in the Dental Department of a recognised General Hospital	Two Years.	Two years.	Two years (7).	Two years (7).
5—FEE	£21 over and above stamp duty. For all Students registered *on or before* October 1st, 1894, £10 10s.	£4 4s. for First. £6 6s. for Second.	£10 10s. for First, and £10 10s. for Final. Fees for re-examination £5 5s. each part.	£4 4s. for First. £6 6s. for Final.
6—LEAST period during which unsuccessful Candidates are referred to their studies	Six months, subject to the decision of the Board and, before re-examination must produce a certificate of three months' additional study at a general hospital and at a special hospital.	Three months. *** No candidate admitted to this Examination who has been rejected by any other Licensing Board within three months.	Three months.	Six months. *** No candidate admitted to this examination who has been rejected by any other Licensing Board within three months.
7—PARTICULARS OF EXAMINATION	One Examination. (A) *First Day* (*Written*). On Anatomy and Physiology; and Surgery and Pathology. (Two questions on each. Time two hours.) On Dental Anatomy and Physiology; and Dental Surgery and Pathology. (Three questions on each. Time three hours.)	*Written and Oral:* (3). 1st Part—Anatomy, Physiology, Chemistry with Metallurgy.	Two examinations. *Primary:* *First Day* (*Written*). 10 a.m. to 1 p.m. Five questions on Physics and five on Chemistry, including Metallurgy, three on each to be answered. 3 p.m. to 6 p.m. Five questions on Anatomy, and five on Physiology and Histology, three questions on each to be answered.	*Written, Oral & Practical:* 1st part—Anatomy, Physiology, Chemistry, and Metallurgy.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Particulars of Examination.—*continued*	(B) *Second Day* (*Practical*). (*a*) On the treatment of Dental Caries, and preparing filling cavities with gold or plastic filling or other material, or other operation in Dental Surgery. [Candidates must provide their own instruments.] (*b*) On the mechanical and Surgical treatment of the various irregularities of Children's teeth. (*c*) In Mechanical Dentistry. (B) *Third Day* (*Oral*). Fifteen minutes each on Anatomy, Surgery, Dental Anatomy, and on Dental Surgery.	2nd Part—Surgery, Medicine, Therapeutics, and Special subjects of Dental Anatomy and Physiology, Dental Surgery, Pathology, and Dental Mechanics. Registered Medical Practitioners are examined on special subjects only. There is a Practical Clinical as well as Written and Oral Examination in Dental and Oral Surgery. Pathology and Mechanics.	*Primary :—continued.* *Second Day* (*Written and Oral*). 10 a.m. to 11.30 a.m. (*Written*). Five questions on Surgery. Three to be answered. 4 p.m (*Oral*). 15 minutes in each of the following subjects—Chemistry, Anatomy, and Surgery. *Third Day* (*Practical*). Practical Examination in Chemistry and Histology at Royal College of Surgeons. Candidates are examined for at least half-an-hour in each subject. *Final :* *First Day*. Practical examination in Clinical Dental Surgery and Practical Operative Dentistry, and Mechanics. Candidates are required to provide their own Instruments and gold for filling.	2nd Part—Surgery, Medicine, Materia Medica, and special Dental subjects. Practical Examination at a Dental Hospital. Candidates are to bring Excavators, Files, and Plugging Instruments.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Particulars of Examination.—*continued*			*Final—continued.* *Second Day* (*Written*). 10 a.m. to 1 p.m. Five questions in Dental Surgery and five in Dental Anatomy, three to be answered. 4 p.m. to 5.30 p.m. Five questions in Dental Mechanics (including Dental Metallurgy), three to be answered. *Third Day* (*Oral*), 4 p.m. Oral Examination, for 15 minutes, in Dental Anatomy and Physiology, Dental Surgery, and Dental Mechanics.	
8—Date of Examination	May and November. N.B. — Candidates who register as dental students after Jan. 1st, 1897, are required to pass three examinations, and the curriculum differs slightly from the above. The first Examination is a Preliminary Scientific, and should be passed *during the three years* devoted to	I. *Primary* Examinations Tuesday, April 27, 1897. ,, July 27, 1897. II. *Final* Examinations. Following Thursday. N.B.—Students who commenced their professional education by apprenticeship, before July 22, 1878, are exempted from the PreliminaryExamination	*Primary* Examinations. Second Monday in February, May & November. *Final* on the Tuesdays following. Candidates must be registered Dental Practitioners in practice before 1878.	May and October. The Second Examination takes place on the two days following these dates.
9—Modified Conditions of Admission to Examination. (2). (*a*) Conditions of eligibility.				

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
9—Modified Conditions of Admission to Examinations (*cont.*) (2).	Mechanical Dentistry. Particulars of these were published in our last issue and can be obtained of the Secretary.		Certificates of moral and professional character, stating he has been five years in practice, and has not attracted business as a dentist by advertising or other unbecoming practices, signed by two gentlemen holding Irish Medical or Dental Diplomas, members of the B.D.A. or Odontological societies.	
(*b*) Certificates, &c., required.			Name. Age. Address.	
			Date of commencing practice, and whether such practice has been carried on in conjunction with any other business, and if so with what business.	
			Professional status.	(8)
			Particulars of Professional Education.	Various undertakings as to Professional conduct, &c., have to be made by the Candidate.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
9—Modified Conditions of Admission to Examinations (*cont.*) (2).				
(*c*) Manner of Examination				
Fee...		First Examination, £4 4s. Second Examination, £6 6s.	First Examination, £10 10s. Second Examination, £26 5s.	
For further information apply to Secretary.	F. G. Hallett, Esq., Examination Hall, Victoria Embankment, London, W.C.	Francis Cadell, M.B., F.R.C.S.E., Secretary and Treasurer, 22, Ainslie Place, Edinburgh.	G. F. Blake, J.P., Royal College of Surgeons, Dublin.	Alex Duncan, Esq., Faculty of Physicians and Surgeons, Faculty Hall, 242, St. Vincent Street, Glasgow.

(1.) Candidates who are Members of the College, or who have passed the Examination in Surgery of the Examining Board in England, or who shall produce evidence of having passed the Examination in Surgery for the Licence in Surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in Surgery for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from re-examination in General Surgery and Pathology.

(2.) Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the Examination in Anatomy and Physiology required for the Licence in Surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an Examination in Anatomy and Physiology required for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from re-examination in those subjects.

(3.) For curriculum required for Students who have commenced their studies *prior* to 1st October, 1890, see Prospectus of Regulations, page 5.

(4.) One year's *bonâ fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted as one of the four years of professional studies. The three years of instruction in mechanical dentistry, or any part of them, may be taken by the student either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

(5.) Candidates who have passed the First and Second Examinations of the Examining Board in England, or who shall produce evidence of having passed the First and Second Examinations of the Scottish Conjoint Board; the third Professional Examination of the Royal College of Surgeons in Ireland; the corresponding Examinations required for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from the First Dental Examination.

(6.) Attendance for two years at a recognised Dental Hospital, or the Dental Department of a recognised General Hospital, in which special provision is made for the proper training of Dental Students.

(7.) Practice of recognised General Surgical Hospital required for six months.

(8.) Candidates qualified in Medicine and Surgery are admitted to the Final Examination on producing evidence of attendance in the Special Dental Courses, including Two (instead of Three) Years' Practical Instruction in Mechanical Dentistry; and they are examined on the Special Dental Subjects only. Candidates who have passed the Examination in Anatomy, Physiology and Chemistry, before any recognised Medical Board are exempt from the First Examination.

THE DENTAL HOSPITAL OF LONDON MEDICAL SCHOOL,

LEICESTER SQUARE.

DENTAL HOSPITAL.

Consulting Physician.—Sir Richard Quain, Bart, F.R.S.. M.D., F.R.C.P., LL.D.

Consulting Surgeon.—Mr. Christopher Heath, F.R.C.S.

Consulting Dental Surgeons.—Mr. T. Arnold Rogers, M.R.C.S., L.D.S.; Mr. J. Smith Turner, M.R.C.S., L.D.S.

Dental Surgeons.—Storer Bennett, F.R.C.S., L.R.C.P.. L.D.S. ; C. E. Truman, M.A.Cantab., M.R.C.S., L.D.S. ; Leonard Matheson, L.D.S. ; E. Lloyd Williams, L.R.C.P., M.R.C.S., L.D.S., L.S.A. ; W. B. Paterson, F.R.C.S., L.D.S. ; W. H. Woodruff, L.D.S.

Assistant Dental Surgeons.—A. Clayton Woodhouse, M.R.C.S., L.D.S.; J. F. Colyer, L.R.C.P., M.R.C.S., L.D.S ; C. F. Rilot, L.R.C.P., M.R.C.S., L.D.S. ; H. Baldwin, M.R.C.S., L.D.S. ; H. Lloyd Williams, M.R.C.S., L.D.S. ; W. H. Dolamore, L.R.C.P., M.R.C.S., L.D.S. ; Percy Smith, L.R.C.P., M.R.C.S., L.D.S. ; G. Hern, L.R.C.P., M.R.C.S., L.D.S. ; J. G. Turner, L.R.C.P., F.R.C.S., L.D.S. ; W. R. Barrett, L.R.C.P., M.R.C.S., L.D.S. ; Ashley Densham, L.R.C.P., M.R.C.S., L.D.S.

Anæsthetists.—Dudley W. Buxton, M.D., B.S.Lond., M.R.C.P. Lond. ; Frederic W. Hewitt, B.A., M.D.Cantab. ; Carter Braine, F.R.C.S. ; Henry Davis, M.R.C.S., L.S.A.

Assistant Anæsthetists.—George Rowell, F.R.C.S. ; A. S. Bridger, M.D.Edin. ; R. Turle Bakewell, M.B.Lond., M.R.C.S., L.R.C.P. ; Harvey Hilliard, L.R.C.P., M.R.C.S.

Demonstrators.—N. G. Bennett, L.D.S. ; H. J. Stevens, L.D.S. ; D. P. Gabell, L.R.C.P., M.R.C.S., L.D.S. ; W. S. Nowell, M.A.Oxon., L.D.S.

Medical Tutor.—W. H. Dolamore, L.R.C.P., M.R.C.S., L.D.S.

Curator of Mechanical Laboratory.—W. E. Fletcher.

MEDICAL SCHOOL.

Dental Anatomy and Physiology (Human and Comparative)—Charles S. Tomes, F.R.S., M.A.Oxon., M.R.C.S., L.D.S.Eng. ; on Wednesdays and Saturdays, at 8 a.m. (Summer).

Dental Surgery and Pathology.—Storer Bennett, F.R.C.S., L.R.C.P., L.D.S., on Tuesdays and Fridays, at 8.0 a.m. (Summer).

Mechanical Dentistry.—E. Lloyd Williams, L.R.C.P., L.S.A., M.R.C.S., L.D.S.Eng., on Wednesdays, at 5 p.m. (Winter).

Metallurgy in its application to Dental Purposes.—Dr. Forster Morley, M.A., F.I.C., F.C.S., on Thursdays, at 5 p.m. (Winter).

Fee for the Special Lectures and Hospital Practice required by the Curriculum, £50 in one payment, or 50 guineas when paid in two yearly instalments.

All fees are payable on day of entry.

FEES FOR SINGLE COURSES.

	£	s.	d.
Dental Anatomy and Physiology, one Course	5	5	0
,, ,, two Courses	8	8	0
Dental Surgery, one Course	5	5	0
,, two Courses	8	8	0
Dental Mechanics, one Course	5	5	0
,, two Courses	8	8	0
Metallurgy, one Course	5	5	0
,, two Courses	8	8	0

Qualified Medical Men or Gentlemen holding Foreign Diplomas to practice in their native country, can receive six months' practical instruction in the Hospital, fee 20 guineas.

Students who perform Operations for Filling Teeth must provide their own instruments for the same, the approximate cost of which is £25.

For further particulars apply to the Dean, who attends at the Hospital every Wednesday from 10 a.m. to 12 noon.

Morton Smale, *Dean.*

NATIONAL DENTAL HOSPITAL AND COLLEGE,

GREAT PORTLAND STREET, W.

HOSPITAL STAFF.

Consulting Physicians.—Sir W. H. Broadbent, Bart., M.D., F.R.C.P. ; Sir B. W. Richardson, M.A., M.D., F.R.S.

Consulting Surgeons.—Sir Spencer Wells, F.R.C.S. ; Christopher Heath, F.R.C.S.

Consulting Dental Surgeon.—Sir Edward Saunders, F.R.C.S.

Hon. Visiting Physician.—James Maughan, M.D.

Hon Visiting Surgeon.—E. W. Roughton, F.R.C.S., etc.

Dental Surgeons.— Monday, F. Henri Weiss, L.D.S.Eng. ; Tuesday, Alfred Smith, L.D.S.Eng. ; Wednesday, Marcus Davis, L.D.S.Eng. ; Thursday, T. G. Read, L.D.S.Eng., D.M.D. ; Friday, W. Rushton, L.D.S.Eng. ; Saturday, C. W. Glassington, M.R.C.S., L.D.S.Edin.

Assistant Dental Surgeons. — Monday, Willoughby Weiss, L.D.S.Eng.; Tuesday, Edgar Beverley, L.D.S.Eng.; Wednesday, Sibley W. Read, L.D.S.Eng.; Thursday, J. W. Pare, M.D., L.D.S.Eng.; Friday, W. H. Wheatley, L.D.S.Eng.; Saturday, H. J. Relph, L.D.S.Eng.

Anæsthetists.—Monday, G. B. Flux, M.D.; Tuesday, C. H. Cozens, M.R.C.S., L.R.C.P.; Wednesday, C. J. Ogle, M.R.C.S., L.S.A.; Thursday, G. Everett Norton, M.R.C.S., L.S.A.; Friday, James Maughan, M.D.; Saturday, Harold Low, M.A., M.B.Camb.

LECTURERS (Winter Session).

Dental Anatomy and Physiology.—J. W. Pare, M.D.Edin., L.D.S.Eng.

Dental Surgery and Pathology.—A. Hopewell Smith, M.R.C.S., L.R.C.P., L.D.S.Eng.

Dental Mechanics.—Harry Rose, L.D.S.Eng.

Dental Metallurgy.—W. Lapraik, Ph.D., F.I.C., F.C.S.

Operative Dental Surgery. — Geo. Cunningham, M.A., L.D.S.Eng., D.M.D.

Dental Materia Medica.—Chas. W. Glassington, M.R.C.S., L.D.S.Edin.

Elements of Histology.—Dr. J. Maughan, M.D.

FEES TO SINGLE COURSES.

	One Course.	Two Courses.
Dental Anatomy and Physiology ...	£2 12 6	£4 4 0
Dental Surgery and Pathology	2 12 6	4 4 0
Dental Mechanics	2 12 6	4 4 0
Dental Metallurgy	3 3 0	5 5 0
*Operative Dental Surgery	2 12 6	
*Dental Materia Medica	2 2 0	
*Elements of Histology	1 1 0	
*Demonstration on Dental Mechanics ...	1 1 0	

Fee for the two years' Hospital Practice required by the Curriculum, £15 15s.

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £31 10s.

An Entrance Exhibition, value £15, is open for competition at the commencement of each Session.

SYDNEY SPOKES, *Dean.*

* These Lectures are free to Students of the College who have fully entered for the Special Lectures.

GUY'S HOSPITAL DENTAL SCHOOL.

Dental Surgeons.—F. Newland-Pedley, F.R.C.S., L.D.S.; W. A. Maggs, L.R.C.P., M.R.C.S., L.D.S.; J. H. Badcock, L.R.C.P., M.R.C.S., L.D.S.

Assistant Dental Surgeons.—J. Mansbridge, L.R.C.P., M.R.C.S., L.D.S.; H. L. Pillin, L.D.S.; G. O. Richards, M.R.C.S., L.D.S.; R. W. Rouw, L.R.C.P., M.R.C.S., L.D.S.; A. E. Baker, L.R.C.P., M.R.C.S., L.D.S.; F. M. Hopson, L.D.S.

Demonstrators of Practical Dentistry.—J. B. Parfitt, L.R.C.P., M.R.C.S., L.D.S.E.; W. R. Wood, L.D.S.E.; E. C. Dimock, L.D.S.E.; J. L. Payne, L.D.S.E.

Anæsthetists.—F. W. Cock, M.D., M.S.; J. F. W. Silk, M.D.; H. F. Lancaster, M.D.; W. J. Scott, M.B., B.S.; C. J. Ogle, M.R.C.S.; E. F. Hamilton, M.D.

Lecturers.

Dental Surgery and Pathology.—Mr. Newland-Pedley.

Dental Anatomy and Pathology.—Mr. Maggs.

Dental Mechanics.—Mr. Rouw.

Metallurgy.—C. E. Groves, F.R.S.

Operative Dental Surgery.—Mr. Badcock.

Anæsthetics.—Mr. T. Bird.

Dental Microscopy.—Mr. Baker.

Practical Dental Mechanics.—Mr. Pillin.

Dean.—Dr. Shaw.

FEES.

Special Lectures and Demonstrations, and Dental Practice only, £50, paid on entrance.

Seven guineas is charged for any further period of Dental Practice not exceeding six months.

Arrangements cannot be made for short periods of instruction.

General Lectures, Demonstrations, and Hospital Practice required for the L.D.S.Eng., £60 paid on entrance, or 30 guineas at the beginning of the first year, and 30 guineas at the beginning of the second year. From these fees a reduction of 12 guineas will be made to students who produce, on joining the school, recognized certificates of instruction in Chemistry, Practical Chemistry, and Materia Medica.

General and *Special* Lectures and Demonstrations, and to the Hospital and Dental Practice required for the L.D.S.Eng., may be

obtained by payment of £110 on entrance, or of 60 guineas at the beginning of the first year, and 50 guineas at the beginning of the second year. The reduction mentioned above will be made.

The inclusive fee for the M.R.C.S., L.R.C.P., and L.D.S.Eng., is 190 guineas, or if paid by instalments at the commencement of the first year 60 guineas, second year 60 guineas, third year 40 guineas, fourth year 40 guineas.

EDINBURGH.

Dental Hospital and School.

Consulting Physician.—Alex. Peddie, M.D.

Consulting Surgeon.—Joseph Bell, M.D., F.R.C.S.Eng.

Fee for the two years' practice required by the Curriculum, £15 15s. Fee for each course of lectures, £3 5s.

Consulting Dental Surgeon.—John Smith, M.D., F.R.C.S.E.

Dean.—W. Bowman Macleod.

Dental Surgeons.—Messrs. George W. Watson; J. Stewart Durward; James Macintosh; J. G. Munro; J. S. Amoore; David Munro.

Assistant Dental Surgeons.—T. Gregory; Frederick Page; H. B. Ezard; Robert Lindsay; J. Alex. Young; Hume Purdie; J. Malcolm; D. Bailie Wilson; S. Simmons; R. N. Hannah; Fred. J. Turnbull.

Chloroformists.—Drs. J. M. Farquharson; W. Lundie; G. Matheson Cullen; R. J. Johnston; Thomas Proudfoot.

Tutorial Dental Surgeon.—Mr. J. Morris Stewart.

Dental School (Lecturers).

Dental Anatomy and Physiology (Human and Comparative).—Mr. Andrew Wilson.

Dental Surgery and Pathology.—Mr. George W. Watson.

Mechanical Dentistry.—Messrs. W. Bowman Macleod and J. Graham Munro.

Practical Mechanics.—Mechanician, Mr. James Mein.

Conservative Dentistry.—Mr. J. Graham Munro.

Dental Materia.—William Guy, F.R.C.P. and S.Ed., L.D.S.Ed.

Gold Filling.—Mr. J. Morris Stewart.

Dental Metallurgy.—Mr. John E. Mackenzie.

Dental Histology.—Mr. G. W. Watson.

General fee for the Hospital Practice and Special Lectures required by the Curriculum.—Hospital Practice, £15 15s. One

course each of Dental Anatomy, Dental Surgery, and Mechanical Dentistry and Demonstrations, £9 15s.—£25 10s.

Fees to separate Classes.—Dental Anatomy, Dental Surgery, Mechanical Dentistry, £3 5s. each.

The hospital practice and lectures qualify for the Dental Diploma of the Royal College of Surgeons, Edinburgh, and also for that of the other licensing bodies. Second courses of the lectures, as required by the Royal College of Surgeons of England, £2 4s.

The Session, 1896-97, opens October 1st, 1896, General fee for the hospital practice and special lectures required, £25 10s.

For further particulars apply to the Dean, 31, Chambers Street, Edinburgh.

BIRMINGHAM SCHOOL OF DENTISTRY, MASON COLLEGE (QUEEN'S FACULTY OF MEDICINE).

The teaching of Dentistry has been undertaken by the Mason College acting in association with the Birmingham Dental Hospital, and the Birmingham Clinical Board, so that students may fully qualify themselves for the Dental Diplomas of the Royal Colleges.

Lectures for the Dental Curriculum.

Dental Surgery.—Frank E. Huxley, M.R.C.S., L.D.S.

Dental Anatomy.—J. Humphreys, L.D.S.I.

Dental Mechanics.—F. Hampton Goffe, L.D.S.

Dental Metallurgy.—Percy F. Frankland, M.D.; W. G. McMillan, F.C.S., F.I.C.

Surgical Diseases of the Mouth.—F. Marsh F.R.C.S.

Medical Diseases of the Mouth.—Stacey Wilson, M.D., M.R.C.P.

Demonstrators.

Operative Dental Surgery.—W. T. Madin, L.D.S.

Mechanical Dentistry.—F. R. Howard, L.D.S.

Dental Pathology and Histology.—Dencer Whittles, L.D.S.

General Subjects.—As taught in the Medical Faculty.

College Fees.

A Composition Fee of £50, payable in one sum or in two sums, viz., £25 at the beginning of the first year and £25 at the beginning of the second year of studentship, admits to the full curriculum required for the Dental Diploma (*exclusive of the necessary Hospital Practice*).

Students wishing to take the Diplomas of M.R.C.S., and L.R.C.P., in addition to their dental qualifications, pay a Composition Fee of £75. This covers all College Fees.

BIRMINGHAM DENTAL HOSPITAL,

71, Newhall Street.

Consulting Physician.—Robert M. Simon, M.D.

Consulting Surgeon.—John St. S. Wilders, M.R.C.S.

Consulting Dentists.—Adams Parker, L.D.S.; Charles Sims L.D.S.

Anæsthetists.—S. W. Haynes, M.B.; J. Henry Blakeney, M.R.C.S.; Cyril Hutchinson, M.R.C.S.; Chas. St. Johnston, M.R.C.S., L.R.C.P.; T. Sydney Short, M.B.; W. H. Pooler, M.R.C.S.

Dental Surgeons.—H. Breward Neal, L.D.S.; Frank E. Huxley, M.R.C.S., L.D.S.; J. Humphreys, L.D.S.; F. W. Richards, L.D.S.; A. E. Donagan, B.A., L.D.S.; Frank H. Goffe, L.D.S.

Assistant Dental Surgeons.—W. T. Madin, L.D.S.; P. T. Naden, L.D.S., L.S.A.Lond; F. R. Howard, L.D.S.; J. Mountford, L.D.S.; J. E. Parrott, L.D.S.

Demonstrators.—A. T. Hilder, L.D.S.; W. Malcolm Knott, L.D.S.

Hospital Fees.

For Dental Hospital Practice and Demonstrations—

Composition Students (2 years)	£12 12 0
Non-Composition Students (2 years)	£14 14 0
Non-Composition Students (1 year)	£8 8 0
Non-Composition Students (6 months)	£5 5 0

For General Surgical Hospital Practice, Lectures, and Demonstrations.

Surgery (2 years) £10 10 0 | Surgery (1 winter) £6 6 0

N.B.—Further particulars may be obtained from the Registrar, at the College, or Mr. J. Humphreys, 149, Edmund Street.

OWEN'S COLLEGE, MANCHESTER.

Dental Department.

Professors and Lecturers. — *Anatomy, Descriptive and Practical.*—Professor Alfred Young, M.B., F.R.C.S. *Physiology.*—Brackenbury Professor Wm. Stirling, M.D., D.Sc. *Chemistry.*—Professor Harold B. Dixon, M.A., F.R.S. *Organic Chemistry.*—Professor W. H. Perkins, Ph.D., F.R.S. *Materia Medica and Therapeutics.*—Professor D. J. Leech, M.D., F.R.C.P. *Medicine.*—Professor J. Dreschfeld, M.D., F.R.C.P. *Systematic Surgery.*—Professor T. Jones, M.B., B.S., F.R.C.S. *Clinical Surgery.*—Professor Walter Whitehead, F.R.C.S.E., F.R.S.E. *Dental*

Surgery.—G. G. Campion, L.D.S. *Operative Dentistry.*—G. O. Whittaker, L.D.S. *Dental Anatomy and Physiology.*—W. A. Hooton, L.D.S., L.R.C.P., M.R.C.S. *Dental Mechanics.*—Thomas Tanner, L.D.S. *Dental Metallurgy.*—C. A. Burghardt, Ph.D. *Dental Pathology and Histology Demonstrator.*—David Headridge, L.D.S.

FEES.—£50, in two sums, at the commencement of first and second year.

Professor Alfred H. Young, M.B., F.R.C.S., *Dean.*

THE VICTORIA DENTAL HOSPITAL OF MANCHESTER.

DEVONSHIRE STREET, ALL SAINTS.

Dean.—Mr. George G. Campion.

Consulting Physicians.—Hy. Simpson, M.D.; D. J. Leech, M.D.

Consulting Surgeons.—Mr. E. Lund; Mr. F. A. Heath; Mr. T. Jones; Mr. J. Hardie.

Consulting Dental Surgeons.—Mr. H. Campion; Mr. G. W. Smith.

Dental Surgeons.—Mr. George G. Campion; Mr. Edward P. Collett; Mr. Leopold Dreschfeld; Mr. John W. Dunkerley; Mr. William Dykes; Mr. William Headridge; Mr. W. A. Hooton; Mr. Isaac Renshaw; Mr. William Simms; Mr. Walter Smithard; Mr. Thomas Tanner; Mr. G. O. Whittaker.

Assistant Dental Surgeons.—Mr. H. T. Dreschfeld; Mr. D. Headridge; Mr. P. A. Linnell; Mr. F. W. Minshall; Mr. C. H. Smale.

Administrators of Anæsthetics.—Mr. Alexander Wilson; J. Prince Stallard, M.B.

Patients attended at the Hospital from 8.30 to 10 a.m. daily, and on Monday, Wednesday, and Friday, from 7 to 8 p.m.

The Hospital is conveniently situated for students, being between the Royal Infirmary and Owens College, and only about five minutes' walk from the latter. It contains three separate operating rooms, devoted respectively to fillings, extractions, and operations under anæsthetics, and two Dental Surgeons are in attendance each time the Hospital is open.

FEES.

The fee for the two years' Dental Hospital Practice required by the College of Surgeons of England is £12 12s., which must be paid

in advance, or £8 8s. for the first year and £5 5s. for the second year.

NOTE.—Students are required to provide themselves with the necessary instruments, for list of which see the prospectus of the Victoria Dental Hospital.

LIVERPOOL DENTAL HOSPITAL.

MOUNT PLEASANT.

Consulting Physician. — Thomas Robinson Glynn, M.D., M.R.C.P.Lond.

Consulting Surgeon.—Frank T. Paul, F.R.C.S.Eng.

Consulting Dental Surgeons.—C. Alder, L.D.S. ; H. C. Quinby, L.D.S. ; W. H. Waite, L.D.S., D.D.S.

Dental Surgeons.—Reg. H. Bates, L.D.S.Eng. ; R. M. Capon, L.D.S.Glas. ; E. A. Councell, L.D.S.Eng. ; R. Edwards, M.R.C.S., L.D.S.Eng. ; W. Maplebeck, L.D.S.I. ; Thos. Mansell, L.D.S.Edin. ; J. Royston, L.D.S.Eng. ; Fredk. Rose, L.D.S.Eng. ; E. A. Mansell, L.D.S.Eng. ; J. P. Roberts, L.D.S.Edin. ; C. A. Barston, L.D.S.Eng. ; W. J. Pidgeon, L.D.S.Eng.

Demonstrator on Operative Dental Surgery.—W. H. Gilmour, L.D.S.Eng.

Chloroformist.—J. E. Gemmel, M.B., C.M.

House Surgeon.—J. A. Woods, L.D.S.Eng.

The Hospital is conveniently situated within five minutes walk of the Medical School. There are four separate operating rooms and a work room, all facing north, and there is an abundant daily attendance of patients.

Every facility is afforded to Students who are anxious to acquire proficiency in Dental Surgery, and to prepare themselves for the L.D.S. of any of the licensing bodies.

The electric light has been introduced (the lamps being supported on brackets specially manufactured).

Fee for two years' hospital practice, 12 guineas. Perpetual, 15 guineas.

R. Edwards, *Dean.*

DEVON AND EXETER DENTAL HOSPITAL.

Consulting Surgeons.—Messrs. A. J. Cumming, F.R.C.S.Eng. ; James Bankart, M.B.Lond., F.R.C.S.Eng.

Consulting Dental Surgeon.—S. Bevan Fox, L.D.S.Eng.

Dental Surgeons.—Messrs. J. T. Browne-Mason, L.D.S.Eng.; Henry Bigging Mason, L.D.S.Eng.; T. G. T. Garland, L.D.S.I.; J. M. Ackland, M.R.C.S., L.D.S.Eng.; T. A. Goard, L.D.S.Eng.; W. H. Goodman, L.D.S.Eng.

Honorary Secretary.—Henry Yeo.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma.

Pupils of any member of the staff or other registered Practitioner (being a Life or Annual Governor) are permitted to attend the practice of the Hospital, subject to the approval of the Medical sub-committee, on payment of £5 5s. annually to the funds of the Institution.

DENTAL HOSPITAL OF IRELAND,

25, Lincoln Place, Dublin.

Consulting Physicians.—F. R. Cruise, M.D.; John W. Moore, M.D.

Consulting Surgeons.—E. H. Bennett, F.R.C.S.I.; Sir W. Stokes, F.R.C.S.I.

Consulting Dental Surgeons.—R. H. Moore, F.R.C.S.I.; Daniel Corbett, M.R.C.S.E., L.D.S.Eng.; W. Booth Pearsall, F.R.C.S.I.

Dental Surgeons.—Messrs. Robert Hazelton, F.R.C.S.I.; R. Theodore Stack, M.D., F.R.C.S.I., D.M.D.Harv., L.D.S.; P. W. W. Baker, M.D., F.R.C.S.I., L.D.S.; Daniel Corbett, jun., A.B., F.R.S.S.I.; George Wycliffe Yates, M.B., Ch.M., L.D.S.I.; G. M. P. Murray, F.R.S.S.I.; J. S. Thomson, L.D.S.Edin.

Assistant Dental Surgeons.—Shenstone Bishop, L.D.S.I.; Kevin E. O. Duffy, V. Doyle, G. C. Moore.

Anæsthetists.—Messrs. John G. Cronyn, L.R.C.S.I.; John R. Graves, L.R.C.S.I.; John B. Coleman, M.B.

Pathologist.—William Mallet Purser, M.D.

Registrar.—William A. Shea.

The Lectures on Dental Surgery and Mechanical Dentistry will be given during the winter, those in Dental Anatomy and Metallurgy during the summer months.

In addition to the longer courses of Hospital attendance, special courses, of three months' duration, will be given to Surgeons about to join the Army and Navy, or to practice in the Colonies or remote country districts.

Regulations as to Fees and other conditions can be obtained from the Registrar of the Hospital, or from R. Theodore Stack, *Dean.*

MEDICAL SCHOOLS.

BARTHOLOMEW'S HOSPITAL, SMITHFIELD, E.C.

Sixty-three guineas; or 31½ guineas; first summer, 31½ guineas.

CHARING CROSS HOSPITAL, W.C.

Fifty-four guineas in one sum; or 30 guineas on entering; 30 guineas 12 months later.

KING'S COLLEGE, STRAND, W.C.

No special arrangements.

LONDON HOSPITAL, MILE END, E.

Composite fee for dental students, £42.

MIDDLESEX HOSPITAL, BERNERS STREET, W.

Fifty-four guineas; or 40 guineas on entrance, and 20 guineas at the beginning of the second winter session.

ST. GEORGE'S HOSPITAL, HYDE PARK CORNER, S.W.

Exclusive of practical chemistry, £50; or in two instalments: first year, £30; second year, £25.

ST. MARY'S HOSPITAL, PADDINGTON, W.

£55; payable in two instalments:—First year, £30; second year, £25.

ST. THOMAS'S HOSPITAL, ALBERT EMBANKMENT, S.E.

£65; or by instalments, £55 for the first year, and £15 for the second year.

WESTMINSTER HOSPITAL, BROAD SANCTUARY, S.W.

£50; or in two payments of £27 10s. each at the commencement of each academic year. A scholarship, value £20, is open to commencing Dental Students.

UNIVERSITY COLLEGE, GOWER STREET, S.W.

£50 guineas; or including Chemistry, Practical Chemistry, Physics and Materia Medica, 65 guineas.

SCHOOL OF MEDICINE, EDINBURGH.

The fees for the general subjects (including practice at the Royal Infirmary) required of dental students, according to the curriculum of the Royal College of Surgeons of Edinburgh, amount to £38 10s.

Illustrations of Mr. Douglas E. Caush's Article.

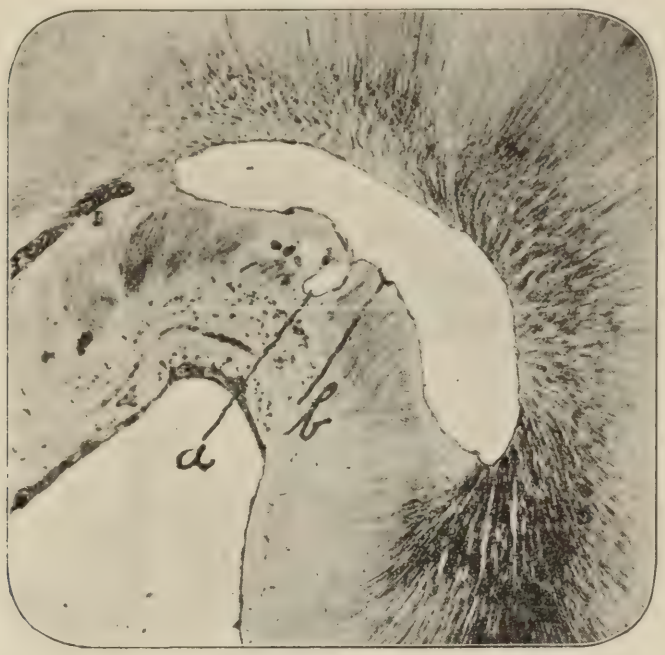

Fig. 15.

a Cavity produced by absorption.

b Absorption commencing.

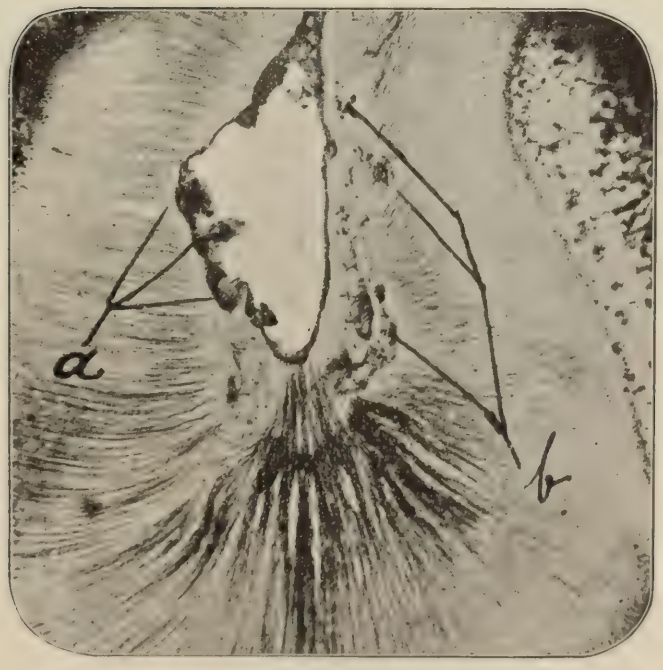

Fig. 16.

a Semilunar spaces.

b New tissue, cemental in character.

THE DENTAL RECORD.

VOL. XVI. OCTOBER 1ST, 1896. No. 10.

Original Communications.

EXOSTOSIS.

By DOUGLAS E. CAUSH.

(Continued from page 342.)

In this third paper we desire for a short time to draw your attention to certain changes that take place in the dentine in and around the pulp canals of exostosed teeth.

In the two previous papers we discussed those changes which took place on the exterior of the dentine, and sought to show how the new tissue has been built up, layer by layer, in the exostosed teeth and while these changes have been taking place on the exterior of the dentine certain other changes may have been going on affecting the interior portion of this tissue, and it is these we now wish to dwell upon.

Soon after we commenced the microscopic examination of exostosed teeth our attention was drawn to some sections of teeth that had variations in the structure of the tissue surrounding the pulp canal, and, not being able to find any explanation of these changes published, we have, after continuous examination and a series of experiments, drawn the following conclusions.

It was whilst examining a section of an upper molar we first saw that a series of excavations had taken place in that portion of the dentine forming the walls of the pulp canal, leaving, instead of the regular outline—"as seen in a healthy tooth"—a margin having a number of semi-lunar shaped cavities on the inner surface of the tissue, and on continuing the examination of a number of teeth we were able to follow up the various changes that took place in this portion of the dentine.

To better understand these changes we will examine a tooth having an inflamed pulp, and on making a section of it we shall probably find the following change has taken place. In the layer of odontoblast cells that form the connecting link between the pulp and the dentine—at that point of the tissue that had been affected by the inflammation—we shall find the individual odontoblast cell altered in character and appearance ; there is an absence of the usual processes, especially those which pass into the dentine, and instead of these we have a cell somewhat oval in shape. It is not at all unusual to find the cells have increased in number, and in appearance are like those cells seen in the cemental surface of a piece of inflamed alveolar dental membrane ; there is an entire absence of the usual processes, and apparently the connection between the dentine and the pulp through the odontoblasts has ceased. This change may be restricted in area, or if the inflammation of the pulp has been either very acute or become chronic, a much larger area may be thus affected, or the cells themselves may become more active, and as a result of the increased supply of formative material brought by the inflamed condition of the blood vessels, increase of the cells, by cell division, takes place, and a certain amount of pressure is thus produced by these cells upon the dentine.

This change in character of the odontoblasts may, as we have already said, be extended over a large or small area, according to the circumstances under which it is brought about. Should it be permanent it leaves indellible traces behind it ; on the other hand, if it is only temporary, we think the result of the cutting off of the supply of nourishment from the restricted area is to produce those transparent zones so frequently seen in the microscopic sections of teeth where there are apparently no tubuli radiating from that portion of the pulp canal in which these changes have taken place. This may spread until the whole of the dentine between the pulp canal and the cementum in this restricted area is apparently structureless. We believe that this change is brought about by the softened portion of the tubuli of the dentine being solidified, and thus forming a transparent zone as seen in the perfectly calcified cementum.

We have experimented on this zone, and found that, though it was an easy matter to fill the tubuli on either side of this transparent

portion with either air or coloured alcohol, and thus to much more thoroughly differentiate the tubuli under the microscope, yet we failed in this transparent portion to obtain any traces of the entrance of either fluid or air into the tubuli ; thus the whole tract of the dentine in this zone becomes almost, if not quite, structureless. A similar condition of the dentine may be produced artificially by perfectly dehydrating a hard section and filling up the tubuli with a solution of balsam in chloroform, and on mounting we have a section similar in character, but artificially produced.

In the mouth we believe these changes are produced by the alteration of the character of the odontoblasts, in those cases where the pulp remains to a very large extent healthy excepting at the point of issue. Should, however, the pulp continue inflamed, we find the original odontoblastic layer becoming thickened, the processes having being previously absorbed or retracted into the cells, and the cells themselves assume a somewhat oval shape, the thickening being produced by the increase in the number of cells in this layer, and after a time we have a development of a number of giant cells in the thickened layer, especially in that portion of the layer that touches or presses upon the dentine. The action of these cells upon the dentine is to absorb the latter away, and this absorption may be very varied in the amount absorbed, and, as a consequence, the irregularities of the outline very marked ; it may be restricted to a single point or two points, as in Fig. 15. When we have a section of a lower molar with two points of absorption, very restricted, but at the same time fairly deep, or it may spread laterally, so that the two or three canals in the roots of a molar tooth may become united into one long irregular canal, or absorption may proceed from any given point absorbing away the tissue more and more deeply until a canal is produced partially through the dentine towards the cementum ; in fact, there appears to be no restriction as to the amount of absorption that may take place in the dentine. This absorption is so varied in its outline that almost every section shows an alteration in the conformation of the canal, yet after a time another stage of the change becomes manifest, the character of the cells forming the outer layer of the inflamed pulp change, and instead of osteoclasts continuing to carry on the work of absorption, the cells appear to alter to those capable of laying down new tissue. No longer does the work of destruction continue, no longer does

the absorption go on, but, instead, there appears a new tissue in the spaces previously produced by the osteoclasts. This new tissue is quite distinct in character from the surrounding tissue, so that instead of its having tubuli produced, as we get in secondary dentine, there is no appearance of the latter, but the microscopic character of the tissue resembles cementum with a number of lacunæ, each having canaliculi (Fig. 16), and these are often found anastomosing with canaliculi of the surrounding lacunæ, thus we have deposited in these excavations a fresh tissue truly cemental in character.

This tissue may vary very much in quantity, from that of a thin layer no more than one cell thick to that in which the tissue is so pronounced that it may be seen without the aid of the microscope on cutting the roots of the tooth transversely. This thicker layer of tissue has usually a very large number of lacunæ, and in some cases we have seen a number of small canals in the pulp canal surrounded by this new tissue. That this tissue is not secondary dentine may be proved from the fact that the first change that takes place before the tissue is deposited is that of the alteration of the character of the odontoblasts in the pulp, then we have the alteration of the margin of the pulp canal by the absorption of a portion of the dentine, and, lastly, the tissue deposited in these semi-lunar spaces there is an absence of any approach to tubuli as found in dentine proper, whereas in the deposition of secondary dentine the latter is added to the original dentine *without any absorption*, the tubuli frequently following on in a line with those already deposited, with an absence, as a rule, of lacunæ. In secondary dentine the tissue is continuously and regularly deposited, so that the pulp chamber becomes gradually smaller, but in the case of the new tissue it is not so, the latter is not deposited regularly and is alway preceded by absorption, and usually contains lacunæ and canaliculi.

That exostosis is not of recent date we have had the opportunity of confirming, thanks to the kindness of Charles Dawson, Esq., F.G.S., F.S.A., he having kindly placed at my disposal, for the purpose of making a microscopic, examination, two teeth found by him. He says: "The two molar teeth were discovered in the chalk *débris* within the artificially excavated caverns at Hayes Down, Lavant (situated on the Goodwood estate of His Grace the

Duke of Richmond and Gordon, K.G.). With the teeth were associated some flint implements of the latter Neolithic type. The age of the teeth probably is *not later* than 2000 years, and perhaps much earlier."

The one was the tooth of a comparatively young patient, we should imagine, from the fact that the cusps were perfect and showed little or no attrition, whilst in the case of the other tooth it had been very much worn down, until the crown was almost absent, the pulp chamber fully exposed but filled with secondary dentine; the roots themselves were perfect, but covered with nodular exostosis. In the case of the first one the roots were covered with general exostosis, gradually spreading from the apex towards the crown.

In examining the teeth of domestic animals we have also found that similar changes take place in the tissues, this is especially so in the case of the horse, as we have had the opportunity of examining about 200 of these. We found a very large number of them exostosed, and changes similar to those already described had taken place, but especially noticeable was the result of the alveolar abscess, and the formation of new tissue, as also was the changes that took place in the pulp canals: both showed these changes more intensified than the changes found in the teeth of man.

Since the two previous portions of our paper were written we have extracted three or four temporary superior canines that have also shown exostosis. In all these cases the teeth have been retained in the mouth much beyond the usual time, and hence the reason why they have been exostosed. Another proof, we take it, that the formation of this new tissue does not take place until *after* the whole of the tooth has been erupted and the root calcified.

In conclusion, we would desire to say that it is quite possible that the changes spoken of in this portion of the paper also may occur in teeth where there has been no exostosis. Our microscopic examinations of such teeth has been small, and we are therefore unable to say if this is so, but should any of our readers have found them in teeth that have not been exostosed, we shall be glad if they would let us know of it.

A METHOD OF TREATMENT BY PORCELAIN INLAYING.

By Frederick R. Howard, L.D.S.

It not infrequently occurs that dentists meet with objection on the part of the patient to having fillings which are likely to be conspicuous inserted in teeth at the front of the mouth, and it is sometimes necessary against one's better judgment to humour the patient by resorting to osteos or guttaperchas instead of gold, which, notwithstanding its good qualities as a sealing plug, is open to the objection just named.

Such consideration it was which led me to experiment, or, as one might say, fad, with porcelain inlays. To begin with, the porcelain as a filling material has so much to recommend it—imperishability, non-shrinkage, non-flaking, &c. The weak points of the treatment were poor anchorage and imperfect adaptation to the walls of the cavity, and, as the individual who endeavoured to create perpetual motion said of friction, "this was all I had to overcome." Many good inlays had been prepared by "Herbst's method" (*i.e.*, moulded to the cavity); but these were only of softish glass of low fusing point.

In these, too, the anchorage was insufficient, whilst colour matching with them was very difficult, and their permanency was for several reasons doubtful. Small porcelain discs, which were ground into the cavity whilst held on an engine mandril, from which they were afterwards detached and subsequently fixed in place with cement, gave a good appearance, fitted fairly accurately, and were held quite securely; but this treatment was applicable in so few cases. The greatest need was a method suitable to the usual

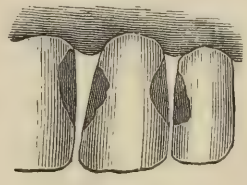

Fig. 1.

interstitial cavity, which I take it is by far the most common in incisor and canine teeth (Fig. 1). Mr. Dall, of Glasgow, on several occasions demonstrated a method, no doubt well known now, which was to shape both back and front cavity wall alike, and to a definite pattern; then, from a series of porcelain rods of various forms on section, to select one the contour of which was exactly adaptable to the case. To this method I am indebted for the suggestion which

enabled me to devise a porcelain inlay, hereafter described. The idea of fitting the porcelain rod through the cavity as it were seemed to me too good not to be taken advantage of, for by this method it is mechanically easier to cut the cavity to any desired shape, and at the same time secure accuracy of fit.

My own method differs from Mr. Dall's in this respect, that whereas he shaped the cavities on more or less curved lines, I obtain three absolutely flat walls arranged to form a slight dovetail. Reference to the illustrations will partly explain this. Porcelain rods (Fig. 2) are prepared which are four sided, and tapered ; in dimensions,

Fig. 2.

some inch and three quarters long, about a quarter of an inch broad at one end and rather less than an eighth at the other. The thickness varies also from the eighth at the thicker end. The section of this rod then would appear to be an oblong, but this is not so, for the breadth on one side is slightly less than on the other, giving a slight dovetail. Three of the surfaces of this rod are ground true on a flat stone, viz., the two edges and broader side. From this, except for contouring purposes, the porcelain is not cut, but the cavity is shaped by means of fissure burs and a special file

Fig. 3.

Fig. 4.

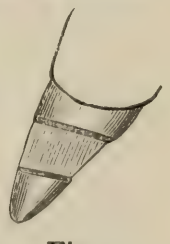

Fig. 5.

to accommodate the rod along some portion of its length, the rod in this position pointing its thin end towards and in the mouth. (See Figs. 3, 4 and 5.)

It is obvious, of course, that greater accuracy of fit is obtainable between two flat surfaces than two curves, and herein lies the possibility of absolute adaptability. When the fit is accurate, both on the lingual and labial aspect, the contouring of the porcelain commences by the cutting off back and front of the superfluous

portions of the rod, and is complete when the bulk of the inlay is reduced very nearly to the actual contour desired. I have found Havard cement to be the best medium for fixing the inlay, but a light colour should be chosen. Once fixed, I defer all trimming for some hours, to give the cement ample time to set. Final stoning is done with fine grit wheels and discs. In the earlier cases I have used small brushes and fine ground pumice for finishing, but to my disappointment found that the bristles whipped out very small portions of the cement, which was perceptible under the lens.

It is over three years now since this method was shown at a branch meeting of the Association, and I am pleased to be able to say that the actual cases treated then are now in perfect condition.

It would seem to many, no doubt, that there is danger to the lower border or cutting edge of the tooth in this treatment, that there is a liability for that part to fracture off. I can only say I have not experienced an accident of the kind. Of course, it goes without saying, that one would always choose the cases to be so treated; nor do I even suggest that this method is suitable in all cases. In instances where decay extends deeply in a cervical direction I have often built up that wall with gold to the level of the gum margin, afterwards truing it in the same way as the others withthe file.

This latter instrument, by the way, consists of an octogon steel holder, carrying strips of "Flexo" files sheared down to an inch in length and a twelfth to a sixteenth in width.

Fig. 6.

There are four points in favour of this treatment which I think merit consideration—1st The repair to the tooth treated is almost invisible. 2nd Nearly all the cavity edge is exposed to the cleaning action of the lips and tongue. 3rd The inlay is self supporting. 4th By this method geometric exactness is possible. (See Fig. 6.)

I should like to add that I am considerably indebted to the Dental Manufacturing Company for the trouble they have taken to make porcelain rods to my patterns. They are now prepared, I understand, to supply the profession with the inlay rods and also the files and file carriers.

THE DENTAL RECORD, LONDON: OCT. 1, 1896.

DIRECT REPRESENTATION OF THE DENTAL PROFESSION.

LITTLE things show which way the wind blows. Now, though we are not apt to put too literal a meaning on post prandial orations, yet, taken with other tokens, they are at least suggestive. Thus, when at the annual dinner of the British Dental Association, a surgeon of eminence said: "I trust that you will have a definite representative of your own on the General Medical Council. I have no doubt that you will soon attain that object, which I am sure you fully deserve," we might, perhaps, not have thought more of the matter, than to acknowledge a kindly and complimentary wish, were it not that several of the candidates for the posts of direct representatives on the Medical Council make, in their election addresses, the support of the appointment of a direct dental representative a distinct ground of claim for support. Surely these facts show that the election of a direct dental representative to the Medical Council is, at any rate, within the range of practical politics. How great is the advance which has been made in this matter is clearly seen if we contrast the state of present feeling with that held but a comparatively few years ago. Thus, at the same dinner, Mr. Smith Turner said:—"At the time when the question of direct representation was becoming very acute in the medical profession, the Dentists Act was just about being introduced into the House of Commons; and at a meeting in reference to direct representation I heard the remark made, 'Why, with all these changes, by-and-by even the dentists will be requiring a representative on the Council.' In this way the dentist was held up as a

'bogey man' to frighten reformers and prevent them from pressing this very needful innovation."

Many practitioners may pass this matter by as one with which they have no practical concern, but this is not so. The Medical Council is the body in whom the administration of the Dental Act is vested. It has control over the various corporations which grant dental diplomas, and subject to the supreme control of the Privy Council it is able to bestow or withdraw this power as it sees fit. Thus it controls dental education. Now, though there are other of its duties to which reference could be made, yet the educational question being one that so intimately concerns each practitioner, be he old or young, it will suffice to impress on all that the composition of a body, having this power, is one of vital import. It is, therefore, no idle request that the profession should have on this Council one who is familiar with its wants. The medical profession may be, and are, our very good friends; those of them who have seats on the Council may, and do, use their powers after mature deliberation, but there are many things they cannot know, and in which it would be to their advantage to have the active co-operation of a dental colleague. Although we may with advantage leave the agitation of this question to our representative bodies, yet each individual member of the profession may do something to help forward the movement. It may be hoped that the Medical Council will voluntarily yield this claim, but if pressure be needed, it would seem that it must be brought to bear through the medical profession, and it is in bringing the individual members of this to appreciate the sweet reasonableness of our wishes that each member of the dental profession may be of use.

We understand that the buildings on the site acquired by the Dental Hospital of London for the new building have been condemned and will shortly be pulled down and the site cleared.

News and Notes.

THE Plymouth Medical Society has decided that its members should refuse to administer chloroform to the patients of dentists who are not on the Dental Register.

Mr. G. H. Bailey, President of the Society of Anæsthetists, will be glad if those who wish to take part in the Jubilee of Anæsthetics will communicate with the secretaries of the society.

IT is with sincere regret that we learn of the suicide of Mr. S. A. Parker, of Birmingham. He seems to have been much depressed by some falling off of his practice, and in an aberration of mind to have taken an overdose of laudanum. The coroner, an old personal friend, testified, at the inquest, to the many excellent qualities of the deceased, and a pathetic letter was read in which he asked "if possible let me lie by the side of the only one I dearly loved, my father."

AT the Glasgow Sheriff Court, on September 7th, before Sheriff Fyfe, J. H. Hatfield, residing at 5, Trongate, Glasgow, was charged at the instance of Samuel M. Carrick, writer, Glasgow, acting on behalf of the British Dental Association, with having contravened "The Dentists Act, 1878," as amended by "The Medical Act, 1886," inasmuch that not being a legally qualified practitioner, and not being a person registered under the Dentists Act, he displayed, at his house, the words "Surgeon Dentist," and other words implying that he was registered under the Act, and a person specially qualified to practice dentistry. The accused pleaded guilty, and a fine of £5 was imposed.

THE Continental match factory of Passaic, New Jersey, U.S.A., has issued an order requiring all employés to show a certificate from a dentist that their teeth are sound, or that they have been satisfactorily repaired. A very sensible order this, and one all match factories should adopt, for phosphorous necrosis is, unfortunately not altogether a thing of the past, though other regulations have undoubtedly lessened its frequency.

Anæsthesia being, if not *the* discovery certainly among the chief discoveries of the Victorian era, it is interesting to recall, as does the *Dominion Dental Journal*, that Sir James Simpson's discovery was denounced as impious, and contrary to holy writ. It was said that its use was "to avoid one part of the primeval curse on woman." Replying to his theological opponents, Sir James said, "They forget the 21st verse of Genesis ii. That is the record of the first surgical operation ever performed, and that text proves that the Maker of the universe before He took the rib from Adam's side for the creation of Eve, caused a deep sleep to fall upon Adam."

At a meeting of the Second District Dental Society, held in Brooklyn, April 8th, 1895, Dr. F. T. Van Woert, says the *Cosmos*, presented the following novel method of quickly making a porcelain crown in an emergency case. A gentleman called at his office a short while ago, early in the evening, having just broken a central Logan crown. He was going to a wedding that same evening, and said that a new crown must be supplied. The dental depôts were closed, and there was no way of obtaining another crown suitable to the case at such short notice. The pin was easily and quickly removed from the root, and an impression with modelling compound was taken, into which quick-setting plaster was poured. A dowel was selected, the projecting end of which was split for a short distance and the parts bent over at a right angle. A rubber tooth was then ground to position on the plaster model. With the tooth and dowel in place on the model, the bent-over ends of the dowel extending to just below the pins of the tooth, fusible metal was melted over the end of the root exposed and against the palatal surface of the tooth. While still fluid it was pressed with a piece of chamois skin so as to fill the space between the end of the root and the shoulder on the tooth above the pins. This was quickly cooled, removed from the model, trimmed and polished. The fit was accurate, the metal having gone absolutely to place, so that it could be finished with perfect edges, and the result was a very strong and beautiful crown. The whole operation was so quickly performed that twenty-five minutes after his first appearance at the office the gentleman departed with the new crown in position. Dr. Van Woert demonstrated this case at the meeting by making another crown on the same cast in ten minutes.

At the end of last year a notable woman died, Olga von Oertzen. For some time she practised dentistry in England, having been to a dental college at Philadelphia, though we believe she was not registered here. But she earned her reputation and many medals as a nurse with the German army during the campaigns against Denmark, Austria, and the Franco-Prussian war. Her experiences were many and varied. Once outside Metz she was in charge of a ward of sixteen patients, mostly cases of typhoid or dysentery, which was emptied three times in one week. They had no water to drink and little to eat. One day peas, which after nine to ten hours boiling were as hard as ever, lying at the bottom of the pot, and this was the food for the patients. But she came of a fighting family. Six great uncles won the Iron Cross fighting against Napoleon, and it is said the family was ennobled in the time of Barbarossa. The Emperor, fighting on the banks of a river, was holding the enemy at bay, at great odds. The enemy pressed on him and a soldier held a boat for him to embark. The man's arm was cut off, he immediately held the boat with the other, which shared the same fate. He then held the boat with his teeth ; the Emperor escaped and in acknowledgment of his bravery ennobled him ; he gave him the name of von Ertzen, meaning "made of metal," and also a ring, which as he had no arms to hold out he received in his mouth. The crest has ever since been two dissevered arms over a coronet and the ring in the hands.

There is a story told of Peter the Great in the character of a dentist which strikes one, writes Mr. James Payn, as very characteristic of his impulsive and high-handed ways. Peter had studied dentistry, in common with most other useful arts, and plumed himself on his dexterity in drawing a tooth, though one finds no record of his giving himself the trouble to fill one. Observing one of his *valets de chambre* to be in bad spirits, he asked what was the matter—an unexpected trait in Peter—and was told that it was the spectacle of his wife suffering from tooth ache that so distressed him. "Why doesn't she have it out ?" inquired the Czar, beginning to feel the professional instinct. "I can't persuade her, sire ; she always pretends not to suffer when we wish to give her ease, but renews her lamentations—which distress me to hear—when the dentist is dismissed." Let me see her," said the Czar ;

"I'll cure her." He was introduced to her apartment, and in spite of her protestations of there being nothing the matter, examined her mouth. Having satisfied himself as to which was the peccant molar, the Czar said to her husband—"Hold her head and arms, and she shall be cured in an instant." Then, in spite of her cries, he extracted her tooth with great address, and without an anæsthetic. Hearing a few days afterwards that the whole affair was a trick of the valet's to torture his wife, with whom he had quarrelled, the Czar beat him within an inch of his life—not so much, it was shrewdly suspected, on account of the deception practised upon him, as because it had caused him to make an incorrect diagnosis.

ABSTRACT OF AN INAUGURAL ADDRESS

Delivered on October 1st, 1896, at St. Mary's Hospital, Paddington,

By Morton Smale,

Surgeon in charge of the Dental Department.

After some preliminary remarks, Mr. Smale said:—The repeated invitations of the press that we should address the public on such occasions, opens up a very wide field to the speaker. It may be presumed that anything we have to say to the public is not likely to be of a complimentary character, but that it will take the form of warning or complaint, and I may add, that on the latter ground we may find unlimited supply of materials. In deference, then, to the invitation of the press, I shall venture to make a few remarks on the subject of so-called patent medicines, and if the public care to listen, I do not think they are likely to hear anything very complimentary, either to themselves or the patent nostrums (excuse the grammar), the sale of which they so extensively promote.

In using the term patent medicine, I do not refer to preparations which are made for the use of the medical profession, the manipulation of which require special processes which may be patented by letters patent; the use of these is a matter which lies alone with the profession, and the fact of their being patented reveals to the public and the profession all the knowledge that is required for their application with safety and benefit to the patient. These, however, constitute but a small portion of the preparations that are offered to the public requiring the Government Stamp. The popular

notion of a patent medicine embraces all such preparations as have a Government Stamp affixed thereto, but nearly all of them are merely proprietary medicines. The following is the true description of these precious articles of commerce. A preparation, to be liable to Stamp Duty, must be one which is to "be used or applied internally or externally as a medicine or medicament for the prevention, cure, or relief of a disorder or complaint incident to or in any wise affecting the human body." Then it must also be brought under one of the following six clauses which constitute liability to duty. (1) "The seller must have a claim to have an occult secret or art for making or preparing"; (2) "An exclusive right or title to making or preparing"; (3) "It must have been patented"; (4) "It must be or must have been recommended to the public as a nostrum or proprietary medicine"; (5) "As a specific" or (6) "As beneficial for the prevention, cure, or relief of any disease."

Any one of these conditions alone entails liability to Stamp Duty. It will be evident, therefore, that although a patent medicine must have a stamp the patent is not a necessary condition.

The condition is, that it must be or must have been recommended to the public as a proprietary medicine, or as a specific, or as having a secret—it may be an occult one—attached to its preparation. One of the peculiarities to be observed here is that it has to be recommended to the public, but by whom it is to be so recommended the conditions are dumb. The person or persons who recommend—to this I call particular attention—may be entirely ignorant, not only of the specifics or cures which they prescribe in a wholesale manner, and of the nature, or source, or course, or sequelæ of the diseases which are to be prevented or cured, but are also utterly ignorant of the complex human tenement which carries the disease. Whatever else their knowledge may be, whether it be limited to the laws of profit and loss and a good balance sheet, or to the glorious mendacity and effrontery of quack advertisements, or whether it includes in its grasp all that has been taught of anatomy and physiology and all that has ever been or can be known of medicine and surgery and the action of drugs, we may rest assured they can never know the circumstances surrounding the sufferer, or anything of the mental or physical conditions accompanying the disease for which the specific or cure is sold.

Thus, gentlemen, while the members of the medical profession may not possess in secret anything which would in any way benefit suffering humanity, and while the unqualified assistant may not (rightly, I think) act but under the strictest surveillance, the humbug may distribute his wares broadcast, fortified by all the glory of a Government Stamp. I say fortified, advisedly, for we all know the spurious value which is attached—not only by the so called ignorant classes, but by many who might be expected to know better—to the revenue label.

Mr. Alpe, of the Inland Revenue Department, in his book on the "Medicine Stamp Duty," says :—"Another objection urged against the duty was that ignorant persons regarded the Government Stamp as a guarantee of purity. The stamp is still held out by the makers of medicine who have paid for the privilege of having their stamps printed from an appropriated plate, as a guarantee that the medicine which it covers is genuine, in the sense that it is really made by them. In this respect the stamp answers the purpose of a trade mark of a superior kind ; for whereas the counterfeiting of a trade mark is only a misdemeanour, and the owner of the trade mark would probably be put to considerable expense to punish the counterfeiter, the counterfeiting of a Revenue Stamp is felony, and the prosecution would be conducted for the protection of the Revenue at the cost of the Crown. This is a sufficient reason for the caution still occasionally given to the purchaser, to see that the name of J. Smith is printed upon the stamp, 'without which none is genuine and to imitate which is felony.' Such intimations may have impressed a great many persons with an idea that a medicine so carefully protected must necessarily possess unusually beneficial properties, and to remove the possibility of such an apprehension, every stamp issued since 1885 bears its own statement in legible letters that this stamp 'involves no Government guarantee.'" I think you will all agree with me in arriving at the conclusion that the ordinary members of the public are quite unable to appreciate the value of these two statements, which must necessarily appear to them to be of a contradictory character.

When we turn from the maker or distributor to the consumer, the position is even more deplorable, and were it not for its serious aspect, might be termed ridiculous. Every advanced medical student and every medical practitioner knows the difficulties

attending diagnosis and prognosis. It may be too much to ask any but the specially trained to appreciate the importance of the latter in indicating treatment; but to the most ignorant, or, what is perhaps worse, the most prejudiced mind, the desirability of a correct diagnosis for successful treatment must be obvious. Yet, gentlemen, this very first essential principle in the intelligent treatment of disease, beset as it is with difficulties to the most experienced, every user of a proprietary medicine assumes and discharges towards himself, and not only to himself, but with the assurance of ignorance, frequently towards others.

As to the unimaginative rustic—

> A primrose by the river brim
> A yellow primrose is to him (and nothing more),

so to the amateur patent medicine prescriber. A cough to him is a cough and nothing more. How much more it is or how much more it may become enters not into his calculations. Yet in the face of this the medical profession is frequently reproached for its powerlessness to check certain diseases which may have been, and indeed often are, fostered by the blind faith of the sufferer in some Government-stamped nostrum or "cure all" with an enticing name.

"The man who is his own lawyer has a fool for his client," says the proverb; may this not also be applied to the man who is his own doctor, although the evidence in the one case may not, to the unititiated, be so obvious as in the other? That they are fools is clear from a perusal of the testimonials in advertisements, which are by experience found to carry conviction and to secure fresh dupes to the vaunted specific.

The common talk amongst the public about new diseases, which, to the medical man are but old enemies, intensified in some instances by the changed condition of modern life, seems to point a moral. May not the enormous increase in the indiscriminate consumption of proprietary drugs, recommended only by interested and unscrupulous concoctors, have some influence in the matter; or again, may not the serious and increasing calls made upon the resources of abdominal surgery and the numerous intestinal troubles requiring medical treatment, be in some measure due to the prevailing fashion of saline drenching so continually resorted to by self-constituted doctors for the sake of the immediate and

transitory relief which they afford. Or it may be so reducing the tone of the various organs and tissues of the body, that they readily yield themselves victims to the attack of any disease germ that may find its way into the system.

Education may be divided into two sections, one general and the other special ; the former beginning at the earliest stage of mental development, first cultivates the power of acquiring and retaining knowledge, then of classifying and utilising it, and then of imparting it to others. A good general education should prevent, and at all events will retard, the inevitable narrowing influence of the special one. It is through a special education that the vast majority of people are more or less fitted to take an active part in life, and for earning their daily bread. This special training must necessarily be in one direction, and just as its objects are kept in view, and the power which it gives is discreetly applied, so, other things being equal, will be the success of its application. If a man apply his special knowledge in a direction opposite to that for which it is adapted, he is most certain to come to failure, very likely to do harm. If he allow a cultivated intellect, or an active imagination innocent of technical knowledge, to carry him into the region of exact science, or to handle subjects which science seeks to control, the results are very likely to be unsatisfactory. I make these remarks in view of a recent article in one of the morning newspapers where it was stated that the advance of education enabled people generally to treat for themselves many of the minor complaints for which at one time the doctor would have been called in. Now, gentlemen, I know that the advance in medical and surgical knowledge has rendered necessary the addition of one year to the period of study required of the medical student. I also know that the demands made upon individul acquirements in other walks of life, both professional and commercial, have been felt as a terrible burden both by the student and by those who have to pay for them. But how all this can have qualified people to treat minor medical complaints is beyond comprehension. The medical student has to study one year longer to meet the exigencies of his calling ; it is therefore evident that the advance of education has not simplified or lessened his difficulties. It may be and is no doubt the case, that these extra demands are made in other professions and that under the stress of competition they are extended to commercial

pursuits, but let me ask if the additional year requisitioned from the time of the medical student, qualifies him in any way for being his own lawyer, or architect, or even his own *Doctor ?*

Going back to the influence of advanced general education, if it has, as it ought to have done, stimulated the intelligence in a healthy manner, it will have enabled the individual to recognise and appreciate the difficulties of the professional man and make him wary of attempting to interfere in matters of the import of which he can only have a glimmering perception.

Moreover, if by stimulating the intelligence is meant stimulating the imagination, I would suggest that the stimulating of this faculty is more likely to promote minor troubles than to impart the power of treating them successfully. But, gentlemen, false economy may be an outcome of advanced education, for education and sound judgment are not synonymous terms. False economy, I fear, is the real advanced education which prompts people to treat minor complaints for themselves for which the doctor would at one time have been called in.

In a few sentences Mr. Smale contrasted the difference between the use of drugs administered by trained men and taken indiscriminately. Continuing, he said :—Well, gentlemen, this is not a very cheerful indictment to bring against the British public and against the Governments which countenance such a state of things; for the public it may be urged that money may be saved, and that convenience is met by the sale of such preparations, and for the Government that it enjoys a substantial addition to the exchequer from the Stamp Duty.

In reply it may be urged that public convenience, which is greatly a matter of habit, might be met in other ways, and that although the tax of two hundred and fifty thousand pounds, which the patent drug consumers lay upon themselves, may help the revenue, it says but little for the economical instincts of that portion of the public—we keep reason on their part out of the question.

In the year 1880, the Medicine Stamp Duty yielded £135,366; ten years later, in 1890, its yield reached £217,264. So that in the present year of "educational enlightment" which gives "power over minor diseases," we may take it that the returns are over a quarter of a million from the Medicine Stamp Duty alone. The rates of

duty vary from 1½d. in a packet not exceeding 1s. in value, to 20s. on a package over 50s. in value, and the vendors of dutiable medicines have to pay 5s. yearly for a licence.

If we take the duty at 10 per cent. all round, a very low estimate, we shall find that the amount of money spent on stamped medicines bought and used by the public—in the majority of cases for they know not what—amounts to something like £2,500,000 per annum. Much has been said about the Drink Bill of the country, but in the consumption of excisable liquors the consumer generally knows what he is paying for and is able to form some opinion as to its merits. I would urge my hearers, nevertheless, to be very moderate in the use of them.

This enormous sum is annually spent by the intelligent British public, which imagines it is doing a smart thing when it listens to and is guided by the quack as against the medical man ; but then the quack, with his plausible platitudes, pretends to bring the mysteries of scientific medicine to the level of the uninstructed (speaking professionally), while persuading his victims that he is raising their knowledge to the level of that possessed by those who have devoted their lives to the study and alleviation of disease, and who have patiently worshipped at the shrines of nature and of science ; he panders to the worst traits in man's character—his self conceit, his superstition and his blind faith in those who claim to be able to perform miracles. Much of the so-called success of the quack is no doubt due to the natural impatience of suffering, especially when accompanied by credulity and incapacity. The doctor who cannot in a few weeks or months cure the malady which has been for years gaining its ascendancy, and which may have been materially helped on by the ubiquitous patent medicine perseveringly applied to symptoms, under the assumption that treating symptoms and treating disease are the same thing, is called an impotent pretender and dismissed. Perhaps if the doctor were in many such cases less reticent, and were to tell the patients a few plain truths, it might be better for both parties ; but the British public, which provides customers for the patent medicine man, also provides juries for the Law Courts, and so can prescribe penalties as easily as it recommends quack medicines. I fear that the same public can yet spend its millions on quack medicines and yet begrudge the doctor his fair remuneration, and goes out of its way by organising clubs, societies,

associations, and working through Co-operative Stores and such-like arrangements, to buy his skill as cheaply as possible, are not much to be trusted in the consideration of medical ethics, and so the medical man finds his safety in silence ; for even when he tries to explain some of the subtleties underlying diseases, his explanation is misunderstood, misquoted, and strange and fantastic stories repeated as to what he has said.

To help us realise how enormous is the traffic in patent medicines, I am able to assure you that the largest customer of the Post Office is an Insurance Company, and the next largest the proprietors of a patent medicine. If by any chance there should happen to be any relationship between those who take so-called patent medicines and this Insurance Company, it might be a good thing for the surviving relatives of the patent medicine imbiber.

It may be that the public are like the Irishman quoted in Le Fanu's "Seventy Years of Irish Life," who said he never called in a doctor because he wished to die a natural death. We may feel content that the man who possessed wit enough to say that had wisdom enough not to take patent medicines.

Having so far tried to comply with the requirements of the press, and pointed out as strongly as possible a matter that may be called a grave and serious scandal, it seems incumbent upon me to suggest some remedies for the state of things I have laid bare.

This, perhaps, is neither the time nor the place to do so, nevertheless, I would urge that the Government Stamp should be abolished, and the present seems to be an opportune moment for abolishing it, when the revenue of the country is so largely augmented by the recently established "Death Duties" ; and although this would not at once either reduce the number of proprietary medicines, or abolish the disgraceful and discreditable advertisements that disfigure our lovely country and infest every periodical that reaches our hand, I am convinced that very shortly it would do so, so sure am I that it is the Government Stamp that attracts and enhances the value of so-called medicine in the eyes of the public.

One other suggestion is that drugs should only be supplied to the public by pharmaceutical chemists, and that no combination of them should be compounded or sold by anybody but a qualified chemist, and then only with a doctor's prescription.

If some practical philanthropist, let us say, Sir John Lubbock, could be convinced of the harm that is yearly being done by these nostrums, he could frame and introduce a Bill into the House of Commons that would confer a benefit upon his countrymen by restricting very largely, if not abolishing altogether, the opportunities which the laity now possess for self medical treatment.

Mr. Smale concluded his address by offering some sound advice to the students.

DEMONSTRATIONS AT THE BRITISH DENTAL ASSOCIATION MEETING.*

Mr. WILLIAM HERN'S demonstration with the Downie Furnace consisted of the following items :—

1st. How to lengthen a tooth by soldering a small piece of platinum to the lower pin and bending them under the tooth to support the Downie body, fusing the body and coating with pink gum.

2nd. How to shorten a tooth by painting a concentre piece of pink gum and fusing.

3rd. A single front collar crown backed up with Downie body.

4th. A Logan bicuspid crown with collar and filled in with Ash's body and pink gum.

5th. A molar collar crown having cusps of a vulcanite or osteo tooth fitted to the bite supported and filled in with Downie body.

6th. A bridge carrying two front teeth backed with Downie body.

Messrs. JONES and LENNOX'S demonstration showed how they deal with a living cuspid or incisor, the crown of which is past filling.

They sawed off the crown and at once removed the pulp by means of a Donaldson bristle dipped in carbolic acid, an operation which proves in practice by no means so painful as one is apt to imagine, the patient in the case demonstrated not flinching at all.

The apex of the root having been sealed and the face brought to a convex form, with its anterior edge rather beyond the gum margin, a plaster model was obtained from an impression taken by

* The following descriptions did not reach us in time for publication in our last issue.

Mr. Lennox's method, and to this an Ash's tube crown was fitted. A post was prepared, bent to suit the crown (with a properly made crown this would not be necessary), and soldered to the tube. Finally the crown was fixed to the root by means of a shred of floss silk and thick gum mastic, a little base-plate guttapercha being placed below the crown.

"Büttner-Downie Crowns," by Mr. J. H. Badcock, M.R.C.S L.R.C.P., L.D.S.

The root canal of a right upper central having been previously prepared, the demonstrator proceeded to ream it to the required size. The root was then cut down flat to the level of the gum and trephined, Büttner's instruments No. 5, being used throughout. The root (in this case) happened to be unusually small. Special stress was laid on the importance of selecting a trephine of such a size that, when sunk to the requisite depth, no part of its circumference should project beyond the cementum. By paying attention to this point the operation was rendered practically bloodless, and pain reduced to the minimum.

As the section of the root was somewhat triangular, small pieces of enamel and dentine remained beyond the ring made by the trephine. These were split off with a fine chisel inserted into the groove and slightly rotated. Owing to the tapering of the root towards the apex, the resulting edge was almost inappreciable. A Büttner's impression cap was then placed on the root and an impression taken with a small piece of Stent's composition, into which the patient was allowed to bite. On removal from the mouth, the cap, which remained behind, was replaced in the stent, and the brass cylinder inserted ready for casting in plaster. For the construction of the crown, a platinum Büttner cap was used, the pin of which projected through the coronal surface about three-sixteenths of an inch. The crown was completed according to the Downie method, *i.e.*, an Ash's pin tooth was fitted to the cap, overlapping the band entirely, so that no platinum was visible from the front. The tooth was retained in position by bending its pins round the post, and its back was built up with Ash's porcelain body, and fused in Ash's bridge furnace. The result was a porcelain crown, perfect in appearance in front and behind, translucent and strong.

In order to save the time that would have been spent in fitting the tooth, another had been already prepared for the other central in the same mouth, and this was fixed with Poulson's Liquid Phosphat-Plombe Cement.

The method of using the Downie and Ash's furnaces and bodies was shown—the operator giving preference to Ash's—as, in his opinion, this body is more adherent to the porcelain, and can be cut and polished with greater impunity. It is made in the chief shades of Ash's teeth.

Mr. Badcock claimed for the crown that it was very strong, of good appearance and easily made, with the infliction of much less pain, and the expenditure of much less time than any other form of cap crown. Moreover, if, with advancing years, the gum should recede, no metal would become visible. It fits entirely beneath the free edge of the gum, and presents no edge that can possibly cause irritation, the margin of the gum keeping its normal pink colour after years of wear.

"Guttapercha Impressions," by Mr. J. H. Badcock, M.R.C.S.

The material used was the best pure guttapercha, easily obtained of any indiarubber merchants at about seven shillings per pound. It is of a dark brown colour, and the best quality is translucent in thin sheets. Owing to its elasticity, even deep undercuts are accurately reproduced, and "dragging" with consequent distortion of the neighbouring gum is obviated.

Sufficient guttapercha for the required impression is immersed in boiling water, and the tray filled as usual; any tendency to stickiness being overcome by wetting the fingers. A special tray is often advisable, though not a necessity, but it should not fit too closely. A little vaseline is smeared on the patient's lips, or they are thoroughly moistened. The fitted tray is then removed from the basin of boiling water to another of cold water, and partially immersed for a few seconds to cool the metal. The cold water should not be allowed to touch the surface of the guttapercha until immediately before it is transferred to the patient's mouth, when it is firmly pressed home and held in position for four minutes.

The resiliency of the material which is so valuable in preventing distortion of the impression while being removed from the mouth, and preserving undercuts, is the very quality which it is necessary to overcome when inserting it, for otherwise, there will be a

tendency to effacement of the impression, and a model will result with short teeth, a fault difficult to detect until the plate is tried in the mouth, *i.e.*, the guttapercha must be used very hot, that its particles may the more readily take up their new position and retain it until all tendency to rebound has disappeared. Neither should it be cooled during this time, as cooling would tend to produce stress and subsequent warping.

On removal from the mouth, the impression should be placed in cold water and kept there until ready to be cast.

When removed from the tray the guttapercha should be cleaned, pressed into wafers of convenient size between two pieces of plate glass and kept under water or glycerine. After some time it becomes sticky and loses much of its elasticity. It should then be discarded in favour of new.

As it does not become hard in the mouth, guttapercha is especially useful for cases when long loose teeth are standing, though its softness necessitates care in withdrawal.

The demonstrator showed a number of models taken with guttapercha, which were generally considered by members to be much better than could be obtained with any other material except plaster.

He also took and cast several impressions of the mouth of a patient with long loose teeth.

On Thursday, August 13th, Mr. BALDWIN demonstrated his "Method of Repairing Bridge-work by Soldering within the Mouth." The case was that of a bridge extending from the second molar to the first bicuspid, and had the porcelain face of the first molar broken off; this Mr. Baldwin replaced by another porcelain face, which he attached with "pearl" solder by means of a small soldering iron.

On the following day, Friday, August 14th, he repeated the demonstration on another case; this one being a Richmond crown on an upper canine root which had the porcelain face broken off, and which he repaired by the same process.

Mr. G. O. WHITTAKER's demonstration consisted of "Preparing and Fixing two Crowns on to the Roots of two Central Incisors," using a gold band, with porcelain front and Downie body at the back, but without a pin up the root canal.

The success of the method depends on the special shaping of the root and contouring of the band.

The Downie body at the back produces a much stronger and more translucent tooth than with gold at the back.

In preparing the root, the labial wall was ground down to the level of the gum, the enamel being chipped away beneath the gum with enamel chipper and fine fissure burr, the lingual wall was left intact, and as long as possible, taking into consideration the articulation of the lower teeth. The mesial and distal walls were sloped with a diamond disc. The band (previously fitted to a plaster of Paris model) was finely fitted to the root in the mouth.

In fitting the band it was tucked under the lingual edge, and tipped forward over the labial, then driven beneath the gum with a strong foot plugger, the sides of the band (pressed upon the sloping mesial and distal edges) widened in diameter, thereby reduced the labio-lingual diameter. Thus the higher the band was pressed beneath the gum the tighter it fitted.

The tooth was now fitted and waxed into position, removed with the band, sunk in sand and plaster, and a platinum diaphram soldered across, the pins were attached to this with pure gold, then filled up with Downie body, and cemented to the root. The gold used was specially prepared platinized gold, and would stand the heat of the fusing of the Downie body.

Abstracts and Selections.

COCAINE AND COCAINEISM.

In the *Revue de Thérapeutique Medico Chirurgicale* of March 15, 1896, Sallard contributes a paper with this title, in which, after a brief historical *résumé* of the influence of this drug upon various portions of the body, he proceeds to discuss the causes and symptoms of acute and chronic cocaine poisoning.

After stating that these untoward symptoms arise from subcutaneous and submucous injection, and from the use of large quantities upon the mucous membranes, particularly the urethra, he reminds us that Réclus, after a careful study, has concluded that

on an average three grains of cocaine is the safe limit for anæsthetic purposes. He also quotes an experience of Abadie's, in which, after the injection of two-thirds of a grain of cocaine into an eyelid before an operation upon ectropion, the patient, aged 71 years, was seized with coma, which lasted for five hours, death ultimately occurring.

He also quotes an experience of Hugenschmidt, a celebrated dentist of Paris, who had a case of syncope lasting half-an-hour as the result of injecting 10 drops of distilled water into the gum, thus illustrating the fact that injections under mucous membranes are capable of producing symptoms independently of the presence of cocaine. We believe this patient had already suffered from an attack of acute cocaine poisoning as the result of an injection. No case of death, however, has resulted after the absorption of a small amount of cocaine. There is one case, however, of a death from the injection into the urethra of a solution containing eight grains of this drug. The symptoms of acute poisoning under these circumstances are variable ; sometimes they are simply those of a brief and fleeting vertigo ; in other instances there is great excitation of the nervous system and a tingling in the extremities, with flushing of the skin followed by pallor ; in other instances there are gesticulations and the patient passes into a condition of active talkative delirium. The latter symptoms are seen most frequently in women. In other instances the symptoms are those of marked depression. The vertigo produces nausea or sensations similar to those of sea sickness. There is marked feebleness, and the patients are in a condition of semi-stupor. There may also be palpitation of the heart and some vomiting. There is marked pallor of the face, dilatation of the pupils, coldness of the extremities, and profuse sweating. Should convulsive symptoms come on, the intoxication is of course exceedingly profound and the prognosis grave. Convulsions are at first tonic, then clonic in character, sometimes resembling those of ordinary eclampsia. There is marked dyspnœa, probably due to tetanic contractions of the respiratory muscles, and cyanosis is present from similar reasons, the cause of death being failure of respiration. The duration of these untoward symptoms produced by poisoning by cocaine is usually from one to two hours, although, of course, they may last for a longer period of time. Marked insomnia is very apt to follow these symptoms.

Sallard points out that Gauthier has stated that the administration of nitro-glycerin will greatly diminish any danger connected with the use of cocaine, and that Glück has claimed that by the use of phenate of cocaine these symptoms can also be avoided.

Goesel has also proclaimed the advantages of tropacocaine as less likely to produce depression of the heart and other untoward symptoms.

Magitot, after stating that only very minute quantities should be used for producing local anæsthesia under the skin or mucous membrane, adds that cocaine injections should never be used in neuropathic patients or in those suffering from cardiac disease or chronic affections of the respiratory passages. Great care should also be taken that it is not introduced into the veins. The patient who receives cocaine injections should always be placed in the horizontal position, save in those instances where in operations upon the mouth or head a semi-reclining or erect position is indispensable. Again, the greatest care should be used that the hydrochlorate of cocaine is absolutely pure and not mixed with other alkaloids which may possess a toxic influence. It is also well to inject gradually rather than all at once. Magitot believes that cocaine possesses over chloroform and ether incontestable advantages.

Should symptoms of acute intoxication by cocaine develop in any case, the treatment is to place the patient flat on his back and use slappings of the face and chest with hot and cold towels, ammonia by inhalation, and, if necessary, nitrite of amyl, and hypodermic injections of ether and caffeine.

Chouppe has recommended that from one-third to one-half a grain of morphine be given hypodermically.

In regard to chronic intoxication by cocaine, or what has been called cocaino-mania, Sallard tells us that this habit is constantly increasing in France. The symptoms consist of loss of appetite, cardiac palpitation, headache and vertigo, finally followed by hallucinations or delusions. The following treatment is to be instituted :

In the first place, abstinence from cocaine is to be insisted upon under proper control of attendants or in a hospital. The method of decreasing the cocaine need not be instantaneous, but it should be tapered off rapidly. Hydrotherapeutic measures designed to increase nutrition should be resorted to, and iron, quinine and

arsenic, with heart tonics, such as caffeine and sparteine, should be employed. Chloral, trional or sulphonal may be employed to overcome insomnia, and the whole effort of the physican should be directed by means of appropriate exercise and a regular method of life to improving the patient's general nutrition.—*Dental Review.*

THE ADVENT OF DENTAL SCIENCE IN THE UNITED STATES.

By William H. Trueman, D.D.L., Philadelphia, Pa.

The first advent of dentistry in our midst seems to have been at Boston. In 1636, the Plymouth Company, an association organized for the purpose of colonizing that section of country, sent out from London to Boston a company of physicians, an apothecary, and three barber surgeons. Now, it is not true that the barbers were the only dentists of that period. There were at that time many medically educated men who confined their practice to disorders of the teeth and gums, and who attained therein much skill and expertness. They brought into line irregular teeth, treated diseased conditions of the teeth and gums, cleaned and filled teeth, extracted and replaced with artificial substitutes those which had ceased to be useful. These were called then, as those who do such work are now called, dentists ; they were professedly dentists ; collectively they were known and honoured as members of the dental profession. When and where these terms originated is lost in the dim, misty past. It is true, then as now, that in isolated communities, communities so small that they are unable to support a dentist, there is usually found some one, blacksmith or schoolmaster, with more courage or ability than his neighbours, who is able and willing to relieve sufferers of an aching tooth, or to suggest remedies for the ills to which the teeth are subject. That does not, however, make them dentists. Such are no more entitled to be considered members or representatives of the dental profession than is a mere vendor of quack medicine, or an amateur midwife, or a natural bone-setter, to be considered a member of the medical profession.

The barber surgeon seems to have been used as a somewhat similar makeshift ; more closely allied, however, to the medical than to the dental profession. When, in course of time, as little by little

his multi-vocation became specialised, dentistry proper had no part. This is clearly shown by the history of the barber surgeon's association in England.* The Company of Barber Surgeons was first incorporated by Edward IV., in 1461. In 1511, an Act of Parliament was passed prohibiting any one practising surgery without first having passed an examination as to qualification. In 1540 the title of the organization was changed and became "The Company of Barbers and Surgeons," the barbers being at the same time restricted in surgical practice to drawing teeth. Five years later, the preamble to an Act of Parliament still further separating these former close companions recites that the trade or practice of a barber is foreign to, and independent of, the practice of surgery. In 1745, the barbers and surgeons separated, each forming an association of their own ; the surgeons organizing as "The Commonality of the Art and Science of Surgery," a title frequently shortened to "The Surgeons' Company." This in 1800 gave place to the "Royal College of Surgeons of London." It is probable that the barber surgeon drifted into dental practice from his position as a public valet, a beautifier of the person. From hair-dressing to teeth-cleaning is but a step. The gentleman of leisure of the olden time would have his morning shave, the brushing up and fresh powdering of his wig, and his teeth polished at the same time and in the same shop. Of this we have evidence from an advertisement in a New York paper published about 1766, which reads : "*James Daniel, Wigmaker and Hairdresser, also Operator upon the Teeth.*"† The more progressive of these public valets advanced still further into dental lines when circumstances encouraged them so to do, especially as beautifiers of the person and purveyors to personal comfort, adding tooth-drawing and replacing of lost teeth. All this was, however, outside of his legitimate calling, and only acceptable to the community when nothing better was obtainable.

Of the three barber surgeons sent to Boston I have so far been unable to find any professional record. The name of one only, William Dinely, is known.‡ He seems to have been unfortunate. Shortly after his arrival he got into trouble by embracing Anne

* Memorial History of Boston, Justin Windsor, 1881, vol. i, page 502.

† Annals and Occurrences of New York City and State, John F. Watson, 1846, page 281.

‡ Memorial History of Boston, Justin Windsor, 1881, vol. i., page 502.

Hutchinson's peculiar religious notions. In 1639, a Roxbury man suffering from toothache sent for him to come and draw the tooth. He started on this mission of mercy accompanied by a maid who brought the message. They were overtaken by a violent storm, lost their way, and were found some days after frozen and dead. His misfortunes have preserved his name to posterity. Madam Dinely shortly after gave birth to a son, who was named, with homely pathos, Fathergone Dinely.

The next reputed dentist of whom I find record is Isaac Greenwood, Jr., also of Boston.* The family came from Norwich, England. Nathaniel Greenwood arrived in Boston about 1650, and engaged in business as a ship carpenter. He died in 1685, leaving two sons, Samuel and Isaac. Isaac became the first professor of mathematics of Harvard College, and was the father of Isaac, Jr., whose name is first brought to notice in a newspaper account of the Boston massacre of March 5th, 1770; he is there described as an ivory turner, a business "naturally embracing that of dentist," so says the chronicler. Dr. Chaplin A. Harris refers to him in his Dictionary of Dental Science as "the first practical dentist in Boston."† So careful and painstaking a writer, who had the advantage of mingling with many who had personal knowledge of those early times, we may safely assume knew whereof he wrote. Of Isaac Greenwood's five sons, three became dentists; two, John and his younger brother, William Pitt, will ever be remembered for their good work as pioneer dentists in the United States.

The story of John Greenwood,‡ as written by himself toward the latter part of his life, although little more than a mere sketch, probably unfinished owing to his sudden death from apoplexy in 1815, is particularly interesting. Born in Boston in 1760, he attended school until his thirteenth year, when he was apprenticed to his uncle, a cabinet-maker of Portland, Maine. Two years later the battle of Lexington brought the strained relations between England and those of her American colonies now embraced within the United States to a crisis. A peculiar train of circumstances led young Greenwood to enlist in the American army rapidly gathering

* Memorial Biographies of the New England Historical and Genealogical Society, Boston, 1880, page 268.

† Harris's Dictionary of Dental Science (1849). John Greenwood, page 333.

‡ *American Journal of Dental Science*, vol. i., 1839, pages 73, 97, 113.

near Boston, and shortly after, at Bunker Hill, he received his first baptism of fire. With his company he assisted to cover the retreat of that patriot band whose defeat brought no disgrace to the vanquished and gave no comfort to the victors. Later he took part in that first and most disastrous campaign in Canada, and ended his army career, his term of enlistment having expired, immediately after taking part in Washington's masterly surprise of the Hessians at Trenton. He enlisted as a fifer, a position which exempted him from many hardships and dangers; but of this he took no advantage, but manfully and courageously did his full duty as a soldier. After a few weeks' rest at his father's home at Boston, he entered the naval service as a privateersman, and in various capacities served therein until the close of the war. We now find him in New York city, almost penniless. Refused assistance by his brother, Clark Greenwood, who was then in that city in practice as a dentist, through the favour of a friend he began business in a small way as a nautical and mathematical instrument maker, with most promising success. A mere chance turned his attention to dentistry, and developing therein exceptional skill, he soon acquired a large and lucrative practice.

John Greenwood, when he performed his first dental operation if the extraction of a tooth may be so termed, was a skilful mechanic. So satisfactorily was this extraction done, that the patient, a physician of repute, asserted that he had never had a tooth removed so carefully or with so little pain, and declared that he would thereafter recommend to him any of his friends or patients requiring a like service. In a little while, so promising seemed this new vocation, that he sold out his business and resolved to devote his whole time and attention to dentistry, determined to make himself a master in his calling. Passing beyond the usual limits of dentistry, tooth-drawing, tooth-replacing, and tooth-filling, he boldly entered the domain of oral surgery, and acquired fame in successfully treating, by novel surgical procedure, diseases of the maxillary sinus.

He was a type of the men who have made illustrious and honoured the dental profession in the United States. His education was meagre, his opportunities for acquiring professional knowledge limited; he made, however, the most of both, and with unflagging zeal and untiring industry this carver of ivory and worker in brass

reached a well-merited and recognized position in the front rank of his profession.

His younger brother, William Pitt Greenwood* was also an ivory turner. After spending a short time in New York assisting his brother, he located in Salem, Massachusetts, as a dentist, in 1790. A few years later he removed to Boston, continuing in dental practice until incapacitated by age. He died at Boston, May 10th, 1851, on the eighty-fifth anniversary of his birth. He early acquired a reputation as a skilful carver of bone dentures; practiced while the fad lasted, replantation; and during his long professional career enjoyed and maintained an excellent reputation and practice. He received in November, 1840, the honorary degree of D.D S. from the Baltimore College of Dental Surgery. He was present at a meeting of the American Society of Dental Surgeons at Boston, July 19th, 1842, when he gave to the society an interesting account of the profession as he knew it some fifty years before. It was said of him then, "that although approaching 80 years of age, his step is still elastic, and his mind possessed of the vigour and freshness of youth."†

Another Boston lad, a few years younger than John Greenwood, while perhaps not so well known (for it was not his fortune to have been dentist to his Excellency, the first President of the United States), will ever occupy an honorable position in the annals of dentistry in America. Of his early life but little is known. He, too, had joined the patriot band, and we first find record of Major Josiah Flagg, a youth of but eighteen years, as being in the army while the French and Americans were in winter quarters, side by side, near Providence, R.I., 1781-82. He served until the close of the war, and then, shortly after, began practice as a dentist in Boston. During the war of 1812 his martial spirit was again aroused; he entered the naval service, was soon taken prisoner and carried to England, where he was paroled. His enforced stay in a foreign land was made less irksome by the kind attentions he received, in recognition of his well-merited reputation, from the learned surgeons of London. While his thoughts were of home and the profession he loved, under the most pleasant auspices he made the most of the opportunity to increase his medical knowledge, and in social intercourse with many distinguished medical teachers

* Memorial Biographies of the New England Historical and Genealogical Society, Boston, 1880, page 268.

† *American Journal of Dental Science*, vol. iii., September, 1842, pages 69, 74, 77.

of London, attending their lectures, assisting in their practical work, and in the study of their methods of teaching, he gathered much that he fondly hoped to make useful to his brethren at home. The war over, he was soon again in Boston, anxious that they should share with him the good he had learned; but shattered health frustrated his plans. Seeking rest and health, he went to Charleston, S.C., and died there, September 30th, 1816, aged fifty-three.* He was the first of a family whose "brainy" men have made their mark in various pursuits. In dentistry they have developed a faculty of early getting to the front and staying there. As teachers and as investigators they have proved earnest, progressive, aggressive, and uncompromising.

Let us now consider for a few moments an event which I think has had an important bearing upon dental history in the United States. It was a sad and anxious winter, that of 1777 and 1778, for the leaders of the American Revolution. The outlook of their attempt to establish a government of the people by the people, and for the people, was gloomy in the extreme. When the fate of the new nation hung as on a balance, it was reserved for a citizen of Philadelphia—our representative in Paris—to transform impending disaster into a grand success, and in so doing transplant to these shores, from the land where it had received its then highest development, the science of dental surgery. Dr. Franklin's world-wide reputation as a scientist secured for him a warm and enthusiastic reception in Paris, for Paris was then and is now what Francis the First's ambition had made her. Notwithstanding that she has been torn by internal strife, sacked by foreign foes, deluged with blood, and baptized by fire time and again, she still remains the metropolis of the scientific world.

While other monarchs of his time were busy with conquest, the gratification of personal vanity, or less laudable pursuits, Francis the First of France was ambitious to make the capital of his domain a literary and scientific centre. Under his wise rule, all that promised usefulness in letters or in science received at Paris a warm welcome and the fullest encouragement. The spirit he there implanted and so zealously fostered has grown, and borne in the years that have passed abundant fruit. In Paris modern surgery was born, and at its birth the dental surgery we now know received its first educational impulse. It was, indeed, an auspicious time for a

* *Dental News Letter*, vol. vii., July, 1854, page 212.

great mind to do the world a signal service when Ambrose Paré arrived at Paris, about 1525, to begin his wonderful career by an apprenticeship to a barber surgeon. At that time the occupation of barber and surgeon, and a little dentistry, was usually combined in one. He early evidenced a disposition to master the more important features of his art, and while still a young man his marked ability as a surgeon attracted the attention of Captain-General Rene de Monte Jean, commander of the French forces during the campaign in Piedmont in 1537, and he received from him a commission as Master Barber Surgeon. In this position he found opportunity and encouragement to introduce those reforms in surgical practice that have earned for him the well-merited title of the Father of Modern Surgery ; and, let me here add, he may as justly be styled the Foster-Father of Modern Dental Surgery. Compared with the dentistry of the present, the dentistry of his day, although crude, was far more advanced than was the general surgery of 1537 compared with that of 1895. He proposed to treat wounds with supporting bandages, control hemorrhage by ligatures, and assist nature with soothing applications in the place of the time-honoured actual cautery and boiling oil. Contemptuously throwing aside his whole array of searing tools, he presented his brazier and oil pots to his cook for use as porringers, and entered upon his work armed only with bandages and a few simple emollients. This radical departure from the accepted creed of the times aroused a violent storm of indignation among his professional compeers ; but the results he obtained made his services in demand by the wounded and the suffering. Where he had charge, the restfulness and quiet was in marked contrast to the stench of burning human flesh and the cries of anguish—time-honoured accompaniments of the then accepted orthodox surgical methods, especially in army practice. To be waived aside, to see this unpretentious youngster, scarcely out of his apprenticeship, and his unheard of methods preferred to theirs, was humiliation enough to those who clung with all the ardour of ethical fanaticism to time-honoured customs; but to see patients who would, after enduring hours of untold anguish under their strictly professional procedures, have been the subjects of a pretentious funeral, by this new departure, after a few weeks' of recuperative rest, fully restored to health and vigour, was exasperating in the extreme ; and they were minded to make things "hot" for Ambrose Paré.

Returning to Paris, he at once, paying no heed to the ravings of his detractors, fully supported and receiving every encouragement from the court, vigorously set to work to reform surgical educational methods and practice. He insisted that surgeons should receive a medical training, be thoroughly instructed in anatomy by dissections, and well versed in all that pertains to the art, and he organized schools for instruction. He wrote a number of works in French upon surgery and surgical practice, touching also upon the practical part of dentistry. He lived to see his work appreciated, his methods generally adopted, and the science he loved placed fairly upon a scientific basis, and died in 1590, honoured and respected by all. The work so well begun went steadily on, and towards the close of the seventeenth century the surgeon and the dentist had so far separated from and advanced beyond their former companion, the tonsorial artist, that they began to claim an equal standing with the profession of medicine, and after a vigorous struggle they gained their point. During this contest the dentist and the surgeon fought for their rights side by side, and at its conclusion, in France, the physician, surgeon, and dentist became professional brothers. There and then, possibly for the first time since the dark ages, dentistry assumed the place she has since held—ever recognized and unchallenged—a science amongst sciences. About the year 1700, persons destined for the profession of dentist were compelled, in France, to undergo a regular examination, the same as surgeons and physicians. From this time on, dentistry assumed, in France, an importance it had nowhere else on the globe. The dental profession attracted to its membership gentlemen medically educated, of broad culture and marked ability, and of the highest scientific attainments. Its progress was rapid. Dental writers and investigators increased in numbers, while their work acquired greater scientific value. We find articles upon dental science and practice freely published in the medical and scientific periodicals. In a word, the dental profession there stood shoulder to shoulder with the liberally learned professions of the day, and received with them equal recognition and appreciation. French dentistry occupied then a similar position to that assigned in later years to so-called "American Dentistry," a term it would be well for the dignity of our profession could we effectually efface from the record, with all the bombastic nonsense associated with it.

Dr. Franklin's mission to France proved a brilliant success.

With all the adroitness of a born statesman, taking full advantage of the political surroundings, he secured from France that material and moral aid the struggling colonies so badly needed, and in a few years a new nation was born. Now, let us see how closely and yet strangely Dr. Franklin's success as a diplomat is connected with the history of dentistry in the United States.

With the land forces sent to our assistance by France was a young officer, Joseph Le Maire,* a dentist of Paris, who, following the example of many of his countrymen, abandoned for the time being his business and tendered his services to the cause of liberty. With the French fleet arrived James Gardette, a naval surgeon on his first cruise, a man whom we dentists of Philadelphia will ever hold in grateful remembrance. He did much to make dentistry in Philadelphia what it is. James Gardette was educated for the medical profession. When he resolved to enter the navy, as part of his profession as a naval surgeon he received instructions in dentistry from M. L. Roy de la Faudiniere, a distinguished dentist of Paris, and provided himself with dental text-books and instruments. This was required of naval surgeons in the French service in 1777. We have no reason to think that he contemplated the practice of dentistry when he left France other than as part of his work as a naval surgeon. He soon acquired a distaste for the sea, and resigned his position. During the winter of 1781-82, the war then being virtually over, the French and American armies were in winter quarters side by side near Providence, R.I. In that camp, relieved of the tension associated with active service† and expecting soon to resume civil life, we find, in intimate friendship, Joseph Le Maire, James Gardette, and Josiah Flagg. Le Maire had, now and again, to the great comfort and satisfaction of his companions, performed dental operations for their relief, and now many of the officers and others took advantage of the opportunity to secure his services. Josiah Flagg had been greatly interested in Le Maire's work, and proved an apt and zealous student. Gardette also embraced the opportunity of adding to his dental knowledge already gained. So you see it needs but little stretch of the imagination to locate the first school of dental instruction in the United States, and the first

* Sometimes by old writers spelled "Lemayeur." Towards the close of the last century, the French Academy simplified the spelling of many French words, dropping silent letters, &c. Le Maire changed the spelling of his name to conform to this.

† *American Journal of Dental Science*, vol. i, New Series, April, 1851, page 375.

dental meeting for mutual improvement, around this Revolutionary camp fire. We may safely say that scientific dental surgery in the United States owes much of that which has given it its well-merited reputation to the good work there done in 1781-82.

Not only did those connected with the army have opportunity to observe and receive the benefits of skilled dental services, but the presence of the army in its then inactive condition attracted from all parts of the country many of our best citizens. When the army disbanded, the merit and advantages of dental attention were made known far and wide, as they could have been so quickly by no other means. This created a demand, the return of peace and prosperity furnished the means, and we soon find dental practitioners in all parts of the land. Towards the close of the last century our profession in the United States was well established and fully appreciated.

I am not unmindful of the good and skilful men, native-born or from abroad, who by their example or their labour have done much to extend our professional knowledge, when I present to you these men as the Fathers of Scientific Dental Surgery in the United States, and so close this story of the advent of dental science in our midst.—*Cosmos.*

DENTISTRY IN THE ORIENT.

By Richard Henry Kimball, D.D.S., Chicago, Ill.

During my sojourn in the "East" I was naturally desirous to obtain all the information I could concerning the progress of the Chinese in that field of science in which I was particularly interested, but I was unable, from lack of time, to extend my research much beyond the limits of foreign residence. Careful observation whenever opportunity presented, and inquiry of those resident among them, failed to reveal even the most primitive attempt at preservation of the natural teeth. I, therefore, believe that I am fully within the bounds of truth when I say that beyond certain remedies for relieving toothache, extracting, and an occasional crude attempt to supply an artificial tooth, or a few teeth, there is no knowledge whatever of dentistry among the hundreds of millions of Chinese.

In the treaty ports with the daily contact with foreigners there has naturally grown up in the minds of many of them, some knowledge of the medical and dental methods of the western world,

and from the medical missionary. Many even of those living in the far interior have come to appreciate the value and importance of foreign medical and surgical skill.

None of them are so ignorant of dental matters, however, that they cannot appreciate, in some degree at least, the distress and inconvenience of an aching tooth, and employ some agency for relief, it may be spiritual, medical or mechanical. It is the quite generally accepted idea with them that pain in the tooth is caused by the presence of a "worm," which has taken up its abode inside of it.

They are encouraged in this belief by the class of men who go about the city streets extracting teeth. These find it to their pecuniary advantage to cater to his notion, and, to prove the truth of their assertion, it is their frequent habit after extracting a tooth where the imprisoned "worm" has been making things particularly lively, to break the tooth and exhibit the "worm" to the astonished victim and interested onlookers. I wish I could bring before you a picture of an aspirant for dental honors as I first saw him at a little village a few miles out from Hong Kong. He was squatting by the roadside, in front of the shops on the main street, proclaiming in loud tones his skill as a "worm" and tooth extractor. (This I learned from a Pigeon English speaking native.) His outfit consisted of a wooden tray some two feet long, fifteen inches wide and perhaps three inches deep, elevated upon a stool. At either end of the tray an upright was fastened, and between these several wires extended upon which were strung hundreds of teeth. In the tray were perhaps enough more teeth to fill a peck measure, beside a number of bottles and paper packages.

I enlisted the aid of the friendly interpreter to find out about the bottles and ascertain what appliance he was using for extracting, there being no instrument whatever in sight.

He was shyness itself, but after much palaver he produced from that part of his clothing made famous by Bret Harte a rather large pair of ancient, much worn, and abominably dirty pliers, of foreign manufacture. These, after some hesitation, he permitted me to take for examination, and I was conscious as I held them in my hand of a profound feeling of respect for the simple tool, the product of some humble European artisan, probably long dead, who in making it had toiled to a better purpose than he had ever dreamed.

In all probability either you or I would have discarded the implement as not retaining enough of its original usefulness

to be of service in tack pulling, and, but for all the horribly abundant septic possibilities present, would have doubted that this was the instrument used, and according to his statement, the only one.

No amount of questioning elicited the least information regarding the other articles in his tray (the bottles and packages), a shake of the head being the only response to my repeated inquiries. Common report tells of a mysterious powder some of these men use in extracting teeth, a small amount of which is placed on the gum around the tooth to be extracted, when after waiting several minutes the tooth can be removed with the fingers.

After much difficulty and several years of waiting I finally succeeded in obtaining, through a Chinese acquaintance, what was *said* to be a specimen of this powder, and its analysis shows it to be composed of potassium nitrate, sodium sulphide and what seems to be red sealing wax. That only the fingers are used in removing the tooth is true, the powder being employed simply to mystify, which it succeeds in doing thoroughly, deceiving many foreigners as well as Chinese, for I have frequently been assured by the former that the powder did the work. A wonderful degree of strength is developed in the fingers by long years of practice in pulling wooden pegs from boards. In Japan the boys are put to this exercise when quite young, and as a result pegs are easily withdrawn by them that we would find it difficult to remove with forceps.

As an object lesson in Chinese dentistry I coveted this outfit, and offered the man what was a large sum for it; but he refused to sell.

Then it was proposed to pay him his own price, including a good pair of forceps, but to no purpose; he could not be induced to part with anything. It may not be amiss to speak, in passing, of the peculiar trait of the Chinese illustrated in this incident. It is characteristic of them no matter how much they may wish to dispose of any article, how desperately they may be in need of the money its sale will bring, they invariably refuse to sell when openly approached with an offer to buy.

They have their customary way of conducting such matters, and with them custom outweighs in importance every other consideration, almost to that of life itself.

The preliminaries to a sale must be conducted with great discretion, for an axiom of much importance in China is, "The

country villager is born perverse ; the more you wish to buy the more he is determined not to sell."

Suspicion is a national characteristic ; not as applied to one's neighbour solely, but each man suspects himself, or recognises his own weaknesses, and in all trades except in shops and open market, where prices are fixed, the employment of an intermediary is necessary. I cannot dwell longer on this trait than to quote the Chinese adage, "If there are no clouds in the sky there will be no rain on the earth ; if there is no one to stand between, business will not be done."

For years I have been trying to get possession of the outfit of one of these Nomadic individuals, even enlisting the assistance of residents of interior cities, where I felt that the prejudicial conditions might not be so great, but thus far without success. What I have stated is, so far as I have been able to ascertain, the sum total of the Chinaman's own unaided efforts on behalf of the natural teeth.

They make an indifferent attempt at supplying the places of lost teeth, the artificial being made of ivory or bone, shaped with a file and attached to the remaining teeth with a brass wire. The effect in mouth is often hideous beyond description. Where a single tooth is lost, an artificial substitute is shaped to fit the vacancy and forced to place, no retaining wire being used. When the space has enlarged until that piece is no longer retained, another and wider piece is made that will fit tight. This wedging operation is repeated until the retaining teeth assume such an angle that it becomes necessary to wire the piece in place. I have with me some specimens of this class of work, and appliances with which they were made.

The file with its teeth cut only one way, is a very fair tool you will observe, rather course for such work, but it is marvellous how much they accomplish with just such instruments. It is of native construction and its temper is poor.

The drill is made from an umbrella rib, while the wire is doubtless of foreign manufacture.

In some of the larger coast cities are to be found a few Chinese practicing dentistry. "Alle same foleign dentist," they would tell you. Their knowledge of things dental is purely empirical, and has been derived from association with foreign dentists : either as assistant, or an attendant, whose duties were to receive visitors and keep the office in order.

During his tenure of office he had probably permitted his sponge-like proclivities to operate with some freedom, and so had "absorbed" enough of the worn, or nearly worn out belongings of his master, to fit him out very fairly when he decided to set up for himself.

Two of these men I know to be possessed of a considerable degree of skill ; one practicing in Hong Kong, was for several years Doctor Roger's assistant, and when I first went there in 1886 was patronised by a number of leading foreigners in preference to the only European dentist there at the time. The other, who is now practicing in Shanghai, was assistant to Doctor H. H. Winn for 15 or more years before I joined him, and continued with us until the time of Doctor Winn's death in 1890, thus enjoying a pupilage of fully 20 years.

Both of these men have fully equipped modern dental offices, furnished in one case with a Wilkerson high low base chair and fountain spittoon, and in the other with an S.S. White pedal lever chair. Each has a full equipment of White's instruments. All of these Chinese practitioners are patronised quite largely by a class of foreigners whose means will not admit of their going to a foreign dentist, such as a merchant and naval seamen, soldiers (in Hong Kong) and many others. They are also doing a good work in educating their own people to some knowledge of dental matters, as many of the better class of Chinese go to them for both operative and prosthetic work. As each one of these native "tooth doctors," as they are called, has a small army of relatives and family connections who, like parasites, attach themselves to him, their value as educators is greatly increased, and I predict that it will not be many years before the foreign dentist in China will have Chinese graduates from American dental colleges to compete with.—*Dental Review.*

SURGERY OF THE NERVES.

Trifacial Neuralgia.—The justifiability of the necessarily severe operations undertaken for the relief of this extremely painful affection is gradually being recognised, and the number of patients subjected to the modern operative procedures is undoubtedly on the increase. There are, however, some who hesitate to admit the value of surgical interference in these cases, among them Dr. Gilles de la Tourette,* who contributes a paper on the subject from the medical point of view.

* Med. Week, July 17, 1896.

In discussing the diagnosis of the condition, he says that the sensory root of the fifth nerve alone is concerned, and he lays particular stress on the "painful spots" where the branches emerge on the face, viz., the supra-orbital, palpebral (at the outer angle of the eye), nasal (at the inner angle), and the ocular points, all associated with the opthalmic division of the fifth. Those associated with the second or superior maxillary division are the infra-orbital, malar, dental, and palatine; and with the third, or inferior maxillary division, the tempero-maxillary, inferior dental, lingual (along the side of the tongue), and mental points. In addition to these points of excessive hyperæthesia, the whole side of the head, in some cases, is sensitive and tender. In less severe cases only one or two branches may be involved. There are two distinct varieties of trifacial neuralgia. (1) A benign and ephemeral variety, in which the pain is continuous throughout the whole course of the disease, with exacerbations of a shooting character. It is often attributable to external irritation, such as cold, and may follow on influenza or other infective diseases. (2) In true tic douloureaux, on the other hand, the symptoms are always paroxysmal, reaching their acme at once, and subsiding with equal suddenness. In the intervals between the attacks there is complete freedom from pain. The pain is intense while it lasts, and the attacks come on with varying frequency, ten, twenty, or a hundred times a day, but are always of short duration. An attack might be excited by such physiological acts as talking, swallowing, coughing, sneezing, &c., all of which the patient tries to avoid as far as possible. Pressure over the tender spots to some extent relieves the pain, and this being resorted to very frequently may result in producing facial marks, or even deformities.

Vaso-motor and trophic changes often accompany the disease, such as injunction of the eyes, œdema of the lids, nasal discharge, excessive salivary secretion, or herpatic eruptions. The essential feature of this variety is its persistence; the older the patient grows the shorter the intervals of freedom from pain become, and the more severe are the attacks.

The etiology of the condition is very obscure. In a few cases the nerve is pressed upon by tumours, syphilitic growths, meningitic patches, or fragments of broken bone, but in the great majority of cases no such definite cause is forthcoming, and the nerve disturbance has to be attributed to such constitutional conditions as gout,

rheumatism, diabetes, and so on. Undoubtedly some cases show evidence of being hereditary.

Krause has found pronounced histological changes in the Gasserian ganglion, but none in the peripheral branches of the fifth nerve. Fowler thinks that the sclerotic changes in the vessels may be the essential pathological lesion.

Differential Diagnosis.—Typical tic douloreaux has to be diagnosed from—(1) The benign form of facial neuralgia; (2) Migraine; and (3) Hysterical paroxysms in the form of facial neuralgia. These are of long duration, with comparatively long intervals between attacks. The paroxysms come on only two or three times a week, at fixed intervals, last for some hours at a time, and often end with a convulsive seizure and weeping. There is almost always an aura, such as the globus hystericus, noises in the ears, or ephemeral hallucinations. The importance of recognising this clinical form lies in the fact that surgical treatment would be particularly inappropriate. At the same time it is to be borne in mind that trifacial neuralgia and hysteria may co-exist, as in a case quoted by Tourette.

Medical Treatment.—The benign variety is always influenced favourably by analgesics—antipyrin, phenacetin, hydrobromate, or valerianate of quinine; whereas true tic defies all such drugs. The writer pins his faith to the treatment advocated by Trousseau and employed by Charcot, namely, the administration of extract of opium in large and progressively increasing doses. He illustrates it by the treatment of a given case. Pills accurately measured and prepared with a view to ready and complete absorption, were ordered, each containing two centigrammes of the extract of opium. On the first day the patient took three pills at regular intervals, and one additional pill was given each day. When a dose of eight pills had been reached the attacks had decreased by half, and the patient could eat and speak without bringing on a paroxysm. After twelve pills a day the pain had disappeared. For five days this dose was given, and then the pills were reduced at the rate of one every other day, and in twenty-five days the treatment was discontinued. A fortnight later (date of reporting) patient was free from pain and gaining weight.

Unfortunately, this relief can only be looked upon as temporary, and on a further attack supervening the pain is less well borne.

This is the case for medicinal treatment by one of its great supporters, and on such data operative measures are disapproved if not actually condemned as unnecessary.—*The Hospital.*

PYORRHŒA ALVEOLARIS.

Dr. Younger said that he considers pyorrhœa to be a disease of the pericementum and not of the gums or other tissues. What is wanted is to create an irritation that will excite granulation. That is best accomplished with lactic acid which will prove successful in 24 out of 25 cases. If this treatment fails it will be because all deposits have not been removed, or because the pockets have not been first cleansed of blood, serum, &c. The lactic acid is best kept in a little test-tube which can be held over the alcohol flame until liquefied and warmed. If not warm it will cause too much pain. One application, *once for all*, will be all that will be required if the deposits have been thoroughly removed and the pockets properly cleansed. He said: "You may laugh, but try it." Before applying the lactic acid the surrounding tissues should be protected by coating with glycerine and covered with cotton; then flood the pocket. The lining membrane will be exfoliated, contraction follows and the gum soon clings closely to the root again. Then wait a week. If the point of the syringe can be introduced it is proof that the deposits have not been thoroughly removed, or that the application was not sufficiently thorough to cause perfect exfoliation of the lining membrane, and the treatment must be repeated.

When union is not prompt in cases of implantation the application of lactic acid in the socket will secure perfect union, which, Dr. Younger said, upholds him in his theory of persistent vitality, as there could not otherwise be such perfect reattachment. He said: "By my method take one tooth at a time and give one, two, three or four hours, if necessary, to the removal of deposits. The next day take another tooth in the same way. If there are three contiguous teeth to be treated, clean the central tooth and the adjacent sides of each of the adjoining teeth. The next day finish the outer sides but do not disturb the central parts. The treatment is very simple but it *must be thorough*, and be very particular not to do any washing out after applying the lactic acid. Flood the pockets and leave it there. As a subsequent wash chlorate of potash, as strong as can be borne, will be found very soothing."—*American Dental Association.*

Reviews.

"Notes on the Treatment and Filling of Teeth." By W. Cass Grayston, L.D.S. Published by the Dental Manufacturing Co., London.

Many of our readers will be glad to hear that the above notes, which have already appeared in the Dental Record, have been published in book form. It is always pleasant and useful to peruse the notes of a busy practitioner, and it would be well if others were to follow his example, and thus enable younger men to quickly gain, in some measure, the knowledge of their seniors. Mr. Grayston has arranged his work under many headings. He commences with some useful notes on "The Relief of Pain," but he seems almost too cautious in certain cases; for instance, he says: "If the tooth is carious, decay should be sufficiently removed to admit a temporary filling," recommending carbolic acid and tannin as a first dressing; but if this fails to relieve pain, we are then told to try either carbolic, or oil of cloves; should this be found useless, he suggests the application of the rubber dam, the dehydration of the cavity, followed by the application of chloroform and other drugs; if still unsuccessful, then expose and kill the pulp. We fancy most of us would resort to "making an exposure" at the second sitting. His remarks on periostitis are useful, as also are those on localising the faulty tooth in referred dental pain. In speaking of rhizodontrophy the author omits to mention its use in the filling of pulpless temporary teeth; but rightly considers the operation only suitable for temporory relief, or in an emergency: he amusingly remarks, "It is rather awkward for the rhizodontrophist when the drill pops into a living instead of, as was expected, a dead pulp"; yes, decidedly awkward, and yet we think all must have experienced the occasional great difficulty in diagnosing a dead from a living pulp. He gives us very little information on the method of scaling teeth; but his notes on pyorrhœa are good and interesting, although we are rather surprised that he makes no special mention of copper sulphate. The author's notes on the filling of teeth are good, although somewhat elementary; his suggestions on the best methods of inserting various kinds of gold are interesting and instructive, and the text is rendered more valuable by several diagrams. He thinks, like most others, that gold is the best filling material, provided, as he wisely remarks,

that one is dealing with a good patient, healthy mouth, and teeth of fairly sound structure. For all that, he has a good word to say for other materials, especially guttapercha in smallish interstitial cavities not extending to the biting surface. He quotes as one of the advantages of amalgams, their "ease and rapidity of introduction," but we think that one reason why some operators have a poor opinion of amalgams is that they do not take sufficient time and care in their insertion; he does not mention the value of thoroughly polishing amalgams at a subsequent sitting. In speaking of tin foil in conjunction with gold, he says: "I consider its only reliable value lies in being a valuable starter for gold, and an excellent low conducting lining under gold": but he appears to have little faith in its presence at the cervical edge, for he remarks: "In using tin to start gold fillings it is always inadvisable to allow it to extend to the margins"; on this latter point much difference of opinion seems to exist. Further on we come to his notes on exposed pulps, with reference to which he correctly remarks: "It is as a rule preferable to waste no time and run no risks of future annoyance, but at once to apply the minute quantity of arsenic necessary to destroy the pulp": but qualifies this statement by recording the numerous occasions on which he has found nerves that refused to die under an arsenic dressing, and even suggests the advisability of "capping" such, and leaving them to die a natural death. His notes on the treatment of dead and putrid pulps are well worth reading, and he concludes by quoting some interesting observations of Dr. Harlan on the value of essential oils. We do not like the expressions "pulpitis" and "soreness of the teeth." Mr. Grayston, in his introduction, writes: "It is hoped that here and there may be found a hint that will be of service to younger practitioners"; we think that all who read his notes will be able to glean some useful knowledge, and find that their perusal will stimulate thoughts on many a half-forgotten detail.

EXTRACTION OF THE TEETH. By J. F. COLYER, L.R.C.P., M.R.C.S., L.D.S. Claudius Ash & Sons, London.

Much useful information may be elicited by the perusal of this little and unpretentious volume, with its 90 and odd pages. Taken through and through, the book may be regarded as a fair presentment—in epitome—of the popular ideas, as they prevail, to-day on

the subject of which it treats. Of the five chapters into which the work is divided, Chapter II., dealing with "the Extraction of Individual Teeth," pleases us the most. We are not in agreement though with the author when he states—speaking of the extraction of the upper incisor—that "a firm inward movement should be made." We have not yet seen fit to depart from the time-honoured custom of adopting the rotatory method for the removal of the teeth in question, and we are glad to find that in a later paragraph the writer, though dissenting from, recognises this practice.

The advice given to the "method of holding an elevator . . . . for the removal of the teeth on the right side of the mandible," does not, in a commendatory sense, appeal to us. We aver that in each case, whether operating on the right or the left side, the position of the finger—a highly important matter—should remain unchanged, *i.e.*, should lie along the flat side of the blade.

Chapter III., devoted to the consideration of "The Extraction of Misplaced Teeth," is embellished with many woodcuts which, in the main, are an excellent supplement to the descriptive matter of the text; we take exception though to Fig. 37, where, if the illustration be true, a more rational means of treatment than that suggested might, in our judgment, well be employed.

Within the limits of the remaining chapters, "The Use of Anæsthetics and Complications and Sequelae," many points of distinct interest are to be found congregated.

Philologically considered, the book leaves something to be desired. What are we to make of such a sentence as "Another indication for extraction is in cases of teeth setting up ulcers"? We have no wish, however, to be thought captious in our criticism, and such small faults as we have pointed out in no way militate against the usefulness of a work whose perusal must be fraught with advantage to the reader, be he student or practitioner.

We are informed that the work on "Dental Materia Medica," by Mr. Glassington, will be published about the end of this month.

Errata.—Mr. Ezard writes to point out that he, and not Mr. Stewart, is the Lecturer on "Gold Filling" in the Edinburgh Dental School, as given on page 434 of our last issue.

On page 415, "sodium chlorate" should read "sodium chloride."

On page 399, "Barton" should read "Berten."

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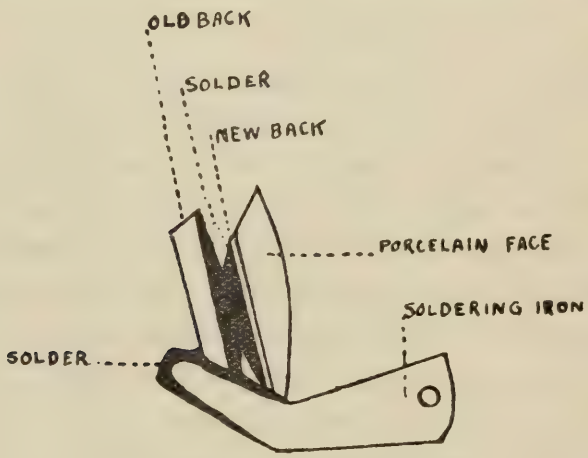
Original Communications.

ON REPAIRING BRIDGES AND CROWNS BY A PROCESS OF SOLDERING IN THE MOUTH.

By H. BALDWIN, M.R.C.S., L.D.S.

THE question of repairing bridges and crowns, which have had their porcelain facings broken, is one which has called forth a good deal of ingenuity, but can hardly be said in any of the usual methods to have found a satisfactory solution. For some years I have treated all the cases which have presented themselves to me by the process of soldering on the new faces with soft solder in the mouth. I have now repaired over thirty cases of bridges and crowns in this way with satisfaction to myself. The first experiments in this direction were conducted with various kinds of blowpipes, and were all utter failures; but as soon as I got to work with a small clockmaker's soldering "iron," I found the operation easy enough. The soldering "iron" is a small copper "bit," attached at right angles to an iron stem, and fixed to a wooden handle. The copper "bit" as sold in the trade requires a little filing down to reduce its width at the point, and also requires bending to an angle of about 45°, to avoid contact with the lip. The bending is effected by fixing one end of the "bit" in a vice and striking the other with a heavy hammer. The iron stem, too, of the clockmaker's tool requires shortening, for greater handiness in use. The kind of solder used varies somewhat with the work in hand. In easy bridge cases a fine quality of ordinary soft solder is the best, in more difficult cases, such as Richmond crowns, a lower melting solder is necessary, and this is to be met with in the trade under the name of "pearl" solder, which contains, in addition to tin and lead, bismuth and mercury, and one variety of which softens in boiling water. A medium grade is the one I generally use, as an increase in readiness to melt implies a decrease in strength. The process

consists in soldering a "backed" tooth to the pre-existing "back" in the mouth. It would be naturally supposed that the extra back would cause a very undue projection of the tooth, but this is hardly ever so, because in the majority of cases the teeth have been broken by the bite, and it is necessary to place their successors further out in order to insure their safety; and, again, it is possible always to choose a rather thin tooth and to "back" it with a rather thin backing. It is important to remember that the closer the surfaces of metal come together the stronger will be the union, and therefore it is absolutely necessary to get the two backs well into apposition over their entire surfaces. Those operators who wish to adopt this



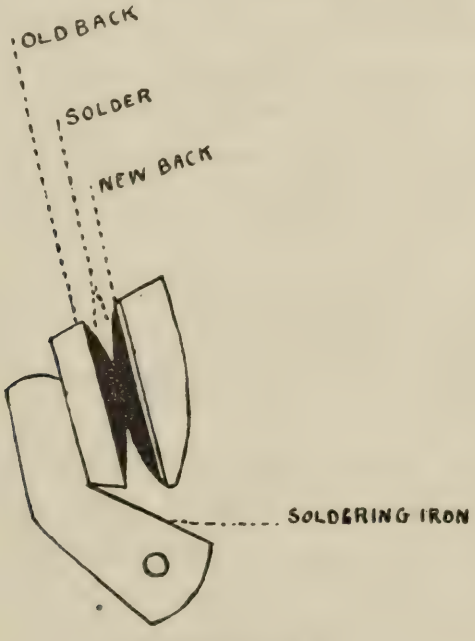
THE CORRECT WAY.

method, and are not expert in soft-soldering, are advised to practice it out of the mouth, so that no hitch may occur during the operation, as it is the rapidity of the soldering which prevents the heat from reaching the patient in any important degree.

The method of procedure is as follows:—A rather thin porcelain flat tooth is selected and backed with No. 7 gold. The pins are cut short and rivetted down into countersunk holes, and then still further attached to the back by melting gold solder over them. The back is then filed down perfectly flat and smooth. The old back remaining in the mouth is also trimmed smooth, all prominences caused by the old pins, &c., being burred down. The new tooth is let down till it takes its proper position in the mouth. The new back is "faced" with an excess of "pearl" solder, by means of the soldering iron, which has itself been previously faced with the same solder. A piece of blotting paper is inserted under the bridge (if bridge it be) and allowed to project each way, to protect the gum

and palate from radient heat from the "iron." A roll of bibulous paper is placed in the labial sulcus and a napkin applied in the usual way.

The old back in the mouth is then faced with the same solder by means of the soldering "iron." Hydrochloric acid and zinc is used as a flux. The new tooth is then placed in position, held there by the finger, a small piece of bibulous paper intervening, and the solder is melted by touching the "iron" to the tips of the two backs where the solder comes to the edges. The "iron" must carry a bead of molten solder in its end. The union is known to be complete when the new tooth is felt to suddenly sink down into its exact position under the pressure of the finger. After each application of heat in the mouth, the work is *immediately cooled off* with a cold wet swab of



THE INCORRECT WAY.

cotton wool. Several other details to observe are the following:— If the new tooth is to be next to a contiguous live tooth, see that both the backs, old and new, are just free of it, and place a single thickness of blotting paper between. See that the new back does not extend so far as to touch the gum. Let the back of the new tooth be as large as possible and its lateral edges not bevelled. See that in facing the backs with pearl solder, the solder be carried well over the cutting edges. See that the "iron" is as hot as possible, always provided it be not over-heated and the facing of solder spoiled thereby. Test the heat of the "iron" by seeing that it will instantly

melt bits of solder when pressed upon them. The iron must be very hot, so as to do the work quickly, and quickness is the soul of the process. When attaching the tooth do not attempt to conduct the heat through the old back, but apply the "iron" to the cutting edges of the backs, so that it comes into contact with the solder previously put upon them. This is the most important detail of all, as *no amount of heat* will do the work properly *through the old back.* The diagrams show the correct and the incorrect way of applying the soldering "iron."

The melting of the solder between the backs seems to be induced by actual contact of that solder with the molten solder constituting the facing of the "iron." The molten condition is evidently passed on from molecule to molecule, each molecule when falling into the molten state knocking down the one next to it in a way which seems to be analogous to the way in which a row of nine pins may be made to knock each other down, or a row of dominoes set up on end. This explains why the molten solder constituting the facing of the "iron" must be placed against the solder already in the "backs." Mere heat will not suffice.

In this way a complete melting of the solder between the backs is effected, no matter how long the tooth. The length of time required to effect this is about two to four seconds, varying with the size of the tooth.

If the tooth after being soldered on is found to be in an incorrect position, it must be melted off again by again applying the "iron" to the tip of the new back, touching the solder, and pulling it forward with the "iron." The reason for putting an excess of solder on the new back when facing it, is, that when it melts it allows the tooth to sink under the pressure of the finger, and so tells when the melting is properly done, and it also ensures there being plenty to fill up all the spaces. The excess is attracted away by the "iron." I have done some cases with teeth backed with dental alloy, but am not sure that the solder attaches quite so well to this as to gold, but when using gold I find it does not do to use a gold of less thickness than No. 7, as the solder in that case has a bad effect on the gold. In wear, the soft solder does not disintegrate nor suffer in any way, nor does it give rise to an unpleasant taste, but the bite must always be made quite free of the new tooth and of its "back."

SOME POINTS OF INTEREST IN DENTAL HISTOLOGY—THE ENAMEL ORGAN.*

By Professor Paul, F.R.C.S.

Mr. President and Gentlemen,—Having yielded to a request from our hon. secretary that I would furnish a paper for the first meeting of the Society this session, I have looked through the work of the past year in the hope of finding something that may interest you, and have put together some notes relating to the structure and development of the enamel organ. I cannot offer these notes as finished work, but rather as an incentive to discussion, and as a stimulus to further investigation.

The points to be dealt with are, of course, all concerned with the development of the dental tissues, a subject full of interest and full of opportunities.

The first recognisable stage in the process by which teeth are evolved in the higher animals is, I need scarcely remind any one here, the growth of a band of cells derived from the surface epithelium, which penetrates the embryonic connective tissues of the fœtal jaw to a considerable depth, and is now known as the tooth band. From this primitive tooth band an epithelial bud, called the enamel organ, is produced at the site of each future milk tooth. The enamel organ is the formative organ. It calls the tooth into existance, and probably determines its shape and size, even although, as in several animals, it forms no part of the tooth finally produced.

A tooth band, theoretically, is constructed to originate a constant succession of teeth by the continuous budding of enamel organs from its lower margin. This happens in many of the lower vertebrata, but in mammalia the band becomes exhausted after the production of a second set of germs. In rare instances a third successional germ buds form a part of the tooth band which has already originated two others. Such a germ may remain abortive, or may continue to develop, and become either a supernumerary tooth or an odontome. The former condition, the budding of a third enamel organ which undergoes no further development, is perhaps not so very uncommon, and is a point which should be settled as regards the human subject by examining a series of embryos during the

* A Paper read before the Liverpool District Odontological Society, October 20th, 1896.

later months of intra-uterine life. I have some sections at that period which certainly seem to show this third budding from the tooth band, but not sufficient to indicate its frequency.

The enamel organ as first produced is a solid bud of epithelial cells, but the latter, as the bud grows, are rapidly differentiated into the four characteristic layers of the enamel organ. The outermost or peripheral layer of cells are elongated. They are continuous with, and correspond to the important cubical layer of cells constantly found at the base of a stratified epithelium, and they fully retain their character of importance in the enamel organ. Over the deep half of the bud these cells constitute the internal enamel epithelium, from which the enamel fibres are developed; whilst those which cover the superficial half become the external enamel epithelium, the chief function of which seems to be the separation from the blood of those constituents of enamel which are elaborated by the internal epithelium. I think we should keep in mind this early association between the two layers of the enamel organ and their common derivation from the active cubical layer of the surface epithelium, because the value of the external layer is likely to be lost sight of, though, as I have frequently noticed in the germs of the sheep, ox and other animals, the character of its growth and the high vascularity of the papillary connective tissue associated with it suggest that it has useful work to do. The other two layers of the enamel organ are the enamel jelly, and the stratum intermedium. I believe there is a general agreement that the stellate cells are not functional, and that they merely fill a space which may be readily occupied by the growing enamel. As regards the cells of the stratum intermedium, the generally, but not universally accepted view that they recruit the internal epithelium as the surface to be covered grows larger, seems to me to be correct.

To return to the internal epithelium itself, we are still in want of exact information as to the process by which it is changed into enamel. The question as to whether the fibres are the result of secretion or conversion is not yet definitely settled; but to my mind it is of much less importance to decide this point than it is to recognise that enamel is certainly the outcome of some change in the cells themselves, and not a change which is effected by the cells upon an intercellular matrix. Herein lies the essential distinction between enamel and dentine. Dentine, like all connective tissues,

has a matrix ; enamel, like all epithelial tissues, has none. No doubt between the cells there is a certain amount of intercellular substance, which serves to cement them together, but this is in no way comparable to a connective tissue ground substance. In the end this cement becomes calcified, but only imperfectly, as is shown by the readiness with which acids act upon it and cause the fibres to fall apart. The recognition of this important fact in the construction of enamel opens the way to understand some of its peculiarities. One of these is the occurrence of the well-known cavities on the dentinal aspect of the enamel with which dentinal fibrils frequently communicate. The cavities have been variously stated to be within or between the fibres. The former is an irrational theory, and is not likely to find much acceptance ; indeed, all tubes or spaces occuring in an epithelial structure must almost of necessity be placed between and not within the cells. We can best understand these enamel tubules, as they are met with in mammalian teeth, by examining microscopically germs in an early stage of development and after very careful fixation On the first appearance of the layer of odontoblasts these cells are seen to be separated from the ameloblasts by a narrow band of transparent tissue, due to a change in the outer border of the pulp matrix. The transparent condition of the pulp matrix is evidently owing to the action of the odontoblasts, and is, indeed, merely the first stage in the formation of dentine matrix into which it will shortly be fully transformed. This first band of dentine matrix lying between the odontoblasts and the ameloblasts is not so sharply defined and cut off from adjacent tissues as superficial examination might lead one to imagine. Mummery has shown—and I fully endorse his views—that it sends processes between the odontoblasts which communicate with the fibrillar matrix of the pulp. The presence of these processes is unquestionable, as they may be readily seen in certain stages of development in properly prepared sections. Now not only are there the processes described by Mummery, but the dentine matrix is not even sharply cut off from the line of ameloblasts. You may see in some sections that it sends arms or processes up between the enamel cells as it does down between the odontoblasts, keeping them apart, and leaving between them when they calcify elongated spaces filled with dentine matrix. That processes of dentine matrix thrust up between the enamel prisms should never calcify is certainly nothing surprising

when one remembers that the first layer of dentine usually only calcifies imperfectly, being characteristically the site of the interglobular spaces of Tomes.

If we accept this as a reasonable explanation of those spaces in enamel which are met with in close contact with the dentine, and admit the general principle that all spaces or tubes in enamel are between and not within the prisms, then the structure of genuine tubular enamel seems less difficult to understand. It is clear that any imperfect approximation of enamel cells must leave spaces between the prisms which can only be filled with an indefinite intercellular substance, or possibly by further prolongations of dentine matrix, and in neither case is it likely that such interprismatic matter would become calcified, because on the one hand it is too far removed from the influence of the odontoblasts, and on the other because the calcifying energy of the ameloblasts is almost entirely expended upon their own internal petrifaction. I would therefore suggest that tubular enamel is an enamel in which there is an excessive amount of intercellular substance only imperfectly calcified, and much as it looks like tubular dentine, it is really formed on an exactly opposite plan. The one is a negative and the other a positive picture. In dentine the cells occupy the tubes, and the intercellular substance becomes the solid calcified matter; in enamel the tubes are represented by the intercellular substance, whilst the cells become the solid calcified matter.

Tubular enamel is regarded as one of the rarer dental tissues, but—at any rate in fish—I am under the impression that it is sufficiently common, and is rather the rule than the exception. Take, for instance, the whole series of the elasmobranch fishes. In the development of their teeth an enamel organ plays a very prominent part. The whole surface of the tooth germ is covered with long and evidently functional ameloblasts, and when it is necessary to decalcify there is a space between the ameloblasts and the dentine matrix which could hardly have been occupied by anything but formed enamel. A study of the development of such teeth would lead one to assume that enamel would be well represented in the fully formed structure, yet they are described as follows by Tomes:—"A central body of osteo dentine, the outer portion of which has dentinal tubes so fine, regular, and closely packed as to merit the name of hard unvascular dentine, and over this again a

thin varnish of enamel. (?)" Let me call your attention to a few sections of shark and ray teeth. In all you will notice that the main body of dentine is covered over with a further layer, which is distinctly differentiated from that beneath it by a line of demarcation. This latter, though partly obliterated in older teeth, becomes, in some immature specimens, a line of separation, allowing the cap of so-called hard dentine to come away from the rest. The cap is thickest at the apex of the tooth, and shades away at the base. It has, in fact, the shape and general appearance of a cap of enamel. Moreover, the external "thin varnish of enamel" is part and parcel of it, there being not the slightest indication of any line of demarcation such as should be more or less visible between enamel and dentine. Hence I am inclined to regard the whole of this outer layer of calcified tissue as enamel, but of the tubular variety: and if tubular enamel is constant in the elasmobranch fishes it is tolerably certain to be not uncommon in other classes.

A further point of interest in connection with the enamel organ is the question of its vascularity. This point has been raised by Professors Howes and Poulson, and is one which ought to admit of a definite settlement. I am glad to know that Mr. Woods is preparing to investigate the subject. Up to the present I have never yet seen a vessel in the enamel organ, though I frequently examine this structure in various animals, and therefore hold to the commonly accepted view, that it, like other epithelial structures, is non-vascular. Concerning this question I have rather occupied myself in trying to ascertain how two such observers, if they are mistaken, could have come to hold such an opinion. It seems to me that a mistake might rather easily arise, for there is often a stellate-celled connective tissue just outside the enamel organ, which is almost indistinguishable from the enamel jelly, except for its vascularity. Over the apex of a tooth the internal and external epithelium soon come together, so that one frequently sees a tooth germ in which the apex is embedded in a stellate-celled connective tissue, whilst the sides are surrounded with enamel jelly. Under such circumstances the two tissues might readily be assumed to be two parts of the same structure, and the vessels of the former could hardly pass without observation. The similarity is rendered more complete by the line of condensed tissue of the sac appearing in section not unlike an external enamel epithelium undergoing atrophy. An examination of some of my

sections will show that in small animals a careful discrimination must be exercised to distinguish between the two structures, though in the wide expanse of enamel jelly visible in the large germs of sheep and oxen no such mistake can be made, and it may be positively asserted that in these animals the enamel organ is non-vascular.

Finally, in connection with the enamel organ, having made further observations in regard to Nasmyth's membrane, I should like to add a few remarks to what I said on a former occasion. Originally I experienced some difficulty in isolating and staining the structure. This is now readily accomplished in the following manner. A fresh unworn tooth is taken immediately after extraction and placed in a phloroglucin decalcifying solution for a few minutes. As soon as the membrane begins to separate the tooth is removed and well washed in several changes of water. It is then stained in Ehrlich's acid hæmatoxylin, again washed, and placed in an aqueous solution of eosine. Finally the membrane is stripped from the tooth and mounted in Farrant. By this process a permanent preparation of Nasmyth's membrane may be made within a quarter of an hour after the extraction of a suitable tooth, and one in which the nuclei of the epithelial cells are often brilliantly stained. Under the microscope the membrane is seen to consist of two layers, the outermost being composed of large flattened epithelial cells, beneath which is a thin translucent pellicle usually marked with hexagonal impressions derived from the ends of the enamel prisms. Hence I think there can be no doubt that Nasmyth's membrane is a remnant of the enamel organ, and not, as advocated by Tomes, a thin layer of cementum. On a former occasion I gave my reasons for not accepting the observations offered by Tomes in support of his view as proof that that view was correct. It is not necessary to repeat them ; the specimens may be left to speak for themselves.

The points of interest in connection with the enamel organ are by no means exhausted, but what time is left at my disposal this evening I would rather occupy in demonstrating than in talking, and I hope that those who are at all interested will not be satisfied with having seen the lantern slides, though they are mostly micro-photographs, but will critically examine the specimens themselves.

FERMENTATION AND ORAL ANTISEPTICS.*

By J. C. Douglas.

Mr. President and Gentlemen,—In a work recently published on the subject of "The Present Evolution of Man," the writer argues that "there is an evolution which has escaped the notice of biologists, but which threatens by survival of the fittest, and elimination of the unfittest, to advance at accelerated speed in the near future." This evolution is one mainly against disease, more especially against zymotic disease, and exists wherever men are crowded together and can take disease from one another, or are under other unfavourable circumstances. When, as we see every year, more and more people pour into our already crowded cities, and and the system of life changes, the arguments adduced appeal with some force. When one remembers that, under normal conditions of ordinary country air, it is estimated that at least 14,000 to 15,000 microbes enter our bodies every hour we breathe—and that a certain number of these are disease producing—whilst the majority are capable of causing grave disturbance of the system, more especially when they find lodgment in degenerate tissue, it seems wonderful that we retain even an average state of good health. Metschnikoff has recently shown us, however, that these death producing bacteria have many enemies in the body, notably the phagocytes, which little cells act as the police and scavengers of our system, dealing out death to the death dealing microbe, and so tend to keep an equilibrium in our vitality.

He also points out that the tonsils, which for a long time have been believed to be functionless, play the part of phagocytes.

Other writers assert that "the complex salivary liquid resulting from the mixture of the salivæ secreted by the three different glands can have a special chemical quality capable of destroying the noxious action of the pathogenic or disease producing bacteria," and M. Vallude in a paper on "Tuberculosis," lays special emphasis on this point. He also says: "In any case it is probable that tuberculous microbes are directly attacked and destroyed by the micro-organisms of every kind which swarm in the saliva."

Acquired immunity against any disease by the accumulation of inborn traits, this writer says, determines the ultimate success of a race in the struggle for life.

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Immunity against disease is at present a vague, much discussed, and scarcely defined term. Many investigators have many opinions. Without going into a discussion on this subject, I would suggest as prominent examples of immunity to a considerable extent the Israelites, who thousands of years ago had, as part of their religion, the most magnificent set of hygienic laws laid down, that have ever been known. By close observance of these this people can, in many cases, pass unscathed, and when attacked live through fevers and other ailments to which Gentiles frequently succumb.

Observations in connection with our special subject of dental surgery, which have only extended over a period of two years, can scarcely give much ground for argument, but one must notice how small is the proportion of Jews coming to this hospital for treatment, and amongst the very few (mostly children) of that race, whom it has been my duty to treat, the apparent quality and strength of their teeth has been remarkable.

From the Address of Sir Joseph Lister, delivered before the British Association four weeks ago, we see what advances have been made in the science of surgery since the advent of antiseptic treatment, and it would, therefore, seem a natural deduction that a leading work of the medical profession in all its branches would be, by dictation, not only to patients, but to the general public, of such a system of antiseptics (in its broadest sense, *i.e.*, as to diet, hygiene, method of life, &c.), as would at any rate tend to give greater immunity against the more virulent classes of microbes once they have entered the body.

In our own branch, as one of the smaller and more specialized of the medical profession, we would seem to have given into our hands many opportunities of assisting the other branches in the matter of antiseptics so far as preventative measures can.

The respiratory organs (the mouth and nose) are the normal openings by which it has been shown that microbes enter the body.

How then can we as specialists so treat these, as to assist, to however small an extent, in causing a certain immunity from disease?

The various structures found in the mouth, from the hardest in the human body to the softest, suggest a variety of treatment, and as we see, from the investigations of our leading bacteriologists, that pathogenic micro-organisms may under certain conditions be nourished in these hard tissues, as well as in the soft, we are the

more impressed with the necessity of serious and careful attention to both, at all times, but more especially however in cases of lesions.

From the numerous experiments and careful clinical observations during recent years of such men as Messrs. Milles and Underwood, Professor Miller and others, we know that caries of the teeth begins by dissolution of the enamel caused by the action of acids, but principally lactic, which is produced by the fermentation of carbo-hydrates (in the form of starchy and sugary foods) which have been left in contact with the teeth for some time.

After the enamel has been washed away the dentine is attacked by the micro-organisms, and a sort of peptonising, or, may I call it, putrefactive fermentation set up. Next to be attacked is the pulp, here we get the various stages of inflammation, resulting eventually in its death and decomposition. Fermentation in one or other of its forms would therefore seem to be the chief and only cause of decay in teeth.

So far back as 200 years ago that eminent philosopher Robert Boyle, in an essay on "The Pathological part of Physik" wrote as follows :—"He that thoroughly understands the nature of ferments and fermentation shall probably be much better able than he that ignores them to give a fair account of divers phenomena of several diseases (as well fevers as others) which, perhaps, will be never properly understood without an insight into the doctrine of fermentations."

What a prophet he was ! To-day our great investigators are, through the proper understanding of fermentations, finding the actual causes of many of the diseases which have been mysteries for centuries.

Knowing the causes, we must surely hope, with the assistance of our chemists, to find preventatives, and, let us also hope, cures for many of the maladies and ills from which we suffer.

On this account I therefore think it worth while to take a passing glance of fermentation.

According to the greatest investigator of modern times on this subject, M. Pasteur, fermentation is "life without air."

In the brewing of beer we have a notable example of fermentation. A brewer after grinding his malt has it mashed in hot water and boiled with hops until all the soluble portions have been extracted,

this being known as wort. This liquor, which is sweet, is drawn off and cooled as rapidly as possible by running it over tubes containing iced water, after which it is mixed with yeast, after having been run into vessels or vats with only one aperture open to the air. Soon after the addition of the yeast a brownish froth appears through the aperture, and grows larger and larger until it falls over the sides of the vessel. This is new yeast, and shows that fermentation is active; but from what does it originate? On examination with the microscope we find a minute unicellular fungus or plant which multiplies by gemmation or budding, that is, it gradually contracts about the middle, until the two parts divide, each with a similar power of dividing again, and so on. So early as 1680 Leeuwenhoek found yeast to be a mass of floating globules, but he had no idea they were alive. This was proved in 1835 by Cagnard de la Tour and Schwann. Then Pasteur, in 1862, next investigated the origin of these organisms, and by his careful investigations into the subject of fermentation of wine and its ailments, he saved to his country hundreds of thousands of pounds. Still, a few years later, his investigations into the fermentation of beer has given us a complete enlightenment as to the action of the yeast ferment, the torula or *saccharomyces cervisiae*.

At the same time we find beer may be fermented without yeast, and the brewer, in order to prevent such fermentation, has added hops to his beer, the essential oil of which is an antiseptic to other ferments.

If beer is left in contact with air it will sooner or later ferment, but most probably not with what is known as the alcoholic fermentation. The maladies of beer are wholly due to the admixture of these outside ferments. Pasteur set himself the task of finding the causes and reasons of this, and he has taught us how to separate the commingled ferments of the air, and to study their individual action.

From numerous experiments he found that if yeast be sown in a fermentable liquid which is supplied with plenty of pure air it will flourish, and produce quantities of carbonic acid gas. The oxygen, in this case, it gets from the surrounding atmosphere. Examination of the liquid hardly showed a trace of alcohol; the yeast flourished and increased, but almost ceased to act as a ferment. When, however, the fermentable liquid was placed in a vessel

with only a small aperture and the yeast sown therein, true fermentation was begun and the liquid fermented ; why, simply because the amount of oxygen which the yeast required for its existence it could not get in sufficient quantity through the small opening in the cask, so it wrenched it from the surrounding substances containing oxygen in a state of combination. It decomposed the sugar of the worts in which it grew, breathed carbonic acid gas and the liquid product of the decomposition was alcohol. The act of fermentation is therefore the result of the effort of the plant to maintain its respiration by means of combined oxygen when its supply of free oxygen is cut off.

The fermentation of wine is similar to that of beer. Pasteur showed that when the grape was ripe the bloom, or must, which is seen on the skin was principally composed of the torula, so that when the juice was squeezed into a vat the ferment usually accompanied it. So also with other fruits. To prove this, by a beautiful experiment he showed that if the juice be carefully extracted, so that none of the bloom accompanied it, it might be left in contact with pure air for an indefinite time and no fermentation would take place.

When one speaks of pure air, one means air free from dust particles. If you on a sunshiny day go into a darkened room where only a small ray of light may find its way, through say a hole in the shutter, you will see myriads of particles of dust dancing in the line of sunshine. Well, take any sterilized but fermentable liquid such as milk, unfermented wine, or juice of beef, let it stand in the room for a time, and in a day or two you will find it fermenting.

If you, however, had a small well-built box which could be closed to all draughts, paint the walls with some sticky substance such as glycerine, so that the particles of dust would adhere to them—then when the box is closed and all the air clear within, pour through a pipette or some other conductor your fermentable liquid into a flask which you have left inside, you would find your liquid keep clear for weeks and months, and no fermentation would take place. From this experiment of the late Professor Tyndall (whose lecture on fermentation is well worth perusal, and from which I have quoted largely), we learn that there is no such thing as spontaneous generation.

Regarding his experiments with milk, he found if it were exposed to air, an organism named "Vibrio" would shortly be found in it, and he showed that these organisms and other analogous though apparently motionless ones decompose the milk and render it sour and putrid. They are the lactic acid and putrid ferments, as the yeast plant is the ferment of sugar. If they and their germs are kept out of milk, it will remain sweet. But he found that milk might become putrid without becoming sour. Microscopical examination revealed a number of shorter organisms, sometimes associated with the "Vibrios," sometimes alone. These showed a wonderful alacrity of motion, but so long as they were kept out of the milk, it remained quite sweet.

Lister, in some later experiments, demonstrated the fact that newly collected blood neither coagulates nor putrifies, if care be taken while collecting it to exclude the presence of these micro-organisms contained in ordinary air.

Putrefaction, or, as it is often called, putrefactive fermentation, is a more complicated process, which also varies according to the amount of oxygen present. It is usually a double process, the first stage of which is brought about by the bacteria which require abundant oxygen (known as aërobic), and the second stage by those which flourish when Oxygen is absent (or anaërobic). If oxygen is present it is not usual to have foul smelling gases—but, if absent, or only very limited in quantity, true putrefaction takes place, and various foul smelling gases, together with various substances (collectively known as ptomaines), which are mostly of a highly poisonous nature are produced. The final result of the processes set up is that the complex organic substances are decomposed into simple or elementary substances. This power possessed by bacteria is of the utmost importance in the economy of nature. When an animal or plant dies all the complex organic matter of which it is composed must be broken up into simple salts before they can be made use of by plants. This breaking up is chiefly performed by animals, but it is also largely brought about by the agency of bacteria. We thus see that they are most useful agents and auxilliaries to animals in keeping our earth clear of dead matter.

Being satisfied that fermentation in its various forms is caused by the products of the struggle for existence of bacteria, let us consider

for a very few moments the different varieties of bacteria, but more especially those found in the mouth.

Bacteria, germs or micro-organisms, are exceedingly minute, unicellular, spherical, or thread-like plants, which multiply by fission or by spore formation, and consist of protoplasm enclosed by a cell wall. Outside this cell wall is a gelatinous sheath which develops in different degrees in different bacteria.

According to their shapes they are known as micrococci—small round or oval like bodies. Bacilli—or small rod shaped bodies. Spirilli—or thread-like bodies ; besides others of varying forms such as the Blastomycetes, the yeast plant ; the Hypopmycetes or moulds as the Leptothrix. Some of these are motile whilst others have no power of movement. Some require oxygen for life ; to others a free supply of oxygen means death, whilst, again, there is a class between those which can live in an atmosphere of oxygen but prefers to be without it.

Another class, known as parasitic bacteria, mostly of the bacilli or spirilla shapes, are the proved disease producers or pathogenic bacteria. Amongst them we find tubercle bacillus and the bacilli of erysipelas, anthrax, &c.

Of all the various classes it would seem from experiments performed on animals that in some form they are essential to life. Animals, when placed in closed cases, breathing only filtered air, and eating only sterilized food, lived most unhappily for varying short periods, some a few hours, some a few days. Therefore, all we can do is to do our best to either destroy the pathogenic members, or in some way nullify the noxious action of their products.

In order to live and thrive, bacteria require several favourable conditions, and, as we shall now see, the mouth forms about the best ground they can find. They require :—

1st. A sufficient supply of moisture. In the mouth they have saliva.

2nd. A certain temperature—this again is found in the mouth, and is very constant.

3rd. An alkaline or nutrient medium—such we have in saliva.

4th. Various nutrient media—such as the carbohydrate and albuminous food stuffs left between the teeth.

5th. Darkness.

6th. A certain amount of air.

I need not further enter into the various classes of bacteria.

Suffice it to say, Professor Miller, and Messieurs. Galippe and Vignal have found six varieties, which evidently take an active part in dental decay, and of these, four were constantly present, the other two occasionally. Five of these were bacilli, and one a micrococcus.

Of pathogenic micro-organisms Miller found four classes fairly constant in the mouth, and in his work on "Micro-organisms of the Mouth" he mentions a large number of diseases, some resulting in death, evidently caused by the accumulation of bacteria in wounds of the mucous membrane, in decayed teeth, in tartar, and in cases of infection of intact soft tissue of the mouth.

Fermentation of carbo-hydrates produces an acid reaction, whilst fermentation of albumens produces an alkaline reaction, and the fermentation of both together is acid. At the same time we find that the products of bacteria are poisonous to themselves when these products amount to more than a certain strength. The yeast plant is killed by the alcohol it produces when this amounts to 20 per cent.

Lactic acid, the product of the fermentation of carbo-hydrates, seldom, however, is in strength of over one per cent. in the mouth, and is therefore sufficient to dissolve the enamel of the teeth, but scarcely sufficient to kill the producing bacteria.

The vitality of many bacteria has been proved to be great, whilst others are more easily killed. Owing to the sheath covering their cell wall some forms withstand prolonged boiling, whilst others withstand exposure to sulphuric acid for lengthened periods; but in all, the spores are most resisting, and we find in many cases, though we know the micro-organism is dead and may have been so for a very long time, if placed in favourable ground, its spores, which have been lying dormant, will quickly revive, and soon develop into fully grown bacteria.

This brings us to a consideration of antiseptics.

For many generations antiseptics have been used both in this and other countries, though as far as we can learn without a knowledge of their peculiar action. To give two examples, we find in the works of Theocritus a reference to the use of sulphur, which is at the present time the official antiseptic of this country. In a translation by Fawkes, he says:—

> "Next with pure sulphur purge the house and bring
> The purest water from the freshest spring,
> This mixed with salt, and with green olive crowned,
> Will cleanse the late contaminated ground."

Again, referring to the hygienic utility of essences and perfumes, Dr. Cornelius Fox, in a work on Ozone says :—" They demonstrate that the disciples of Empedocles were not in error when they planted aromatic and balsamic herbs as preventatives of pestilence." In another part of the same work he alludes to the fact, recorded by Herodian, that " in a plague which devastated Italy in the Second century, strangers crowding into Rome were directed by the physicians to retreat to Laurentum," now San Lorenzo, " that by a cooler atmosphere and by the odour of laurel they might escape the danger of infection."

In our own country the ancient custom amongst physicians of furnishing the handles of their canes with vinaigrettes, the fumes of which might protect them from the noxious exhalations of their patients, and the old practice of strewing aromatic herbs, such as rue, before filthy prisoners in the dock of a criminal court, so that the olfactory nerves of those round about them should not be offended, as well as that of providing the chaplain with a bouquet when accompanying a criminal to Tyburn, lose their apparent absurdity when one considers the reasons ; also when considered under the light of recent investigations.

Considering the various structures in the mouth, also the extremely poisonous nature of many of our antiseptics, it will be apparent that a careful selection is necessary, more especially in those cases where the patient is to use them at home.

The general surgeon uses strong antiseptics, such as carbolic and mercury. First, because they have such affinity for the epidermis, and in the case of carbolic acid acts as cleansers of fatty matters. Secondly, because they are cheap. Neither of those reasons need specially restrict us to their use. We have not skin to deal with, and the quantities we use are so small that cost need only be a secondary consideration. I would place scrupulous cleanliness as the leading antiseptic for treatment of the mouth in health and disease. To obtain that, the use of the toothbrush night and morning is absolutely essential, also the use of the quill or wooden toothpick after meals is, if anything, rather more necessary than those dainty finger bowls presented to us after dinner.

Miller also recommends the cleansing of the teeth interstitially by passing between them a strand of silk thread which has been dipped in an antiseptic. Of toothbrushes, the pattern which I find

most satisfactory is one known as the Wessel, children's size, and of medium hardness. The majority of toothbrushes are much too large to do their work effectually, especially round the molars.

After brushing with a tooth powder, the mouth ought to be washed, and the fauces gargled with an antiseptic and tonic mouth wash, and I am not sure that one ought not to wash the nostrils as thoroughly as the mouth. Personal experience would lead me to say yes to that, but I should like to have opinion on the point.

Of the many tooth powders and washes sold to the public one can say but little. Numbers of them are extremely bad for both teeth and gums. As a rule, amongst our more respectable chemists, the powders which they make themselves, at any rate, do not contain any deleterious matters. However, I think we ought to be prepared to prescribe our own powders and washes to suit the cases we treat.

To be of use, a tooth powder ought to have as a base some material like prepared chalk, which to a certain extent neutralizes acid secretions, is softer than enamel, and therefore polishes without scratching it. A soap should be added to clean away fatty or greasy matter, then tonics for the gums and antiseptics to act in the small spaces inaccessible to the brush are necessary. Finally, flavouring and colouring matters are added.

Professor Miller puts more faith in the energetic use of the brush, silk and toothpick, with a simple powder, such as prepared chalk, and followed by a mouth wash than in a special powder. However, I fancy both have their good points and corresponding usefulness.

Of mouth washes, an antiseptic and tonic are the principal essentials, but as these are often rather unpleasant to taste, and sometimes to smell, they are usually combined with a colouring and a sweet or aromatic substance.

One thing has to be kept in mind ; it is no use prescribing the best antiseptic tooth powder or mouth wash if it tastes at all bad—patients won't use them. It is therefore a good plan to try your prescriptions yourself first.

I would here draw your attention to a base for a powder which has been recently introduced. It is named "Dimatos," and is got from the crushed remains of a bivalve algæ, the Diatomaceae. It does not absorb, and so destroy the power of essential oils and other antiseptics nearly so much as prepared chalk or magnesium.

In the case of fœtidity of the breath and the numerous troubles of which it is the symptom, there are many which we can treat, others of which belong to the domain of the physician and surgeon.

Badly fitting, and even well fitting dentures, badly fitting pivots and crowns (especially those fixed to roots which have been abscessed) collections of tartar, carelessly inserted fillings and carious cavities are some of them.

Those who wear artificial plates should, for their own comfort, and that of those with whom they come in contact, be instructed to remove the denture at night, carefully brush it with an antiseptic and leave it in water till the morning.

Taking first what is sometimes spoken of as the "chief or king of antiseptics," *perchloride of mercury*, we find it about the most widely used in general surgery. According to almost all authorities it takes the highest rank as a germicide and antiseptic.

The strengths in which it is used vary from 1—500 to 1—5,000. Professor Miller, of Berlin, places it absolutely first in his list. He says 1—500,000 will arrest the action of, whilst 1—100,000 destroys the bacteria in the mouth, and recommends it as a mouth wash in strength of 1—5,000. Many authorities assert that it blackens the teeth even in weak solutions, and as it is very poisonous, and acts as an irritant to the skin in strength of 1—1,500 to 1—2,000, it does not seem to be a proper application for a mouth wash. Used as a dressing for foul root canals, after they have been cleaned, and before filling, it is most useful.

Unfortunately, however, it coagulates albumens, and in doing so loses its antiseptic properties, so that the roots would require to be well cleansed with bristle, drill and heat before using it.

Not long ago Drs. Lubbert and Schneider found that a solution composed of

Perchloride of Mercury	2 parts
Sodium Chloride	100 ,,
Distilled Water	600 ,,
Glycerine	100 ,,
Rectified Spirit	200 ,,

did *not* coagulate albumens, and retained the antiseptic qualities of the perchloride.

Another preparation, introduced by Mr. C. T. Kingzett, contain

5 per cent. of mercuric perchloride and 5 per cent. of peroxide of hydrogen. These are so combined that they do not coagulate albumens, and the antiseptic property is not impaired.

For safety in the surgery it is better that poisonous preparations should contain some colouring matter, such as indigo blue, to distinguish them from other drugs. Another preparation, mentioned by Dr. S. Rideal in his very complete work on Disinfectants, is *potassio mercuric iodide*. This is said to have double the germicidal powers of perchloride of mercury, and to be much less poisonous. In the experiments tried, 1—4,000 of this was found to have equal antiseptic properties to 1—2,000 of the perchloride. It is insoluble in water, and composed of one grain of mercuric iodide to one grain of iodide of potassium. The mercuric salt is soluble in an excess of iodide of potassium, and remains of a bright scarlet colour. I should think one of these might be tried in the treatment of foul roots.

The next antiseptic in general use is *carbolic acid*. It was first introduced in the early seventies by the father of modern Antiseptic Surgery, Sir Joseph Lister. It is, perhaps, the most widely used antiseptic we have got.

Sir Joseph Lister and Sir William MacCormac place it as the most useful antiseptic we have—when in solutions of 1—20 or 1—40—principally, I think, because of its affinity for the epidermis, and because it mingles with fatty matters, whereas mercuric perchloride does not.

Recent investigations have shown us that though an antiseptic (or germ disturber), it is not a disinfectant (or germ destroyer).

Professor Miller places it ninth on his list. Koch, whilst placing it seventh on his list when in water solution, found that in an oil or alcoholic solution it had no effect at all.

Dr. Bond says carbolic arrests the growth of fungi, but does not destroy them.

Sternberg and Gärtner and Flagge place carbolic on a higher basis than Miller, Koch, Klein or Bond.

Its exact mode of action is uncertain. It coagulates albumens, and thus loses much of its antiseptic power ; in strengths of 1—20 it irritates the skin, and it is a poison.

As an obtundent, when excavating carious cavities, especially in combination with cocaine, it is excellent, but to have full effect the

cavity must first be dried with hot air. You must frequently have noticed when cutting out a cavity some extremely sensitive spots between the enamel and dentine. At this position, according to Mr. Stack, of Dublin, is a layer of nerve endings. One, therefore, wonders that the progress of caries does not cause pain when the enamel has been dissolved. An explanation I would suggest would be that as the ptomaines produced by bacteria have been shown to have actions like the alkaloids, aconite, curare, &c., and as these, we know, paralyse the nerves of touch and sensation, so they might possibly act in the same way on those in the teeth. If this is so, it might also, to a certain extent, account for the extreme sensitiveness so often found in erosion cavities, where there has been no caries.

Being escharotic as well as antiseptic we find carbolic extremely useful for cleaning painful and suppurating cavities in the gums and alveolus after extraction. In solutions of 1—20 and 1—40 it is an excellent wash for syringing old sinuses to abcesses once or twice, as its irritant qualities are useful in such.

For disinfecting instruments, it is I believe along with boiling water the most effective cleanser, besides which it has no ill effects on steel.

It is much used in tooth powders, but I am disinclined to believe in its good qualities in these, because, to be of any use, it ought to be of a strength of not less than 5 per cent. (free), and that strength would have a markedly bad effect on the gum, and mucous membrane of the mouth.

When carbolic remains suspended as globules in water, it may be judged impure—and only acts as an escharotic.

A mixture of carbolic and sulphuric acid of equal parts, known as *asceptol*, or sozolic acid, is spoken of as being a good antiseptic, which does not coagulate albumens, is not escharotic, is soluble in water, glycerine and alcohol, but, mixed with the two latter, is inactive *Copper sulphate* is the French official disinfectant ; Rideal ranks it next to mercury ; Dougall says it is the best of the metallic salts ; whilst Miguel and Bucholtz both place it very high in their lists. pockets Kingzett says it is the best of the sulphates. This is useful for packing of gum round teeth affected by pyorrhœa alveolaris, because it dissolves so slowly, but its extremely unpleasant taste is much against its use. It discolours the teeth and coagulates albumens.

Salycilic Acid.— Miller found a solution of 1—100 killed bacteria of the mouth in a quarter of a minute. Sternberg places it high amongst his list of disinfectants. It is said, however, to have a bad effect on enamel, even in weak solution ; it is irritating to the skin, but non-poisonous. *Iodine* is one of the best antiseptics, but is very irritating to the skin and discolours. Miller found 1—6,000 destroyed mouth bacteria. Rideal says it has about three times the power of carbolic. It is very destructive to steel instruments.

Iodoform—has lately come much into use in dental surgery for the disinfection of root canals. Its action is not thoroughly understood, but it would seem that, being so volatile, it in some way becomes chemically combined with putrefying matter, releasing iodine and acting in this way. Clinically, it seems to act well, sweetening foul and smelling sores—and as a soothing agent. Experimentally, however, Hehn and Rosvinj, Reidlin, Bouillat, and many others found it had practically no antiseptic action. The greatest objection to its more general use is the unpleasant smell and taste. Therefore a root canal with a dressing of iodoform ought to be well sealed, or the patient is likely to complain of the constant presence in the mouth of the unpleasant taste of this drug.

Iodol, another iodine preparation, has not the unpleasant smell of iodoform, is non-irritating, and is not poisonous, and is said to be a useful temporary dressing for root canals.

Aristol and *sozoidol*, are spoken well of for the same uses as iodoform and iodol.

Of the *zinc* compounds, the *chloride* is deliquescent, caustic and strongly antiseptic. Sir J. Lister and Watson Cheyne use it in 8 per cent. solution for dressings. Miguel places it third in his list of antiseptics. Richardson, Hamilton, Pettenkoffer and Calvert also put a high value on it as an antiseptic—whilst Mac Cormac says: "Where wounds have been open to septic influence zinc chloride is about the best antiseptic we can employ," and recommends it specially for disinfection of sinuses or wounds in the mouth.

It enters into the composition of some osteos, but these ought only to be used either where there is a considerable thickness of healthy dentine between the pulp and the cavity or where there is no pulp.

It is occasionally used as a mouth wash in weak solutions. *Benzoic acid* is placed by Sternberg as the highest among the

organic acids—as an antiseptic. Miller also speaks highly of it. It is stimulant and expectorant, therefore, in solutions of say 1—100 or 1—200 should be useful in mouth washes. Of *boric acid* a great deal has been made, but from the various experiments I have studied its power seems to be comparatively small. Still, for a cheap and effective mouth wash—a mixture of equal parts of chlorate of potash, and boric acid—half a drachm to the ounce of water I have found very efficacious, and decidedly pleasanter in every way than permanganate of potassium.

In *permanganate of potassium* we find an effective antiseptic solution suitable for mouth washes and gargles in cases of suppuration and fœtid breath. It is a powerful oxidiser. By many it is said to be a better deodorizer than actual disinfectant, but clinically we find it satisfactory. Koch says it ought to be used in five per cent. solutious. The objections to its use are that it corrodes and stains so readily. It is very astringent, and the taste is not pleasant.

Of the *Naphthol* series, Dr. Edington says: Hydronaphthol is more efficient as a disinfectant and germicide even than mercury, and much more than carbolic acid. It is also recorded as being a powerful antiseptic for treating foul roots, abscesses and ulcers.

Creosote is used by many practitioners. It is a most powerful disinfectant. According to Buccholtz and Werncke 1—1,000 kills bacteria. On the other hand it coagulates albumen, and is poisonous. All these antiseptics I have mentioned, excepting iodoform and napthol, act by coming in actual contact with the micro-organisms. There are of course many others, such as *Izal* (which is scarcely poisonous, does not coagulate albumens, and in strengths of 1—200 is said to be more powerful than carbolic. It is non volatile). *Guaiacol*, *resorcin salol*, *chlorinated soda*, *sulphur* in some of its many forms—especially *aromatic sulphuric acid*—*aluminium acetate*, and others.

Added to these we have a number, which, by virtue of the gases they give off, are very effective, as by this volatile action they can more thoroughly in a cavity attack every part. Of such the first and leader is *peroxide of hydrogen*. This is made in three strengths of 10 and 12 volumes, and of 20 volumes, *i.e.*, that when the 10 volume strength is decomposed 1 c.c. yields 10 c.c. of free oxygen. With this antiseptic we approach more nearly to nature's hygiene than by any other. The 10 volume

strength is best suited for dental purposes, as the 20 volume strength creates too much disturbance when introduced into a cavity, and causes great pain, swelling, and bleaching of the surrounding tissue. As a sterilizer of root canals and abscess sacs, I believe it is unsurpassed. Unfortunately, it easily decomposes, and as it should be perfectly fresh when used, it is better to get it in small quantities and in coloured bottles, which should be well corked. A more stable compound is *ozonic ether*, but I think, with ordinary care, the peroxide is quite satisfactory.

This brings us to the essential oils and terpenes, of which there are such a number that I shall only treat of a few. Mr. Kingzett, who has made exhaustive enquiries into the values and strengths of these as antiseptics, has given us many writings upon the same, to which I would refer you. He found that many of these absorbed large quantities of oxygen, and when afterwards brought in contact with decomposing matter gave it out again, and so nullified and destroyed the septic influences arising from such. We find such action most noticeable in the case of the eucalyptus tree. Districts which were at one time hot beds of malaria and other fevers have quite changed since the planting and growth of this tree. Now we find the oils possess such properties in an increased scale, and because of their volatile nature they are specially valuable to us in our work. For tooth powders and mouth washes, they are mostly pleasant to taste, aromatic and effective as antiseptics. Of these I would specially mention *thymol, oil of wintergreen, oil of peppermint, and eucalyptus.*

Thymol dissolves slowly and if after a foul root canal has been cleaned with peroxide of hydrogen and the bristle it is partly filled with thymol, it will keep sweet for a very long time. Eucalyptus oil with iodoform has much the same effect. Combinations of these we find in *Listerine*, which contains borobenzoic acid, thymol, eucalyptus, baptisia, gaultheria, and peppermint ; also in *Sanitas*, which contains thymol, eucalyptus, and oil of turpentine.

I now wish to mention, in connection with the use of oxygen—nature's own antiseptic—a home which has been opened in London for the treatment of abcesses and ulcers by nothing more than rest, cleanliness, and oxygen. The founder, Dr. Stoker, was, I believe, an army surgeon, and noticed during the Zulu War how those wounded in battle were removed as soon as possible to the highest hills or

mountains, and how quickly in such positions the wounds healed. Further study led him to devise some means of treating patients in London with oxygen. I have visited this home, and I think my friend our chief secretary will bear me out when I say the results we saw were surprising. I have been so much impressed with this that I should very much like to see a Committee of our Surgeons try the treatment on one of those prolonged and tedious antral cases, which are so often well nigh incurable. Apparently new but really very old methods are starting up round us every day, and I believe in our profession we are like many others—only at the beginning. My argument would therefore tend more in favour of the use of oxygenating antiseptics, in the majority of cases, as by such means we would more nearly approach nature's methods, which surely are the best.

Some Dental Preparations.

These are mostly from the prescriptions of French practitioners and are recommended, not because of their being in any way better antiseptics than many British, but because they are as a rule more palatable.

Antiseptic Tooth Powders. (M. David's).

1. ℞	Pulv. Cretae preparata ...	...	45 grains
	„ Mag. Carb. ...	...	45 „
	„ Acidi Boraci ...	...	25 „
	„ Pot. Chlor. ...	...	60 „
	„ Guaiac	...	60 „
	Ess. Mentha. pip. (1 in 50)	...	6 mins.
	or „ Rosae	...	3 „

From this is suggested :—

2. ℞	Pulv. Dimatos	...	ʒ ij.
	„ Cretae precip ...	...	ʒ ij.
	„ Acidi Boraci ...	...	ʒ ss.
	„ Pot. Chlor. ...	...	ʒ ss.
	„ Guaiac	...	grs. lx.
	Ol. Sanitas	...	♏ x.
	„ Rosae (geranium)...	...	♏ x.

(M. David).

3. ℞ Pulv. Cretae precip. 3 35
„ Pummice ... ... „ 1¾
„ Iridis ... ... „ 6½
„ Pot. Chlor. ... ... „ 1¾
„ Acidi Boraci ... ... „ 1¾
Vanilline ... ... grs. 75
Sod. Fluosilicate... ... ... 3 6½
Salol ... ... grs. 75
Ess. Rosae ... ... ♏ 75
Cochineal ... ... q.s.

A tooth powder suggested :—

4. ℞ Pulv. Cretae precip. ... ... ℥ ij.
„ Dimatos ... ... ℥ iv.
„ Saponis Hisp. ... ... 3 iij.
„ Pot. Chlor. ... ... 3 ij.
Ol. Eucalypti ... . ♏ x.
Ess. Mentha. pip. (1 in 50) ... ♏ x.
Otto Rosae ... ... ♏ mvj.

Liquid Preparations. (Eau de M. Botot).

℞ Star Anise 3 2
Cannelle Bark ... ... 3 ½
Cloves ... ... grs. 15
Pyrethrum Root ... ... „ 60
Cochineal ... ... „ 70
Cream of Tartar ... ... „ 80
Gum Myrrh ... ... „ 30
Ess. Peppermint (1 in 50) ... ♏ 60
Alcohol 3 70

Tinct. Arnica (Aromatic). M. Bouchut).

℞ Arnica Floreto 3 1½
Canelle, Cloves, Ginger } ... ... grs. 150
Aniseed 3 3½
Alcohol 3 35

BORASEPTINE. (M. ROSEY). To rinse mouth after extractions.

℞ Acidi Boraci	3	1½
Glycerini	3	3½
Aquæ dest...	3	35
Ess. Mentha. pip. or Rosae ...	9	s. ♏

Mix with equal parts in warm water.

FOR THOSE WEARING ARTIFICIAL PLATES. (M. LOEWE).

℞ Alcohol (decressou du para) ...	3	1¾
Tinct. Krameria	♏	150
Thymol	grs.	7
Ess. Oil of Thyme	♏	7

FOR STOMATITIS, ULCERATION, &c. (M. MELANGEZ).

℞ Pot. Chlor.	grs.	150
Aqua. dest.	3	8
Mel. Rosae	grs.	150
Acidi Hydrochlor.	♏	30

MOUTH WASH. (M. GALIPPE).

℞ Acidi Benzoici	grs.	45
„ Thymigi	„	1½
Tinct. Eucalypt.	♏	150
Aquæ. dest.	3	35

Reports of Societies.

LIVERPOOL DISTRICT ODONTOLOGICAL SOCIETY.

THE first Ordinary Meeting of this Session for the above Society was held in the Medical Institution, on Tuesday evening, October 20th.

There were 23 members and two visitors present; and the President, Dr. Waite, was in the chair. After some preliminary remarks by the President, who drew attention to the papers, &c., that had been promised for this Session, he called upon the Hon. Secretary to read the minutes of the last meeting.

Mr. Tindal, L.D.S.Eng., was proposed for membership.

Mr. HADEN (Southport) showed a very good specimen of a three-rooted upper first bicuspid.

Mr. BATES spoke to the value of base plate guttapercha as a filling material, he had found it more durable than any of the

manufactured forms of guttapercha. The question of guttapercha as a filling material was discussed by Messrs. Haden, Woods, Waite, Royston and Matthews.

Mr. PHILLIPS proposed a very hearty vote of thanks to Dr Waite for the exceedingly enjoyable reception that he gave to the members of the Society in April last at the Adelphi Hotel, and for his able speech on that occasion. This was carried by acclamation, and, Dr. Waite having suitably replied, he then called upon Professor Paul for his paper, entitled "Some Points of Interest in Dental Histology. The Enamel Organ." (See page 493).

After a discussion, in which Messrs. Royston, Councell, Matthews, and Woods took part, Professor Paul was thanked for his valuable paper, and the meeting was adjourned.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

THE first General Meeting of the Winter Session was held on Monday, October 12th, the President, Mr. F. J. COLYER, in the chair.

The Curator and Librarian, Mr. DOUGLAS, said that he much regretted to announce that he had received, as yet, no answer to the appeals for books that were recently sent out. He thought, however, that this might partly be accounted for by the presence of the summer holidays, and hoped that there would be a more generous response to the next appeal.

There were no casual communications.

The PRESIDENT then called upon Mr. Douglas for his paper on "Fermentations and Oral Antiseptics." (See page 499.)

In the discussion which followed—

Mr. HEATH said he was very grateful to Mr. Douglas for all that he had learnt that evening, though he could not possibly hope to carry away all the facts with him. He did not quite understand Mr. Douglas when he said sulphur was the national antiseptic, and added that he should regard anyone who carried out Mr. Douglas's rules for cleansing the mouth after every meal with an admiration not unmixed with awe.

Dr. AUSTIN thanked Mr. Douglas for his excellent paper, and drew a distinction between asepsis and antiseptics. He remarked that one could go even further back into history than Mr. Douglas had gone, instancing the case of Ulysses who used sulphur after the departure of Penelope's suitors.

Mr. NOWELL spoke in praise of the Oxygen Hospital mentioned by Mr. Douglas, citing a case which he had seen there, where an ulcer two inches in diameter had completely healed within 48 hours.

Mr. GABELL insisted on the fact that in dentistry cleanliness came before antiseptics. He could see very little use in antiseptics in the mouth, for one had not there to deal with a pure cultivation, but with organisms covered with thick mucous, mixed with all kinds of *debris*, and inaccessible to position.

In reply, Mr. DOUGLAS said he much regretted that owing to the lateness of the hour they had had no criticism from the President or the Surgeons present, as he believed these discussions were chiefly valuable to students, because of the summing up of those who had been in practice for some time, and could therefore the better judge the good points of both sides. He was pleased to note the distinction drawn by Dr. Austin between Asepsis and Antiseptics. Regarding Mr. Nowell's remarks on the Oxygen Home, one point he would add, which he believed was new as regard bacteriology and wounds. In treatment with oxygen it was found that when a wound was healing the two chromogenic micro-organisms streptococci pyogenes aureus and citreus were always present, and grew to large size, and the necessity for their presence was proved by the fact that, where a wound was foul, and slow in healing, an inoculation of a pure cultivation of one of these had an almost immediate beneficial effect on the wound. The other chromogenic pyogenic micro-organisms did not have the same effect. To Mr. Gabell he would reply that he would use the words clean and antiseptic as having the same meaning; but specially noted the necessity for mechanical as well as chemical cleansing, for the reasons that Mr. Gabell gave, viz., a mixed culture and heavily covered organism, and would specially draw attention to Professor Miller's comparative table of times taken to kill mixed cultivations, found in the mouth, with various chemicals. He finally wished to thank the gentlemen present for their attention to his paper, and his critics for so gently dealing with it.

The PRESIDENT then proposed a vote of thanks to Mr. Douglas and those gentlemen who had taken part in the discussion, and announced that the next General Meeting of the Society would take place on Monday, November 16th, at 7 o'clock p.m.

The proceedings then terminated.

THE DENTAL RECORD, LONDON: NOV. 2, 1896.

It is claimed, and doubtless with truth, that the lot of man is fairly equal, that that which he lacks is ever compensated by that which he has. The practitioner of dentistry is no exception to this rule, and if we dwell for a time on his disadvantages it should be taken in no sense that we are oblivious to the other side of the picture, nor that we regard his condition to be at variance with this general equilibrium. Perhaps the chief disadvantage in the practice of dentistry, or rather the chief difficulty with which we have to contend, is the wearying nature of the work; the intense application to each case, which is needed to ensure the highest result, the constant repetition of the same kind of thing, and the unvarying nature of the strain. It is obvious that it is given but to few to ignore this weariness and to allow no trace of this to mark work with signs of imperfection. If dentistry has made great progress in the last half century, it has also become a harder task master, demanding, not only greater skill, but closer attention; a higher strain, a more complete neglect of self. But because of all this, and because if not to-day, then to-morrow, this will result in lowering the standard of the ideal, it behoves all to avail themselves of the different mechanical aids which the genius of others has provided. Among the chief of these we should place the use of an operating stool, so that, at any rate, the longer operations may be done sitting down. There is no novelty in this, but it is a practice which is but too rarely followed, and which, though it may present some inconveniences at the first trial, is really quite as suitable for work as the standing position. Nor need we dwell upon the fact that long standing by the chair is apt to lead to permanently diseased condition of the veins of the lower extremities, which, to say the least of it, renders the practice of dentistry yet more trying. To follow this practice to the full extent, we must,

of course, use a chair having the full range of movement and have instruments within reaching distance. It is even, we suppose, possible, that the old-fashioned, cumbersome, rigid chair of a previous date, still lingers on beneath its dirty velvet. Is it necessary to assure its owner that he would be consulting his own comfort by consigning his old friend to the quiet seclusion of the lumber room. Students we would advise to learn from the first to operate sitting down, though, indeed, they are often handicapped by the very imperfect arrangements under which they work. It is, of course, difficult to arrange that each student shall have some similar arrangement for his instruments, &c., as is usual in private practice, but it is a consummation devoutly to be wished.

Imperfect light, whether natural or artificial, is another cause of needless strain, which, in the long run, must tell disadvantageously. With regard to the former, windows facing north-west always seem to us to be the best. The additional period of daylight in the evening which these give, is, in the usual arrangement of working hours, a great gain. Of artificial light, electricity doubtless possesses great advantages, but care is needed in using it that both the eyes of the operator and of the patient should be shielded from its direct rays. This is more especially the case when using the more powerful lamps while stopping teeth; indeed, it always seems to us that the light required for extracting is distinct in kind to that needed for other work. For, whereas the latter requires to be powerful and concentrated, the former requires a more diffuse illumination, issuing, if possible, from different points, so that shadows may be minimised. Many other illustrations of labour saving methods could be mentioned, and although in some cases they may not agree with the preformed ideas, yet in trying them, and, when satisfactory, in permanently adopting them, the practitioner is not merely making a concession to modern ideas, but by so much as they save his labour, by so much they increase his capacity for doing work of high merit.

News and Notes.

In connection with the new Dental Bill of New South Wales, we learn that the authorities of the Sydney Hospital are making provision for the practical training of students in chemistry; and the Senate of the University of Sydney has referred to the Faculty of Medicine for report a proposal to establish a School of Dentistry in connection with the Medical School. The scheme provides for a full curriculum and a diploma in dental surgery.

In a recent issue we noticed that a match factory in the neighbourhood of New York had decided that the employees should have their teeth examined and present a certificate on the condition of these; this has not been taken at all kindly, or wisely, by the factory girls, some hundred of whom refused to obey these directions and have now come out on strike. Ignorance is, it is true, no excuse, but at any rate it offers an explanation. The more one may sympathise with the aspirations of the working class, the more we must lament such ill-advised action. It is quite on a par with the reception often accorded to improvements in machinery intended to save life and lessen accident. One cannot help feeling that there is something wrong in the educational methods in the elementary schools that children should grow up so oblivious to that which is for their own real good.

On October 22nd a lively scene occurred at the meeting of the Burnley Board of Guardians, on Lady O'Hagan proposing the appointment of dentists to attend children in cottage homes, Mr. Barton objecting to the expense: "They should remember they were only workhouse children."—Mr. Whittaker, interrupting: "They are not workhouse children—the word stinks."—Mr. Barlow, continuing, said that few ratepayers sent their children to dentists.—Lady O'Hagan retorted: "Then they ought to."—Mr. Whittaker said Mr. Barlow was evidently a man who wanted eye for eye, tooth for tooth—to visit the sins of parents on children. The resolution was referred to a committee.

What a farce that some Members of these Boards should be called Guardians of the Poor!

"L'Odontologie" quotes a case of a supernumerary tooth in the nose, met with by Dr. Seifert in a patient whose dentition was complete and well formed. It was situated on the floor of the right nasal fossa, two centimetres from the anterior margin, and was encrusted in calcarious salts and covered over by granulation tissue.

THE DENTISTS BILL, N.S.W.

The Dentists Bill, according to the last report, has passed the Upper House of the N. S. Wales Legislature. It contains nineteen sections—that is to say, it is less than half the size of the British Act, which contains forty sections.

Provision is made for the establishment of a Dental Board, a Registrar, the qualifications necessary for registration, the penalties inflicted upon unregistered persons using the terms that imply registration, also upon persons who commit frauds on the Act. Section 15 states, amongst other things, that the Board may make, alter, and repeal regulations for carrying the Act into full effect, and for prescribing what certificates, &c., will be recognised by the Board, and for holding examinations and prescribing the subjects and fees therefor. It is provided that the regulations of the Board be approved by the Governor, and that they be laid before both Houses of Parliament.

The first Dental Board will be a nominee body of eight members, two of whom must be registered medical practitioners, four of whom must be dentists who are qualified for registration under the Act, and two of whom must be persons not medical practitioners or dentists. One of the eight is to be appointed President. This Board will continue in office for three years only. At the expiration of the three years the registered dentists will elect a Board according to regulations approved by the Governor. The elected Board will choose one of its number as President. At least five of the elected Board shall be dentists, and three shall be legally qualified medical practitioners.

The Bill, if passed into law, will come into force on January 1st, 1897, after which time no person other than a medical practitioner shall be entitled to take or use the name of dentist, or any name, etc., implying that he is registered under the Act without being liable (as in Great Britain) to a penalty not exceeding twenty pounds.

The portions, therefore, of the Bill that deal with the qualifications necessary for registration become important. The requirements for registration are almost identical with those of the British Act. In Section 11 of the Bill they are stated as follows:—Any person who (*a*) is registered in the United Kingdom in accordance with the laws for the time being in force therein as a dentist or a medical practitioner; or (*b*) is entitled as hereinafter mentioned to be registered under this Act as a dentist; or (*c*) has for a period of six months before the commencement of this Act been *bonâ fide* engaged in New South Wales in the practice of dentistry, either separately or in conjunction with the practice of medicine, surgery, or pharmacy, and who has made application for registration to the Board within one year from the commencement of this Act; or (*d*) has attained the age of twenty-one years, and has been engaged during a period of not less than four years in the acquirement of professional knowlege in dentistry, and has passed an examination before the Board according to the prescribed regulations; or (*e*) has attained the age of twenty-one years, and shall have been a pupil or apprentice of a registered dentist for a period of two years, and shall have been such pupil or apprentice for a period of six months before the commencement of this Act; or (*f*) has obtained a diploma or degree in dentistry from a university in Australia shall be entitled to be registered as a dentist under this Act. And in Section 12:—Any person who has practiced dentistry for not less than twelve months elsewhere than in New South Wales, and who holds some recognised certificate as herinafter defined, and who proves to the satisfaction of the Board that he is of good character, shall be entitled upon the payment of the prescribed registration fees and without examination to be registered as a dentist under this Act. The term "recognised certificate" means a certificate, diploma, membership, degree, license, letters, testimonial, or other title, status, or document granted by some university, college or other public institution in a British possession or foreign country, and which is recognised by the Board as entitling the holder thereof to practice dentistry in such possession or country, and as furnishing sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of dentistry.—*Australasian Medical Gazette*

NEW COLLEGE BUILDINGS OF THE ROYAL COLLEGE OF DENTAL SURGEONS, ONTARIO.

THIS splendid new building was opened on October 1st, by His Honour Lieut.-Gov. Kirkpatrick.

Dr. R. J. HUSBAND, President of the College, occupied the Chair, and opened the proceedings with a brief address of welcome.

The Rev. Principal CAVEN then delivered a short opening prayer.

Dr. J. B. WILLMOT, Dean of the College, gave a review of dentistry in Ontario. He detailed the growth of dentistry in the province. He thought that dentistry was an individual science, apart from medicine, to which it owed little, and believed it should continue to develop as an individual science.

Dr. H. T. WOOD, the oldest member of the board, and chairman of the Building Committee, resuming, believed this was the proudest day of his life. He had laboured for years to attain the object which it was his pleasure to now behold. He had been connected with the movement since 1868, and had always held as his goal the erection of such a building as the directors now had for dental education.

Dr. Husband then vacated the chair, and Dr. Wood presided for the remainder of the meeting.

Hon G. W. Ross, the Minister of Education, congratulated the directors and the faculty of the college on the good taste shown in the erection of such a building for dental education. The directors had shown great judgment and enterprise, and it was a marvel to him how they were in a sufficiently strong financial position to undertake such a task. It was a mystery how they secured the money. He was glad to hear of the upward evolution of dentistry. He was pleased also to know that it required such a high educational standing before a scholar could enter the college. Such should always be. He was glad for the honour of the profession that this standard had been founded. It was as high, if not higher, than that required for any other profession in the world. Dentistry was now in line as a leading profession in Canada, and it embraced all the science and skill of the other medical professions. The Dental College was the youngest of those affiliated with the Toronto University, but by no means the least. The State University had

done well to admit the Royal Dental College, and it was the duty for every State Uuiversity to open its doors and encourage such fondlings in education. A great responsibility rested upon the graduates of the dental school, he said, in conclusion. They should give of the best of their ability to the country which gives of its best to them, so that no stigma should rest upon the standing or character of any graduate of the Royal College of Dental Surgeons.

Prof. THOMAS FILLEBROWN, of the Dental Department of Harvard University, desired to express the high esteem in which the members of the profession in Ontario are held by their brethren in the States. He offered the cordial greeting of the dental profession of the United States to the dental profession of Ontario. He would not make any apology in opening his remarks. Men differed, and he would deal with his theme as it appeared to him. A question had arisen :—"Is dentisty a speciality of medicine, or is it not?" He believed it was. Dentistry was one of the first specialties of medicine. Early in the Christian era it had its foundation. The professor then dealt with the gradual development of dentistry. It had a noble past, an honourable present, and there was awaiting it a glorious future. To make it practical for medical schools to include dentistry in their courses of study some changes must be made in the present plan of the study of specialties. When medical education is organized upon the plan proposed, and each student shall be required to be informed in all the principles of medicine, and shall have opportunities to perfect himself practically in some one specialty, then will dentistry assume its proper place. It will be found that it will take quite as much practice and clinical observation for an ophthalmologist or a laryngologist to acquire practical ability as for a stomatologist, and the seemingly well-grounded objection to making dentistry a part of medical instruction on account of its essentially practical nature will disappear. When this principle is fully recognised and teaching is arranged to conform to it, all difficulties as to the medical education of dentists will vanish. The large increase of dental students and the extraordinary growth of the Harvard Medical School have again brought to the front this question of the proper education of dentists in Harvard University, and a marked difference of opinion is found to exist there as here. Shall our medical schools educate dentists as medical

men and graduate them as such? Professional men say yes. Well informed public opinion says yes. A large number of the dental profession have declared themselves in favour of it, and every friend of higher education and skill admits its desirability. Thus all the signs of the times point to the medical standing of dentistry. Medical schools should claim it as not only their duty, but their right and privilege, to include dentistry in their instruction. They should reclaim dentistry from the custody of partial culture, as medicine, not many years ago, reclaimed surgery from the ignorant practice of the barber and blacksmith." Professor Fillebrown, concluding, wished "Long life to the Royal College of Dental Surgeons, and the University and Government which has fostered it. And amid our rejoicings let us not fail to remember that greater Government the mother of us all, on whose domain the 'sun of Heaven never sets,' and also to render homage and honour to her who, for the longest period in the history of England, has been the ideal ruler of this great nation, one in whom the world so much admires the queenliness of the woman, and the womanliness of the Queen. God save the Queen."

His Honour Lieut.-Governor KIRKPATRICK then rose to declare the college formally opened. After the very entertaining speeches he would say very little, but desired to add his praises to those who had spoken previously, complimenting the directors on the erection of the building. Dentistry was one of the great professions of the age, and he was glad to see its development in Ontario. He wished to tender his thanks to Professor Fillebrown for his warm words of praise on behalf of her Most Gracious Majesty the Queen. Like Mr. Ross, he hoped that those students who would go out from the institution in the future would look to the honour of the college, and do what they could to elevate their own profession. His Honour then declared the building formally opened.

The building occupies a frontage of 50 feet by a depth of 106 feet, and consists of a high basement and three storeys. The style is Renaissance, and the materials used are Credit Valley brown stone for the basement, Portage Entry red sandstone for the ground storey, and the same stone and red pressed brick for the remaining two storeys. At the west end is the main entrance with a flight of stone steps with handsome balustrades, and a hood over the doorway formed by a boldly projecting dentil cornice, supported by richly

carved corbels. At the east end is an archway leading to the students' entrance, and closed by a pair of ornamental wrought-iron gates.

The basement contains the laboratories for metal work. They have granolithic floors, and are fitted with furnaces for melting metals, and moulding and casting tables. Here are also the boiler-room, the students' coat-room and lavatory, and the janitor's apartments.

On the ground floor at the front are the board-room and reading-room, in the rear the large lecture-room, seating 200, with the necessary appliance-rooms, and in the middle of the building is the general laboratory. The students' staircase is centrally situated on the east side, extends from bottom to top of the building, and is reached from the street by the archway referred to. The general staircase is close to the main entrance and communicates with the rooms to which patients will have access. The first floor is mostly taken up by the operating-room and the upper part of the lecture-room. The windows in the operating-room are so arranged that there is one opposite each operating chair. The extracting-room opens off the operating-room, and the clerk's room has communication both with the operating-room and the students' staircase.

The second storey contains laboratories for histology, technique, and chemistry, and the small lecture-room. Each of the laboratories has been fitted up with the most modern appliances for the particular department of study for which it is to be used, those in the chemical laboratory being the most elaborate, the tables being fitted with slate tops, and a sink to each two students, with hot and cold water. Each student is also provided with a cupboard and a drawer for his own use, and a special gas tap. Gas is also led to all the work tables where it is required, and washbasins and sinks are provided for each laboratory, and toilet-rooms for the use of the professors on each floor. The blackboards throughout are of unpolished plate glass. The heating is by low pressure steam, and there is a complete system of ventilation, fresh warm air being suppled by indirect steam radiators, and the foul air extracted by a large fan worked by an electric motor.

A room capable of accommodating about 50 bicycles has been provided under the staging of the large lecture-room.

Abstracts and Selections.

FORMALIN AS A PRESERVATIVE.

By H. A. L. Ryfkogel, M.D., San Francisco, Cal.

Curator of the Museum, Medical Department, University of California, and Assistant Demonstrator of Anatomy, Medical Department, University of California.

To find an ideal preserving fluid has long been the aim of those taking an interest in the care of specimens of organic life.

Such a preservative must not alter the preparation in any way ; it should cause no shrinkage nor hardening, the colour of the object ought not to change, the microscopic as well as the macroscopic appearance must be preserved, the fluid should be non-inflammable and obtainable at but little cost. As yet no combination has fulfilled all these indications, nor is it likely that any ever will : for preserving fluids are usually such by virtue of one of these very objections, if such it really be, namely the hardening of albuminous material.

Of necessity all preserving fluids must have antiseptic qualities, and many such, as alcohol and glycerine, are hygroscopic as well. This last quality is of course not an advantage, owing to the great shrinkage that occurs on the withdrawal of any water from animal tissues.

It is by the presence of these qualities that we must judge the value of the different media in use. Thus, solutions of boric acid, 4 per cent., or carbolic acid, 1 to 2 per cent., are simply antiseptic. Any object placed in these will indeed not suffer putrefactive changes, but after a time will become macerated and practically worthless. Glycerine is hygroscopic and slightly antiseptic. It alters by shrinkage, and is too costly for ordinary use. Alcohol is hygroscopic, antiseptic, and coagulates albumin. It therefore both hardens and shrinks the specimens. It also alters by dissolving out many of the organic pigments. Finally, solutions of formic aldehyde are antiseptic. They harden albumin, but cause no shrinkage, and affect animal pigment but slightly.

Of course, all fluid preservatives alter the appearance of tissues to a certain degree by the withdrawal of blood.

The specimens we show you have been kept in formic aldehyde solution, or formalin, which appears to overcome many of the objections mentioned above.

Formic aldehyde, a gaseous body, discovered in 1863 by Hoffmann, while passing methyl alcohol and air over hot platinum, is one of a peculiar series of chemical compounds which differ only in the amount of oxygen they contain. The first of these is methane, or marsh gas, of which the chemical formula is CH_4. The second is methyl alcohol, with a formula of CH_4O, and the third, methylenglycol, is represented by the formula CH_4O_2. If we now extract from this last one molecule of water, we have the formula of formic aldehyde, CH_2O.

Formic aldehyde is a gas, colourless, and possessing a very pungent odour. When inhaled it is very irritating, quickly setting up a coryza or bronchitis. Its point of saturation in water is 40 per cent. and it is this saturated solution that is sold under the name of formalin by Schering. We probably have here a solution of methylenglycol, for, as shown above, formic aldehyde plus one molecule of water gives us methylenglycol, thus : $CH_2O + H_2O = CH_4O_2$.

On account of its antiseptic properties, discovered by Blum, it has been used in many diseased conditions dependent on pathogenic germs, but it is of its uses as a preservative and fixing agent that we now wish to speak. These, as mentioned above, depend on its antiseptic powers and ability to harden protoplasm.

Solutions of 1 per cent. strength, *i.e.*, one volume of formalin to 40 of water preserve gross specimens of tissue indefinitely, and so thoroughly that microscopic sections may be prepared therefrom at any time. Solutions of this strength will not, however, fix the cells so as to show fine intercellular structure. Still it is the architecture of the tissue, as it were, that most interests the pathologist, and this will be perfectly shown.

Solutions of even less strength may be used, but with less satisfactory results as regards preservation of color and minute detail. When the object to be preserved has many delicate colors that must be shown, a stronger solution, *e.g.*, 4 per cent. to 8 per cent., had better be employed. Bodies of insects and reptiles, fruit and flowers should thus be preserved.

You have all noticed that the slime or mucous that covers the bodies of certain fishes, reptiles, &c., and some pathologic specimens become converted into white stringy masses when the animal or tissue is placed in alcohol. This does not occur with formalin in solutions stronger than one in forty (1 per cent.) ; so that any slime or mucus that covers specimens placed therein remains transparent.

Formalin gives beautiful results in the preservation of the central nervous system, showing very distinctly the white and grey matter. For this purpose, however, it has two objections. First, it causes a certain amount of swelling; second, the gray matter becomes very brittle, so that small pieces are broken off in handling. These may both be remedied by making up the 1 per cent. solution of formalin in 50 pet cent. alcohol, thus :—

℞ Formalin.....1 part.
Alcohol,
Water.....*aa* 50 parts.

This at first glance may appear expensive, but it is not so, for a single emersion will suffice, owing to the great rapidity of penetration of the formalin. Of course, if alcohol alone were used it would have to be changed one or more times to obtain a good result.

If a strong solution of formalin be injected into the digestive tube and carotid artery of a small animal, the specimen may be left hanging in the open air for many months without undergoing change.

Blanchard has preserved leeches in the fluid and found no alteration in the delicate coloration of the animals after a year.

Egg albumen placed in formalin, 4 per cent., solidifies and becomes slightly opalescent. If it is now boiled it will not change in appearance.

Formalin has also been of great use to teachers of bacteriology demonstrating cultures in gelatin. For, if the vapour of formalin be introduced into a test tube in which a culture is growing, it immediately arrests the growth of bacteria. Moreover, the gelatin which has been liquefied by the bacteria is again solidified without alteration of appearance. Thus a culture may be kept in any stage of growth desired.

As a fixing agent in solutions of 2 per cent. to 5 per cent. it far surpasses alcohol, and almost equals the more costly fixing agents, such as osmic acid, &c., killing as it does the cells before any change can take place in the finest intracellular structure. For example, it has been used instead of osmic acid in Ramon y Cajal's method for nervous tissues with better results.

Durig has used 4 per cent. formalin as a mordant instead of aniline-oil water.

Cullen, of Johns Hopkins, has devised a method for making frozen sections permanent by means of formalin. He places the

section in formalin, 4 per cent., three to five minutes; alcohol 50 per cent., three minutes; alcohol absolute, five minutes. Cullen finds sections prepared in this manner in twenty minutes after an operation as definite for diagnostic purposes as those prepared by the ordinary methods, which take several days.

To recapitulate, the advantages of formalin over alcohol are as follows:—

1. Alcohol, by withdrawing the water from a specimen, causes great shrinkage. Formalin, acting only by changing the protoplasm, causes very little shrinkage.

2. Alcohol dissolves out most organic pigments and so greatly alters the appearance of objects. Formalin does not do this to any extent

3. The price of alcohol is nearly $3 a gallon; that of 1 per cent. formalin solution about 30 cents.

4. Alcohol is very inflammable. Formalin being a watery solution of a gas, is not so.

5. Alcohol, by changing mucous or slime to white strings, spoils the appearance of objects covered by this material. Formalin, by leaving mucous and slime transparent, is free from this objection.

The objection to formalin is the irritating quality of its vapour when inhaled. This is, however, not troublesome in the solutions ordinarily employed.

The specimens shown well illustrated the advantages of formalin. Two were specimens of pneumonic lung, one in alcohol, the other in formalin. From the external surface of the one in alcohol, the delicate mottling and striping had almost vanished. On the contrary the specimens in formalin—in this case 1 per cent.—was almost unaltered.

In another jar was a uterus from a case dead of pupura hemorrhagica. This was placed in a 4 per cent. formalin solution, in order thoroughly to harden the blood clot in the interior of the uterus. After four weeks the uterus was carefully cut across and the specimen was ready. Upon examination it was seen that the blood clot formed a perfect cast of the cavity. Neither the uterus nor the clot had shrunken to any appreciable degree.

Colloid material in the Graafian follicles remains clear and has not decreased in volume; one of them is filled with a clot which, like that in the uterus, completely fills the cavity.

Had this specimen been prepared in alcohol everything would have been shrunken and distorted. The clot would not have formed such a perfect cast of the uterine canal and the contents of the Graafian follicles woud have appeared as opaque balls or strings filling a small part of their interior.—*Medical Record.*

PROSECUTIONS UNDER THE DENTISTS ACT.

At the Nottingham Summons Court, on September 28th, before Mr. E. W. Enfield and Alderman Fraser, Edward Jessop Hadley, described as a dentist's assistant, of Market Street, was summoned under the Dentists Act, 1878, he not being registered. Mr. Johnstone prosecuted on behalf of the Nottingham and Notts Dental Association, and Mr. Arthur Wright (Leicester) defended.

Mr. Johnstone said the prosecution in this case had been instituted under Section 3 of the Dentists Act, 1878, as amended by the Medical Act, 1886. There had been several prosecutions under this Act in various parts of the country; one of them was at Newport Police Court, on May 22nd.

Mr. Wright objected to this statement on the ground that it afforded proof of a malicious prosecution.

Mr. Johnstone (continuing) said prosecutions had already been heard under this Act, and convictions had been obtained where even it was admitted that the defendant had, in course of conversation, stated that he was not registered. The evidence he should put before the Bench that day would show the person who was now there as the defendant, had distinctly stated that he was a fully qualified man and a dentist. Those were the words used in the section of the Act, where a person was liable to a penalty of £20, and if that case was proved he should ask the Bench to inflict the full penalty, because other cases had been heard where managers in the service of Messrs. Goodman and Company had been convicted, and it seemed that previous convictions were no warning to them. He thought there would be some question as to the identity of the defendant.

Frank Johnson said he went to the premises occupied by Messrs. Goodman and Company, in Market Street, and asked for Mr. Goodman. He saw Dr. Loveday, who told him that Mr. Goodman was not in. Witness asked Dr. Loveday if he was a qualified dentist, and he replied that he was not, but that there was a

qualified dentist on the premises. He then saw the detendant, who said his name was "Mr. Hadley," and that he was a registered and qualified dentist. Witness told him he wanted his teeth seen to and defendant thereupon examined his mouth. On the following Monday he again went to the premises and asked Dr. Loveday if he could see Mr. Hadley, and the doctor replied that Mr. Hadley had left some time. He asked the doctor what his name was, and he replied that, if he particularly wished to know, his name was Jones.

Mr. H. Blandy, L.D.S., stated that on September 18th he telegraphed to "Edward Jessop Hadley, 163, Cheltenham Road, Bristol." He produced the reply which he receivod thereto.

Mr. Wright objected to the evidence.

Mr. Johnstone said he knew the service had not been regularly effected, and he had not anticipated proceeding further than applying for a warrant. He had not expected to find the defendant present. Therefore, he should have to ask for an adjournment of the case, so as to enable him to commuicate with the person whose name and address were on the telegram.

Mr. Wright strongly opposed an adjournment. Mr. Hadley was a properly qualified dentist; his name appeared in the Register for the current year.

The Bench decided that the telegram was not admissible.

Mr. Blandy, cross-examined by Mr. Wright, said the proceedings had been instituted in consequence of a resolution adopted by the Nottingham and Notts Dental Association.

For the defence Mr. Wright called Henry William Meadment, florist, of 26, Burton Road, Cotham, Bristol, who stated that the defendant Edward Jessop Hadley was related to him by marriage, and he had known him about ten years. He had been residing in Bristol until recently, and practising in that city as a dentist, at Bristol Bridge, Old Market Street, and Cheltenham Road.

Cross-examined by Mr. Johnstone—Mr. Hadley ceased to carry on business in Cheltenham Road about two months since.

Mr. Loveday, L.S.A., of 51, Burton Street, Nottingham, stated that he managed a practice for Messrs. Goodman and Company in Market Street, Nottingham. He had been in their service about three years. It was the custom of Messrs. Goodman to employ only qualified men. He had known defendant about two months. Defendant was a qualified man, and his name appeared in the

Register. Witness recollected the witness Johnson and another man calling on him. They asked him the name of the man who attended on Johnson the previous Friday, and witness did not tell them. They then asked where Mr. Hadley was, and he replied that he had left a long while. He did not intend them to infer that Hadley had left some weeks or months previously. The Bench dismissed the case. Upon the question of costs they intimated that they would give their decision on the following Wednesday.

BEFORE Sheriff Cowan, in the Sheriff Court, on September 25th, Louis H. Fenton, 27, George Street, Paisley, was charged with having contravened the Dentists Act, 1878, particularly Sections 3 and 4, in so far as he, not being a legally qualified practitioner, and not being a person registered under the said Act, unlawfully did, on or about September 1st, and still continues to publicly advertise that he was a dentist, thus implying that he was registered under the Dentists Act, and that he was a person specially qualified to practise dentistry.

The Sheriff held it proved that he had caused to be issued certain advertisements as charged, but dismissed the case on a technical point raised by respondent's agent, viz., that there was no proof put forward that he was not a registered dentist.

The agent for the prosecution said that as at a former stage the point in question had been admitted, he had not put forward the Register of qualified dentists as evidence.

The Sheriff, however, held that it could not be taken as granted, and therefore dismissed the case on the point.

DEATH FROM CHLOROFORM.

MR. J. J. THORNEY (Coroner of Hull), held an inquest respecting the death of Maria Elizabeth Crowther, who died while under the influence of chloroform administered for a dental operation.

Mr. George William Crowther, 14, Sharp Street, husband of deceased, gave evidence of identification. Her age was 25 years. Her teeth were so bad that she could not eat, and it was determined to have them removed. Witness arranged with Mr. Hart, dentist, to take them out, and fit in a new set, and with Mr. Wyllie surgeon, to attend at Mr. Hart's.

Mr. Wyllie said he attended the deceased in her confinement about eleven months ago. He had not noticed any weakness of the heart. He attended at deceased's house at three o'clock with Mr. Hart for the purpose of administering chloroform, preliminary to Mr. Hart extracting her teeth. Mrs. Crowther seemed in the best of health. Deceased went readily under its influence, and became fully influenced in about five minutes. Mr. Hart then commenced to extract the teeth, and there appeared to be no difficulty in the extraction. Witness, because he found consciousness of pain returning, renewed the dose perhaps three times, using about a quarter of an ounce. Everything seemed to go on right. On one occasion Mr. Hart removed the gag to examine the mouth, and he saw that six teeth were remaining. He closely examined the patient then, and she was going on all right. Her breathing was good. The operation was finished about twenty or twenty-five minutes from the commencement. The patient was on a couch in the kitchen. When Mr. Hart removed his hand from the mouth witness saw that the breathing had stopped, and the lips lost their colour. He then began artificial respiration, and continued that for about two hours. She gave two slight moans when he began, but showed no signs of life afterwards. He sent for Mr. Aikman some time after. He was not quite sure she was dead. He kept on hoping. He heard the heart beating at the end of two hours from commencing artificial respiration. The chloroform had paralysed the lungs and caused asphyxia. He had administered chloroform more than 1,000 times without any mishap. The dentist's operations no doubt interfered with the breathing.

Mr. Aikman, surgeon, said he saw deceased about five o'clock on Tuesday night. It was difficult to say if she was alive. Mr. Wyllie was still carrying on artificial respiration. Various methods were tried to restore consciousness. Witness had made a post-mortem examination of the body, which was well nourished and free from disease. The heart was perfectly sound. Death was due to asphyxia, caused by chloroform. He thought the operation would interfere with breathing, apart from the chloroform.

The jury returned a verdict "That deceased died from asphyxia, caused by the use of chloroform, administered to her for the purpose of extracting her teeth."

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PAIN.*

By R. EDWARDS, M.R.C.S., L.D.S.

WHETHER we are prepared to accept the plain, simple biblical narrative of disobedience as a sufficient explanation for the doom "that man should live by the sweat of his face," or whether we prefer to account for it by a somewhat more modern scientific theory; the fact nevertheless remains, and is co-existent with the world's history.

The hardships and vicissitudes attendant on a precarious existence have at all times rendered him liable to injury and disease, and it requires but a slight exercise of our imagination to picture to ourselves a period in man's existence, when nature's powers and promptings were the sole curative means at his command.

Fortunately for the human race, the Supreme Director of all things, in His wisdom and benevolence, implanted in man not only the power to sustain himself under the hardships of labour, but also a recuperative power from the accidents and mischances of his precarious existence.

To quote Mr. Hilton,† "The prime agent employed by nature in the restoration of a disease or injured part is pain. Pain is man's first prompter of the morbid condition; pain admonishes him when he strays from that condition most essential to his recovery; and pain enables him to employ so beneficially, and to regulate so accurately, means for his relief and comfort."

This faculty of providing for the well-being and preservation of the body is the property of the nervous system. This system of nerve cells and fibres forms a most complete chain of communication

* A paper read before the Liverpool District Odontological Society.

† Lecturer on "Rest and Pain"

between all the organs of the body, and thus serves to associate the functions of the different parts, causing them to act in harmony for the common good of the organism.

So intimate is this relationship, or, as it is commonly termed, sympathy, that no one part can be disordered in its functions, without affecting the rest.

Under normal conditions, and if restricted to a limited degree, this inherent conservative power is a constant source of gratification and pleasure to us. The reception of good news, for example, will excite in the cerebrum a train of results, which produce in the mind a highly agreeable and pleasing sensation. The sincere and hearty shake of a friend's hand sends its thrill of joy to the brain, which serves to deepen the mutual respect and admiration. The act of taking in food stimulates the nerves of taste and deglutition, and the impulse thus conveyed to those centres eliminates a pleasurable impression. But if the food is taken in excess, or not of the right kind, sooner or later the function of these nerves and those of digestion becomes perverted, an unwonted stimulus is conveyed to them, sensation is unduly exalted and transformed into pain.

Pain then may be defined as exalted sensation, or, as some prefer it, altered sensation; and the agent which causes it is called a stimulus or irritation, and which may be either emotional, mechanical, chemical, or thermal.

Generally speaking, the severity of the pain varies proportionately with the extent and quality of the stimulus, though light contact may, under certain conditions of the general health, produce more intense impressions than severe handling, as is well exemplified in persons suffering from that morbid complex disease, Hysteria.

But there are other important considerations which serve to accentuate or modify the exhibition of pain. In many instances heredity plays an important part. Many persons from their birth are possessed of such a highly strung nervous temperament, that the least emotional or physical irritation is productive of severe and potent impressions, affecting more or less the whole constitution. Yet, notwithstanding such an error of function, the effect can be measurably counteracted by an effort of the will at resistance.

The close relationship of the mind with the material organism, and the predominating influence of this occult power over so many functions of the body, many sensibly modify the exhibition of any

disturbance; and the continued exercise of this power becomes in course of time so greatly developed as to control to an appreciable extent the function of sensation.

This is probably the explanation why some persons bear pain so much better than others.

In our daily practice, however, we must frequently have observed that the same persons at different intervals, manifest pain with different degrees of appreciation; and it is to the general condition of the health that we must look for an explanation for these variations. Many constitutional disorders, some of which may be regarded as slight ailments, have the effect of increasing the conductivity of the nerve fibres.

A theory has been advanced that an impulse is conveyed to the seat of consciousness by a series of vibrations; consequently the irritation, in whatever form applied, is productive of pain in proportion to the facility of the afferent fibres to take on undulatory action. Any derangement capable of producing deleterious effects upon the nerve fibres would also act upon the ganglionic centres, and the probability is, that the changed condition of the latter is also a potent factor in the perversion. General debility, anæmia, pregnancy, and blood poisoning, especially by alcohol, and the metallic poisons often reduce the nervous system to such a tremulous and agitated condition that the slightest external stimulus is transformed into acute pain. Also such diseases as malaria, gout, and rheumatism, by the presence in the blood of the specific poisons from which they spring, and the exhausting effects of these diseases on the system generally are productive of severe nerve lesions. It is very important that we should bear these facts in mind, so that we may be on the alert to detect any undue agitation or mental suffering in those who seek our aid, and employ those palliative means at our command as circumstances suggest.

In extreme cases Dr. Marshall recommends the administration of some sedative, such as croton chloral, morphia, or bromide of potassium 20 minutes or half an hour before operating. Our efforts should be further directed to gain the patient's confidence, with the assurance that our utmost skill and care will be exercised in the treatment. All our knowledge, tact, and judgment should be exercised to approximately judge how much fatigue and nervous strain a delicate child or sensitive woman can, with safety, endure.

To subject a person to undergo a prolonged or painful operation when the mental and physical capacities are below par, will often produce extreme nervous exhaustion; and the re-action which follows may prostrate the patient for several days, rendering the period one of great distress and discouragement.

Pain is usually regarded as a symptom and not a disease, *per se*, and when referred by the seat of consciousness to the exact locality of its cause, it becomes an infallible aid in diagnosis.

We are, however, only too familiar with the fact, that the irritation of a nerve may, and constantly does, manifest itself by pain in one or more remote or distant places, and as it were to render confusion worse confounded, the true seat of lesion may be altogether free from this symptom.

Not unfrequently the pain declares itself in a perfectly sound organ, which, through carelessness or ignorance, may be readily sacrificed at the expense of the real offender.

Owing to the constant irritation to which its terminal branches are exposed, the fifth or trifacial is more prone to be the seat of referred or neuralgic pains than any other nerve in the body. It is *the nerve* of all others which concerns us mostly as dentists, and its varied functions, numerous communications, and wide distribution should be the objects of our special study. Any diseases affecting the regions supplied by this nerve may give rise to neuralgic pains. Amongst the dental causes may be mentioned, sensitive dentine, putrescent pulp and irritating gases in the root canals, alveolar periostitis, inflammation of the lining membrane of the antrum, but, as far as my experience goes, chronic inflammation of the pulp is by far the most common source of irritation. So constantly are these pains associated with this latter disease that I always make it a rule to ascertain their presence or absence, and the information I receive becomes a valuable guide in my further investigation. The patient's statement is as often as not unreliable and misleading, and when this is complicated by the presence of unhealthy roots, pulpless teeth, or teeth with large fillings in them in the region complained of, it is no easy matter to identify any particular one with the disorder. Under these circumstances, when there is a history of diffused pains, and if in addition the paroxysms are prevalent at night after retiring to rest, we may rest assured that in ninety-five per cent. of cases which present themselves to us the irritation is

due to a living nerve and not to a dead one; and we should not rest content in our examination until we have thoroughly satisfied ourselves on this point.

The next most frequent dental cause of referred or neuralgic pain is undeveloped or impacted wisdoms or supernumerary teeth. Usually dental neuralgia is confined to the branches of the fifth nerve, but when arising from the retarded eruption of teeth, especially lower wisdoms, the pain is often more diffused, extending down the neck, shoulder and arm of the affected side. Nor does the evil effects of misplaced wisdoms even terminate here. Numerous well authenticated cases are on record in which wide neurotic disturbances have been distinctly traced to the reflex irritation of these misplaced organs.

Mr. Hutchinson, in a paper read before the Southern Counties Branch, emphatically asserts that important functional derangements of the whole nervous system, resulting in syncope, partial and complete, epilepsy and hystero-epilepsy, can be traced to the reflex irritation arising from some interference with the eruption of the wisdom teeth.

It is not often that the dentist is consulted in these more extensive nervous disturbances, unless the medical attendant has recognised some possible source of irritation in the mouth. Nevertheless cases of the kind may come under our notice more frequently than we suspect, and the substantial relief which might follow our interference should be an incentive to us to pay special attention to the condition of the wisdoms between the ages of eighteen and twenty-five.

The causes of reflex pain first enumerated are spoken of as peripheral neuralgia; the source of the irritation may be situated at any point in the course of a nerve trunk or its branch, or at the nerve centres (central neuralgia). I shall conclude with a brief reference to that intractably painful condition idiopathic neuralgia. So far comparatively little is known of the pathology of this affection; and whether neuralgia pure and simple is of itself a true disease, or whether it is merely a symptom of some obscure lesion hidden from our view, is, I think, still a much disputed question. Many investigators have from time to time observed marked degenerative changes, more especially in the spinal cord and posterior roots of the spinal nerves, and in resected nerve fibres which were the seat of inveterate neuralgic pains; and, in the absence

of any other known cause, these changes have been supposed to be the source of irritation. It has been pointed out that this disordered nutrition of the nerve tissue itself may be secondary to some peripheral or central lesion, and bearing in mind the trophic influence of long continued neuralgia upon the organs which the affected nerve supplies, it must be admitted that this explanation is a very plausible one.

Trousseau says "Whether neuralgia be due to chlorosis or to a carious tooth it is still a symptom: in the first case of chlorotic cachexia, in the second of a carious tooth." "There is a great deal of difference between these two forms of neuralgia as regards their obscurity and curability, but not as regards pain."

The sudden onset of the pain, its intermittent character and complete cessation in the intervals of the paroxysms, its constant association with many well-known local and systemic disorders, the rapidity with which a cure can often be effected, and the fact that in so many instances the most careful microscopical examination fails to reveal any changes in the nerve tissue itself, would lead us to the conviction that in the large majority of cases we must regard these referred neuralgic pains as the symptom of some local disease or functional derangement. Hence we should approach them in a sanguine manner, and carefully exclude every possible cause of dental irritation before regarding them as beyond the scope of our specialty.

ADAPTIVE MODIFICATION OF TEETH.*

By W. B. Barnard, M.R.C.S., L.D.S.

Mr. President and Gentlemen,—On looking at the list of Papers read before this Society during the present year, I find the subject matter of nearly all has a direct and practical bearing, useful in the extreme, on our everyday work.

The subject of my Paper this evening, "Adaptive Modification of Teeth," may perhaps at the first glance seem to have but little of practical importance to us, yet I venture to think that an occasional review of some of those influences at work in the formation and modification of teeth, cannot but help us to account for and form a true estimate of some of the conditions we are liable to meet with

* A Paper read before the Students' Society, Dental Hospital of London.

more especially, perhaps, in connection with regulation cases, where we find modifications in the conformation of the jaws, increased and diminished number of malformations and malpositions of the teeth. In the limited time before me, I feel an almost insurmountable difficulty in compressing into a short space anything like a comprehensive survey of the subject. The examples of the extent to which adaptive modification has taken place in the specialization of teeth are so very numerous, and the secondary results accruing from it so very extensive, and at the same time the causes of each so very involved, that it is extremely difficult, if not impossible, to confine the consideration of adaptive modification within a narrow limitation, while a separate description and discussion of the causes of individual cases would keep you sitting here all night.

I can only hope, therefore, by very broadly mentioning some of the distinctive influences at work in that very complex force termed "Evolution," and by quoting a few of the more marked and characteristic cases of adaptive modification, to recall its operations to you, and in a measure illustrate how changes result from its influence.

I have said from its influence, speaking as though it was *per se* a distinctive, all-sufficient agent, but its existence in turn is so dependent upon, and so intimately connected with the effective working of other forces of evolution, and upon the ever varying and changeful conditions under which evolution takes place, that, regarding it in this light, it must be considered as a complex or collective influence.

These influences, forces, or agents, as they are variously styled, with which we are all now so generally familiar, have been in a measure separately defined or formulated for us, and are presented to us as more or less scientific axioms in such expressions as "Natural Selection," "Adaptive Modification," "Correlation of Growth," and others, which will readily occur to you.

Adaptive modification may be defined then as a scientific axiom which represents a certain force in the process of evolution, which force in its operations tends to eliminate or do away with any part or parts of an organization, which in the struggle for existence are not directly useful, and to further develop any part or parts which are found serviceable ; in other words, it effects "the suppression of things not needed and the increased development of those most used."

When we come to examine any dentition or individual tooth, although we may say of it that it has attained to the condition in which we find it by adaptive modification, it is as well to bear in mind the various progressive steps by which it originated, as we shall better understand the part played by adaptive modification in its formation, and indeed we must regard it as the resulting issue of all these agencies of evolution which we now recognise, and probably of others which have not yet been finally determined. So when we speak of adaptive modification of teeth, although we refer more especially to that phase of evolution which is concerned in their adaptation and modification into the various forms suitable to the environment and requirements of their possessors, yet on account of its very intimate association with the other influences of evolution, such as "Correlation of Growth," and its dependence as it were on the antecedent operations of some other of these influences, we must, as I have already said, broadly keep in view the general course of events in their gradual formation.

By thus recognising the various influences, their active co-operation one with another and the ever repeating sequence of events, we are in a position to understand how a simple dermal covering becomes modified through successive generations, producing dermal papillæ, spines, scales, or teeth, as the situation may determine, and it is by exactly the self-same process as that by which they originated, and which so differentiated them as to make them appear at the first glance totally distinct from other structures with which they had a common origin, that they now assume such adaptive modifications in structure form, number and position, in the various classes of organized beings, and such adaptive modifications even in the same individual as to merit for themselves separate descriptions.

In tracing out as far as we can the course of events in the record of adaptive modification, it would appear that gradually, step by step, the teeth of the various organizations became specialized, one in this manner, one in that, diverging more and more widely in their particular characteristics, until at last each organization in its way was exactly suited to its conditions of life ; and just so long as the conditions of life remained stable so long did the special characteristics of each dentition and of each individual tooth remain constant ; but inasmuch as the conditions of life at no time remain

for any very lengthened period exactly the same, but are constantly varying in a major or minor degree, so greater or less degrees of adaptive modification take place, in the one case affecting whole dentitions by a series of changes, in the other altering and remodelling individual teeth.

Thus we find a complete dentition, carefully built up, specialized and perfected to meet certain conditions, and in turn, under changed conditions, just as carefully, as it were, disintegrated and removed, until perhaps nothing more than a trace remains to show its former presence, and this applies in like manner to specialized individual teeth, so that we have to consider adaptive modifications of whole dentitions, and it is by the consideration of these that we are materially helped to divide up organized forms into definite and distinct orders and adaptive modifications in minor degrees, in the various orders and distinctive features of the several individuals in each, while we find many adaptive modifications which serve to link together the various orders.

With each successive modification, it will be readily seen that there must often be, as the result of, and that the full benefit of such modification should accrue, a corresponding modification of the immediate surroundings, hence it is that we find adaptive modifications of the various tissues which support, carry, or which are brought into immediate connection with the teeth, and again in the manner and arrangement of their development.

Another consideration to which I have already alluded is the very great influence of outside conditions, that is environment and general requirements of life, which, in turn, by determining the manner and extent of use to which the teeth are put, exercises a most important bearing on their further modification.

Thus in the first instance, regarding the function of the teeth as agents in digestion, the various subsidiary uses to which we find the teeth put, for any purpose, all tends to adaptively modify them in certain directions, and it is easily conceivable how certain teeth may, in process of time, by means of successive adaptive modifications, come to serve primarily for these particular functions. I have said that we find adaptive modifications in structure, form, number and position, and for the sake of preserving some sort of method, I shall briefly recall to you illustrations of each, although as a matter of fact they are to a great extent inseparable, the one influencing and

determining the other. Under "position" we can also review some of the secondary modifications which occur in the surrounding structures, and some more general considerations connected with adaptive modification.

Structure.—The investigations into the development and structure of the various dental tissues, enamel, dentine and cementum, has demonstrated the adaptive modification of these tissues individually and of the manner and arrangement of their depositions. Although we now class these tissues into distinctive varieties, such as "hard dentine," "vaso dentine," "plicidentine," etc., yet we know that each is but a modification from a common origin, and is the outcome of some special requirement in the structural arrangement of the tooth. The folding up and wrinkling of ordinary dentine into "plicidentine" illustrates this, and we see further examples in the same pulp forming two or more varieties of dentine, as in many fishes, where we have a hard fine-tubed dentine merging lower down in the structure to a tubeless "vaso dentine," while in the "sheep's head fish" (Sargus) and in the "manatee," we have, as it were, teeth caught in the very act of adaptive modification, for not only do we find the transition from a hard fine-tubed dentine to a softer variety, but we have a vaso dentine in which the vascular canals are in process of suppression. Similar illustrations may be seen in the various forms and patterns of arrangement of the enamel fibres, from the simple straight fibres of the before mentioned "manatee," to the most complicated and intricate pattern of some of the rodents; while, again, some enamel is penetrated by tubes, as in most "marsupials," some few of the rodents and insectivora, and in many fishes; further, the enamel may be entirely absent as is seen in the "edentata."

In the cementum also we find adaptive modifications in quantity and position, in some cases being absent or scarcely present, in others forming an essential feature in the bulk of the whole tooth; sometimes forming a partial and sometimes a complete investment. As a very general rule we find a more or less thick coating of the hardest material placed on the outside to receive the brunt of the wear, and this at the first glance would appear at once the simplest and most efficacious arrangement, but the ever varying conditions of life have necessitated, in many cases, an adaptive modification of this arrangement. With many grinding and crushing teeth their

efficacy depends upon their keeping a roughened surface, and this has been attained by the disposition of the tooth structures, plates of enamel and dentine being, as it were, vertically embedded in cementum, the difference in the rate of wear of these materials continually keeping up a roughened area ; whereas, had there simply been a thick enamel coating, this, in process of time, would inevitably have worn smooth and rendered the tooth useless.

Again, where a sharp cutting chisel edge is necessary, this same adaptive modification in the disposition has taken place, the harder tissues being placed only on the front surfaces, the posterior surface being thus unprotected and formed only of comparatively soft material wears away much faster, leaving the front standing as a sharp cutting edge. Another structural adaptive modification is in some instances produced by the formative pulp calcifying into an osteo-dentine.

Many other examples might be quoted showing an almost endless adaptive modification in structure, brought about by the many variations in quantity and deposition of the various dental tissues.

Form.—The adaptive modifications in form are, generally speaking, more obvious than those of structure, and it is to the form that perhaps more significance is attached when reviewing adaptive modification. Yet, as is easily understood, the form is in a measure due to the structure.

It is now generally accepted, that at an early period in evolution, teeth were all more or less alike in form, or homodont, and that all the heterodont or diverse forms have been produced by adaptive modifications from a simple pattern of tooth, somewhat similar to certain teeth still found among some of the reptiles and fishes. Although the varying degrees of development into highly specialized forms is so extreme that in many instances it is only by analogy that we can recognise the individual teeth, yet the general course of adaptive modification, at any rate among the higher orders, has been sufficiently similar in its results as to bring about a tolerably uniform resemblance between the various teeth of different animals, enabling us to classify them into incisors, canines, premolars and molars, and it is by the comparison of these individual teeth, one with another in the different species of an order and of the various orders, that we can more nicely trace out the graduations in the steps of adaptive modification.

Thus the comparison of the premolars and molars of the various species of carnivorous animals affords an illustration of their varying development into cutting blade-like instruments, showing the graduation in adaptive modification suiting the animal to its special habits of life.

Among the "Æluridea," the most carnivorous in habits, the premolars and molars all tend more or less to a blade-like form, and the sectorial or carnassial teeth proper are especially well marked both in form and size, while in the "Arctoidæ," proceeding down the various sub-families, "Mustelidœ," "Procyonidœ," we find a gradual diminution in this blade-like form, till among the "Ursidæ" this characteristic has almost disappeared. In many instances so characteristic has the adaptive modification in form become, that it is comparatively easy to tell, very approximately, the habits and nature of food of any animal, inversely, as it were, from his dentition. And, again, especially in the case of the canine tooth, the differentiation in form has become so marked that in those cases where another tooth has been adaptively modified to fulfil the function necessitating this particular shape, it has become a matter of difficulty to determine which is the true canine. The general characteristics of the canine are too familiar to need mention, but as illustrating the degrees of differentiation into a highly specialized weapon, we may recall the "pig" family. Under domestication, the pig has a comparatively small, harmless looking canine—although relatively to the other teeth much larger and modified—to serve as a digging weapon. In his progenitors, the wild boar, living under vastly different conditions of life, these teeth are much more developed, the curved and pointed tusks becoming formidable weapons, not only of use for digging, but furnishing the animal with offensive and defensive weapons in his struggle for existence; thus by comparison we see evidence in the domesticated pig of a reduction in size and general strength of the canine, *i.e.*, the suppression of things not needed. Turn the domesticated pig out to run wild again, and in a comparatively short period under the stimulus of constant use in his changed surroundings, the canine in succeeding generations once again becomes the tusk of the wild boar by the increased development of things most used. In the "wart-hog," with his huge and formidable tusks, and in "sus babirussa," with his immensely elongated and curved tusks, we have evidence

again of the further adaptive modification which takes place under still more different conditions of life. Similar instances of change in form, due to different conditions and habits of life, may be found among the other teeth, as the premolars and molars of the horse, from the brachyodont type of tooth found in its earlier ancestors, to the hypsodont type of the present time; while the manner of disposition of the tooth structure results in the worn surfaces of the teeth presenting a series of diagrammatic patterns which literally record the various changes which have taken place. There are many other marked instances of adaptive modification in form to meet special requirements, as the poison fang of the viperine order, the forceps-like incisors of many insectivora, the huge development of the incisor tusks of "Proboscidea," the canines of the narwhal, &c., while among the lower orders we have many both curious and remarkable examples, as for instance, that very eccentric modification found in the teeth of the "Mesoplodon Layardii."

Number.—When we come to examine the adaptive modification in number, we find that out of an apparent confusion, each species and individual comes to be suited with a definite, well-proportioned and serviceable number of teeth.

It would almost seem as if during the period of evolution, teeth had been differentiated in innumerable quantities, in endless succession, and in almost every conceivable situation, as it were, by way of experiment, and subsequently the process modified according as to whether, so to speak, the experimental teeth were found serviceable or not. In this or that case the innumerable quantities have been reduced to a definite and certain number, and the endless succession to a limited succession at certain periods of life, or to the persistent growth of one or more teeth. In many of the lower orders, as reptiles and fishes, we still see this almost endless succession taking place, while the specialization of individual teeth and the consequent secondary modification in the surrounding structures in some measure accounts for the limitation in number and succession, as is to some extent shown in the general relation between the succession of teeth and the retaining of a simple homodont dentition or the development to a heterodont dentition. As a general rule the homodont having but one functional set, while the heterodont develops a successional set.

We frequently find those teeth nearest to a highly specialized one much dwarfed in development, and this gives us some sort of

clue as to the adaptive modification in number; for it is quite conceiveable that the bulk of the nutrition as supplied to the developing germs, would to a large extent be absorbed in the development of the specialized tooth, while those in its more immediate vicinity would suffer from a deficiency, and in consequence remain more or less undeveloped. We can easily understand that if this occurred to any great extent they would finally perish, partly from this immediate cause, and partly because their development would never be sufficiently great to bring them into useful existence, and as useless appendages they would naturally tend to entire extinction by this very suppression of things not useful in the struggle for existence.

The gradual suppression of teeth, as it were, keeping pace with the specialization of the poison fang in the various dentitions, from the non-poisonous up to the most venomous snakes, shows this adaptive modification in number remarkably well. Apparently in other cases the reduction is effected in a similar manner, but by the specialization of parts, other than the teeth, as the baleen plates of the whale, while the total disappearance of teeth in birds may be accounted for by the adaptive modification of the surrounding structures into a bill or beak.

The adaptive modification of two of the upper incisors in elephants into highly specialized weapons, together with the development of the trunk, which in many ways fulfils the function of incisor teeth, would account for the suppression of the other front teeth.

The intimate connection between "Adaptive Modification" and "Correlation of Growth" is exemplified in some of the ruminants in which the dentition is adaptively modified in number, to the extent of the loss of the upper canines, or to only a partial development of this tooth in those animals possessed of horns; in these instances the horns functionally taking the place of the teeth.

The examination of almost any dentition, either of an order of species or an individual of a species, will show evidence of adaptive modification in the number of its teeth, while in some few instances among the heterodonts, we have examples of adaptive modification in the functional use of deciduous teeth with the permanent (hedgehog, etc.) as though the differentiation into two dentitions were still incomplete.

Position.—In reviewing the course of adaptive modification of teeth, we might well start by speaking of the position they occupied, because in the first instance it was greatly due to the position in which the elementary tissues came to be situated that their differentiation into teeth took place: and again the specialization of any particular tooth is perhaps primarily accounted for by its occupying a favourable position suitable to that specialization. But the adaptive modification in position being relatively determined by the amount of secondary adaptive modification occurring as the result of specialization in structure, form and number, it is perhaps best considered after these have been reviewed, while in connection with it we may consider those further adaptive modifications occasioned for the effective development, eruption and protection of these specializations.

We can understand that once specialization has started in any one tooth, the constancy of its development in that particular situation in successive generations becomes an essential feature both in the perpetuation of this characteristic and in its further modification. Thus "the certainty," if I may so express it, with which we find, at least among the higher orders, cutting, slicing, or piercing teeth in the front of the mouth, crushing and grinding at the back, always being developed and occupying more or less the same relative position is in a measure the outcome of adaptive modification. The position primilarly determining adaptive modification and the resulting specialization in turn, ensuring by functional activity a recurring constancy of position. The position then having come to be more or less fixed, any further adaptive modification would in many cases necessitate further modifications in the bony surroundings, and these in turn, while not interfering with the essential position, may effect a relative change in the general position. The increased area for implantation and for growth from a persistent pulp, examples of which are numerous, illustrates this; thus, the implanted portion of a persistent tooth will come to occupy practically the whole length of the jaws, extending possibly beneath the implanted portions of other teeth. Although many of these adaptive modifications in the surrounding structures are spoken of as secondary to that of the teeth, they can scarcely be considered so in all cases, as they take place concurrently with the modification of the teeth themselves, and form an essential feature in the general adaptation.

Thus the differentiation of the various manners of tooth attachment may be considered due to adaptive modification, and at any rate in the case of the hinged teeth is obviously the important adaptation.

Again, inasmuch as each specialization of either dentition or individual tooth is directed to the survival of the particular organization, special adaptive modifications occur for the due protection of each characteristic, and for their due succession and proper eruption when required. Downward projections of the lower jaw occurred in some animals to protect the long upper canines, which, when the mouth was closed, would otherwise have projected below the lower jaw. Protection to the poison fang of viperine snakes is afforded by a highly specialized adaptive modification of the skull and jaw bones, resulting in a mechanical arrangement whereby the fang is laid flat along the roof of the mouth when not in use, while a specialized mode of development takes place ensuring the almost immediate replacement of a poison fang should it be injured or lost. The curvature so frequently seen in teeth of persistent growth is a further illustration of adaptive modification for protective purposes, the curvature relieving the pulp tissues from direct pressure and concussions, which otherwise might set up inflammatory conditions terminating in its destruction.

There are many other secondary modifications occurring in connection with the adaptation of the teeth, as the alterations in the general conformation of the skull bones, developments of special bony areas for increased muscular attachment, and modifications in the manner of the jaw articulation all of which, though interesting, would take too long to go into on this occasion.

Perhaps, as illustrating the capacity for, and the certainty with which adaptive modification takes place, the instance of those cases were certain species have been isolated and cut off from all intercommunication with each other, as the "Aye-Aye" of Madagascar, the "Wombat" of Australia, and the rodents of the rest of the world should be mentioned.

Although these species are totally distinct, yet the resulting outcome of adaptive modification of their dentitions has been practically the same. So much so indeed that a casual observer would be led to suppose them, if not quite of the same species, yet very nearly akin. In these instances, as there was, so to speak, a

different starting point in each case, it would serve to show that it is not the particular elements available that determine the result, but rather the conditions and habits of life under which each is developed, so that should these conditions at all correspond, the resulting dentitions would in a large measure approximate, and the existing differences be relatively slight and solely due to the ntegral differences of the elementary tissues. The same fact is apparent in the comparison of the hinged teeth of the "pike" with those of other fishes, where we find that although the structural peculiarities of each is distinct, yet the same ultimate result is obtained by adaptive modification.

Of more especial interest to us is the study of man's dentition, and we find that in common with the rest of all organized beings, it has reached its present condition through a long series of adaptive modifications. It is only by investigating, reviewing and tabulating the series of steps which have taken place in the origin of the various species that we are enabled to realize and appreciate its true character.

The study of the development of the human jaw, of the tooth germs, the structural peculiarities of the teeth, their form and number, still afford us some broad hints as to their adaptive modification from and through lower forms, and although in the retrogressive study of the teeth of man, back to the earlier and less specialized dentitions, there comes a period beyond which we cannot with certainty proceed, the chain of evidence being far from complete, yet we can by analogically filling in the gaps estimate fairly accurately the types in form and number from which they have been adaptively modified.

We can still trace in the gradual transition frcm one tooth to another, central to lateral, lateral to canine, and so on, the relationship of one tooth to another, and possibly a suggestion of the relationship to an antecedent homodont form, though in the earliest and most primitive mammalian forms known the dentition had already assumed a heterodont condition. By investigation we have formulated the typical number of teeth for the mammalian group as 44, and we see from this that a modification in number has taken place to the extent of the suppression of 12 teeth out of the 44.

We find in the comparison of the dentitions of anthropoid apes,

early man, and savage races with those of civilized beings, direct evidence of adaptive modification taking place as it were within historical measurement.

Although in number, in structure and deposition of tooth tissue they are practically identical, and the periods of eruption nearly similar, there is a very appreciable difference in their general characteristics.

In the dentition of the anthropoid apes we find a very much greater increase in the general strength and size both of the individual teeth and of jaw development generally. The third molar especially, instead of being the same size as the other molars, as is the case in early man, or even smaller as is generally the case, at the present time is larger in both the gorilla and orang-outang. The canines are largely developed, more especially in the males, and a diastema exists for the reception of the point of the lower one, while there is a difference in the period of eruption, due to its great development in the males being chiefly a sexual characteristic, and hence only erupting when sexual maturity is reached ; while it is tolerably certain that man's earlier progenitors had a very similar development of the canine tooth, and we still see occasionally cases of reversion in which the canine projects above the level of the other teeth and a trace of a diastema is present.

Apart from racial distinctions, the teeth of early man and savage nations are, perhaps, denser and harder in structure ; the individual teeth slightly larger, and the general cusp area consequently greater and the implantation more extensive ; the third molar especially being a larger and more typical tooth than is generally found among civilized races, while the general jaw development is proportionately greater.

Early man was, and savages are, less liable to irregularities and morbid conditions of the teeth generally, and this would indicate to a great extent perfect functional use, that is an exact adaptive modification to their condition of life. Savages in various parts of Africa and in the Malay Archipelago file the incisors into points like those of a saw, or pierce them with holes into which they insert studs, revealing at least by these acts a less sensitive state of the tooth structure than perhaps the majority of us are accustomed to meet with.

The consideration of these facts would point to a lesser susceptibility in the tooth structure to those conditions which, in a civilized

being, would rapidly tend to the destruction of the teeth, and thus indirectly show that some sort of modification has taken place among civilized communities. The investigations into the deviations of the cusp patterns of the molar teeth of man point to a modification in the number and size of development of the cusps, while the third molar is slowly but surely tending towards a rudimentary development which, if continued, must end in its total disappearance.

The frequency with which we find at the present day jaws developed on a much smaller scale than the teeth which they have to accommodate, probably points to the conclusion of a further reduction in number eventually taking place, while some of the irregularities which we encounter, as suppression or complete absence of certain teeth, deviations from the normal type, more especially in the direction of a reduction in size, fusion of cusps and roots, etc., might be regarded as an evidence of a modification now in progress.

The susceptibility of the teeth at the present time to caries and other morbid conditions in structure, although perhaps primarily accountable to other causes, *may* indicate a tendency to a softer and less lasting condition of tooth structure. We have realized that adaptive modification is occasioned by the changing conditions of life, and when we review the immense changes that have occurred in the habits and general surroundings of man, and the very rapid progress towards further changes, we cannot wonder at, and, indeed, must expect to see modifications taking place in his dentition.

I have already referred to the correlationship between the development of one and another part as affecting the course of adaptive modification. These have been shown to exist between "hair and teeth," "horns and teeth," "muscular development and jaw development," and again between the jaws and the development of the extremities (hands and feet).

When we consider these in connection with man's circumstances of life, and think of the many existing conditions which materially affect the development of the hair, the hands and feet, and muscular development generally, may we not expect to find his dentition in a somewhat unstable condition?

We are perhaps inclined, when reviewing adaptive modification, to call to mind those teeth which have been developed to an unusual degree, to serve some special function, as especially illustrative of

the subject, almost forgetting that the partial or complete suppression of individual teeth or dentitions, general changes in structure, eruption and development, however slight, are quite as important ; while again we are inclined to regard a particular dentition as more perfect than that of a subsequent generation of the same species, and to view with regret the degenerate days of dentition that have befallen the descendants of a once more perfect race. In some such a manner I have heard our present dentition spoken of, but it is reassuring to remember that these apparent degenerations may be regarded as the outward and visible sign of the inward and spiritual grace of adaptive modification, which tends to the betterment of all things to meet the requirements of existence.

What the ultimate outcome of the modification of our present dentition will be is perhaps an interesting but scarcely practical subject for speculation, but if the present tendency to suppression in size and number of teeth continues, two points are apparent: I.—That at some future period our dental formula will have to be re-written ; and II. (not strictly scientific) that the number of dentists available for the treatment of man's teeth, or may be "tooth," will be amply sufficient.

In conclusion, I feel I ought perhaps to apologize for the broad and general manner in which I have spoken of my subject. In a measure I may have infringed, and attributed to adaptive modification what in many instances is due to other influences of evolution ; but, as I have tried to show at the commencement, the whole question of adaptive modification is so involved and in the cycle of events the various influences, as it were, in turn become cause and effect, that it seems almost impossible to altogether attribute to an individual agency any one special course. Thus I have spoken very generally, first, because I found I couldn't help it ; and, secondly, because it leaves a large field for criticism and discussion.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE Ordinary Monthly Meetings were resumed on the 2nd ultimo, the PRESIDENT (Mr. Robert Woodhouse) in the chair.

The minutes of the previous meeting (which was also the Annual General Meeting), held on June 1st, were read and confirmed.

Mr. Lucien E. Browne, L.D.S.I., Marsh House, Tottenham, Middlesex, was proposed for membership, and Mr. Robert Stephen Fairbank, M.R.C.S.Eng., L.D.S., 18, George Street, Hanover Square, W., was balloted for and duly elected a member of the Society.

The LIBRARIAN (Mr. W. A. Maggs), reported in addition to the usual periodicals and journals, the following books had been received :—Two copies, Nos. 12 and 13, "North American Fauna," United States Department of Agriculture ; two copies "La Photomicrographie," by J. Choquet ; the Calendar of the Royal College of Surgeons, England, 1896 ; and the "Transactions of the American Dental Association, 1896."

The CURATOR (Mr. Storer Bennett) had no report to make.

The PRESIDENT then delivered his Inaugural Address. He remarked, by way of preface, that his call to office was a surprise which made him feel like Cincinnatus called from the plough to guide affairs of State, except, that unlike him, he found his predecessor had so judiciously conducted the work of the Society that there were no tangled skeins standing over from last Session to be dealt with. The 40th Anniversary of the Society, which would be celebrated during the current year, was likely to be an important one in their history, for in the present Session they must face the momentous question of their future domicile, now that the hospital was about to be rebuilt on an adjoining site. The accommodation required was much greater now than formerly, owing to the expansion of the Museum and Library as well as the increase of membership ; but while he would like to see the Society a greater power even than it had been as regards its great ethical and scientific aims, yet it ought to be so situated that its social growth could also be enhanced. Whether they might hope to continue their alliance with the Dental Hospital in more commodious quarters, or whether they might possibly locate themselves in some more central position, was a question which remained open, and he was fortunate in being supported by an able Council who could well be entrusted with so important a matter. Since the previous meeting of their Society in June, the medical profession had to mourn the loss of several of its leading members. Where so many had fallen it was difficult to specialize, but the passing away of two such men as Sir John Erichson and Sir George Humphrey from amongst the leading

surgeons of the day created a blank which time alone could fill. Sir John Erichson showed his interest in their branch of surgery in many ways, and was for several years Chairman of the Managing Committee of the Dental Hospital of London. In passing in review the immense advance made in dental surgery since the commencement of the Victorian era, it must be conceded that it was in the United States that a systematic training was first organised, and diplomas in dental surgery first granted ; but while America was a few years in advance of us in this respect, on the other hand, the English educational system was on a much more satisfactory basis. Our examination in arts was a safeguard to the entrance to the profession, and the examination for the minimum qualification, newly authorised by the College of Surgeons, enabled them to look forward to the future with hope and confidence. In the past there were men of good position and scientific attainments, or the Odontological Society could not have come into existence, but it was no disparagement to them to say that they could be equalled to-day, and behind them was a strong and ever increasing body of well educated and skilful practitioners—it was, after all, to the rank and file of an army that its real efficiency was due. Not only in Great Britain but throughout her colonies and dependencies, and notably just now in New South Wales, were minds astir in the question of dental reform. These newer communities had the great advantage in dental, as in other reforms, of profiting by the experience and mistakes made by the older country. Although the practitioners of to-day had such enormous advantages over their predecessors in every form of appliance and treatment, nevertheless they had to deal with deteriorating structures, and it was to efficiently grapple with this condition that all their energies and resources were called into play. He had, however, been much struck by the fact that they could often regard caries as a transitory condition, and even the virulent of phagedaenic form—which in young mouths well nigh drove them to despair—to a great extent ceased after puberty, when, if judicious treatment had been adopted, the strengthening forces of nature came to aid the dental surgeon in his apparently hopeless task. What the Copernican system of astronomy was to the old Ptolemaic, the science of bacteriology had been to the older theories in shedding light on much that was previously dark and inexplicable; it had revolutionized general

surgical treatment, and their branch of the healing art felt the full force of the wave ; antisepsis and prophylactic treatment, based on its investigation, had aided them materially, and fortunately this knowledge was not limited to professional circles—the general public was becoming more and more alive to the importance of having the guidance of the dental surgeon from the first dentition. When parents realized that neglect of their children's teeth up to fourteen or fifteen years of age too often meant ruin as to their future comfort, health and appearance, much would be gained. It would be remembered that the present year was the jubilee of the introduction of anæsthetics, and it might justly be said that, collectively, anæsthetics represent the greatest boon that modern discovery had conferred on mankind. In connection with this subject he could not but express the hope that ere long legislature that so rightly protected dumb animals from needless suffering, would make the production of narcosis in human beings, save in qualified hands, a penal offence. He regretted that as much could not be said for local as for general anæsthetics, in these there was still a great deal to be desired, although great things were often promised. Cataphoresis was now raising hopes, but any method requiring a length of time for its adaptation tended to increase the nerve tension of the patient, and so discounted its value. Speaking of the Röntgen rays, the President said it had occurred to him that possibly it might influence their decision when hesitating as to the removal of retained temporary teeth, with the hope of permanent successors taking their place, as well as in other ways. The charge of monotony and narrowness had sometimes been levelled against their work, but the validity of such a charge entirely depended upon the spirit in which that work was done. There was ample scope for the accurate observer to note facts and form deductions as to the laws of health, heredity and disease as applied to their vocation. The busy man was often at a disadvantage in this respect, for, unless endowed with a retentive memory and power of marshalling facts, he often missed much that a more leisurely employed colleague might gather from his experiences. It was to societies like their own that the codification of incidents in practice was greatly due, and so a mass of experience was being accumulated for the guidance and benefit of a future generation. Of late years they had seen a rapid multiplication of medical societies of all kinds, the ever

widening field of knowledge accounted for this, and specialists like themselves gained much by the close interchange of ideas thus afforded. A society ought to be the means of confessing failure as well as of recording success ; as had been well expressed in a recent medical journal : "It is certain that in the long run we hesitate to believe in the man who always believes in himself, and he who begins by publishing nothing but his success may end by having nothing to publish."

In looking back through the transactions of their Society, it was noticeable how the discussions had broadened out, and that many more took part in them than formerly ; nothing could be more gratifying to the author of a paper, or more generally helpful, than evoking a good discussion. Amid professional progress there was a great deal around to deplore, but time, that impartial eliminator, would banish much of this, the blatant quack and mendacious charlatan would vanish midst protective laws and the enlightenment of a better education. The *roma quadrata* they saw to-day would give place to a *roma imperialis* of the future ; then would be seen the full fruition of a movement fraught with immense benefit to mankind, in which their Society had done much, but as yet had reaped only the first fruits. The President was glad to say the Secretaries had the promise of some excellent papers during the coming session, and he might remind the Society how much pleasure and profit was derived from casual communications ; he therefore asked them to keep this list as full as possible. In conclusion he thanked them again for the great and undeserved honour they had bestowed upon him, and could assure them that no effort of his would be wanting to justify their trust and to sustain the best traditions of the Odontological Society.

Mr. William Hern related the particulars of a case of anchylosis of the temporary mandibular joint in a rather diminutive lad, aged twelve, first seen about four or five years ago. The lower jaw was small, undeveloped, and practically fixed to the upper, and the one could not be separated from the other for more than an eighth of an inch. The upper jaw was fairly developed and had marked protrusion of the incisor teeth. There was no history of injury to the face or jaw. After mechanical treatment for about six months, feeling that little could be expected of it, Mr. Hern, when the boy's dentition was completed in May last,

consulted his colleague Mr. Bland Sutton, who advised the removal of both condyles of the mandible. The boy came into the Middlesex Hospital in August last, and Mr. Sutton commenced the treatment by removing the right condyle, with the result that after the operation the boy could open the mouth to the extent of over an inch ; he had since been able to masticate with all kinds of food. There was one very curious thing in connection with the case, viz., the marvellous development of the platysma muscle.

Mr. Bland Sutton said cases of undeveloped mandible had interested him for a good many years, and bearing in mind the tradition of surgery, he had never felt disposed to perform any operation for them ; but when he wrote the article on diseases of the jaw for Mr. Treves's "Surgery," he made up his mind that if ever another case came before him he would at once operate and deliberately take out both condyles. Mr. Hern asked him to see the boy, and he came to the conclusion that the left half of the jaw was undeveloped, although the right half was fully developed ; the jaw was so firmly ankylosed that by no manner of means could the patient get his mouth open, and he used to stuff his food in with his fingers, much like a schoolboy would fill a popgun. The parents were quite willing to have the operation carried out, and he started with the intention of removing both condyles. He made an incision down to the jaw where the condyle should be, and to his astonishment came on a solid pier of bone, as thick as his thumb. Neither the condyle nor the place where the joint should be could be distinguished, but there was a thin narrow chink out of which fibrous tissue projected. He detached the solid pier of bone, and then cut a piece out half an inch broad completely across it. The facts of the case might be fairly well stated by saying that the ascending ramus of the jaw on the right side was practically represented by a solid pier of bone, half an inch square, firmly ankylosed to the temporal bone. Having cut that piece of bone right through, taking care not to damage the nerve or artery, the patient's jaw was forced open with a powerful pair of forceps, and to his (Mr. Sutton's) astonishment the whole jaw began to move, and he discovered that there was a perfectly good condyle on the opposite side. For a few days there was a little trouble with the wound, a good deal of oozing coming from the under surface of the bone, but after four or five days the patient was perfectly happy.

The etiology of the condition was one which had exercised him a good deal, and he thought the most reasonable cause for a lateral ankylosis of that sort might be possibly explained by an injury to the tempero-mandibular articulation with the point of forceps during delivery. An injury at the time of birth might go on very slowly, and ultimately induce in young children an ankylosis such as had been described.

Mr. Alfred Woodhouse mentioned a similar case in a lady who was a little over fifty when she first consulted him. When about four years old she had measles, and inflammation occurred in the articulation ; whether from pain or some other cause she ceased to open her mouth. She was sent to a gentleman of high repute in those days, but without much benefit, for in the result the jaw became absolutely ankylosed. She had since lived by pushing food through a space produced on the right side by taking out the canines in both the upper and lower jaws. Her lower, which had not developed much, was altogether receding, the muscles of the neck were also but feebly developed.

Mr. Cornelius Robbins described the further history of a case of retarded eruption of the permanent teeth, brought before the Society some six years ago. The patient was a young lady aged about twenty. It was one of those cases where no explanation could be given. The first model showed the jaw undeveloped from the right upper central to the second bicuspid on the left side, due to the alveolus remainining in *statu quo* owing to the nonappearance of the permanent central, lateral, canine, and first bicuspid. Originally there was a history of constant irritation in front of the second bicuspid, which for want of support was leaning forward. There was occasionally a small discharge at this spot, and on probing Mr. Robbins could distinctly feel the polished cusp of one tooth, but could not be sure of a second. Finding there was no possibility of the tooth erupting in a position to be of use he removed the offender under an anæsthetic, and found the leaning tooth was the missing first bicuspid, and immediately below was the misplaced canine. A small vulcanite plate was made and had been worn ever since. Within the last few months he had been consulted again, and, strange to say, the missing central and lateral appeared in exactly the same spot from which the first two teeth were removed. The second model showed the last two teeth *in situ*. At the present

time the missing right canine was ready to make its appearance. Mr. Robbins also showed a photograph of a piece of glass *in situ* taken by the X rays, which had been tolerated in the cheek of his patient for over thirty years. The first attempt to photograph was made on a piece of sensitized film, somewhat too large. They had been covered with black paper and rubber-dam. Only a portion of the large piece of glass showed, but a small portion of another fragment was demonstrated of which they were ignorant. In the next attempt they placed a portion of film on the tongue side of the mandible, and increased the exposure, with the result that the tooth, alveolus, and a portion of vulcanized plate showed fairly well, but the glass was a failure. Ultimately they cut a smaller piece of film, placed it as before, inside the cheek, and during the exposure pulled the cheek upward, with the excellent result shown in the picture.

Mr. T. CHARTERS WHITE read a communication on "A Method of Infiltrating Dental Osseos Tissues." His object was to explain the utility of his process and the method of its manipulation. First, as to its utility : experience showed that mounting sections of teeth or bone in Canada balsam resulted in the obliteration of cavernous and tubulous structures in the finished specimen, owing to the balsam being absorbed by the dentinal tubuli or the lacunæ of bone. He had overcome this difficulty for many years by mounting such tissues after thorough saturation in water and drying their surfaces ; it naturally followed that the internal structures being filled with water, the balsam could not run in ; but it occurred to him later that if he filled the spaces with some coloured medium it would give more decided evidence of the existence of cavities, if such existed, than could be furnished by the water method. After a variety of experiments he finally adopted the following process : in the first place he ground the sections moderately thin to about $\frac{1}{32}$ of an inch, and dehydrated by immersion first in absolute alcohol, then for the same time in ether. When thoroughly saturated he transferred it to a dry thin solution of celloidin, about three grains of celloidin to half an ounce of equal parts of absolute alcohol and ether. In making this mixture coloured red it is necessary to add fuschine to the alcohol first, as the dye will not readily mix with the completed solution. In his earlier experiment she had considerable difficulty in getting the coloured celloidin solution to run into all the delicate cavernous structures. This would be obviated ' the air

contained in these structures was first replaced by ether ; the solution would then follow the ether readily. When the tissue has remained in this solution for a day or two, if deemed sufficiently impregnated with it, it might be removed and placed on paper to evaporate. Paper was better than glass, because the preparations would stick to the latter, and would become broken in the endeavour to remove them. If, on the other hand, they should stick to the paper, they could be readily soaked off in water. Another advantage of this method of infiltration was that the sections were rendered less brittle by their saturation with celloidin, and could be ground to the desired tenuity without much fear of fracture, whilst cavities, normal or abnornal, showed up a brilliant red, without their obliteration by balsam running in ; sometimes the balsam became stained by the red ; but this did not militate against the efficiency of the process. Specimens indicating the above method were shown under microscopes.

Mr. F. J. Bennett said Mr. White's ingenious suggestion as to colouring with celloidin was one which was new, and which appeared to be full of promise. He should like to ask Mr. White whose celloidin he used, as it was a substance very difficult to get, and especially to get it of good quality. When staining larger cavities, especially cavities occupied by blood vessels, for example of the cementum and the larger lacunæ, they should be on their guard to remember that celloidin shrank, and therefore if they saw an apparently new structure under the microscope, it should be remembered that it was due to the celloidin having contracted in drying. There was no better study for beginners than to take the stones of fruit in the spring of the year, say peach stones, and make sections of them as they developed. It was well known that stones of fruit at all stages of development were extremely good structures for illustrating the formation of lacunæ of bone. The fruit stone started as a typical cell, and ultimately it became indistinguishable to amateurs from bone lacunæ.

Mr. Charters White said the celloidin he used was Scherin's.

The usual vote of thanks concluded the proceedings, and the next Meeting was announced for the 7th December, when a paper by Mr. J. F. Colyer will be read, entitled " Open Bites."

LIVERPOOL DISTRICT ODONTOLOGICAL SOCIETY.

THE Second Ordinary Meeting for this Session of the above Society was held in the Medical Institution, on Tuesday evening, November 17th.

Dr. WAITE, the President, was in the chair, and there was a good attendance of members present.

The Hon. Secretary read the minutes of the last meeting.

Mr. Tindal, L.D.S.Eng., was elected a member of the Society.

Mr. ROSE presented two casual communications. First—An impacted upper central, very faulty in the enamel, and root only half developed ; removed from a cyst by Dr. Newbolt from a boy, aged 11½. Second—Model taken from a young lady, aged 23 ; the lateral incisor suppressed, and in its place the canine, and the temporary canine, *in situ*, quite firm and strong.

Mr. COUNCELL showed a very useful bite frame, of his own pattern, made out of perforated zinc ; also the root of an upper bicuspid that had undergone a certain amount of absorption, the tooth had been replanted for the patient some years previous to removal.

Mr. PARSONS handed round a model showing great deformity through wearing a suction disc.

Mr. BATES brought forward a case of perforation of the apex of a root in preparing for a pivot. A discussion took place among the members as to the relative merits of sponge-grafting or guttapercha in such a case.

Mr. NIXON showed a very interesting model of dilaceration in the lower central incisors, their crowns were lying almost horizontal with the cutting edge presented to the lip. There was a history of the patient having run the blade of a pair of scissors into her gum when she was about three or four years old.

Mr. DICKIN (Southport) brought forward the following case.—Some time ago a lady patient, who has several pivot teeth, had the misfortune, while away from home, to break the face off the upper right lateral crown. The dentist whom she consulted put in a Balkwill tube and split pin to the new crown. Shortly after her return home the patient came to see Mr. Dickin about an abscess which had formed at the root. By removing the crown (which was an easy matter, thanks to the split pin) he was enabled to dress the root and pass fluids through the fistulous openings on the gum, and

effect an apparent cure. But when from home again, a swelling came under the right eye, which could not be reduced by cold water applications, and the root being free from any tenderness, the patient had the impression that the swelling could not arise from anything dental; she being anxious to keep the root if possible. So, without telling him, she consulted her medical attendant, who thought there must be some eye affection, and advised opening the swelling, expecting to find diseased bone, though he found none. Then, the patient having drawn his attention to the removable crown, she came again to see Mr. Dickin, who decided that the root must come out. After its removal a piece (about one-eighth of an inch) of a broken nerve extractor was discovered protruding through the apex, the root was dilacerated, and showing a perforation at the bend, which must have been caused by drilling out the pin of the first crown, and preparing for the second. The openings at the side of the root accounted for the way Mr. Dickin was able to dress the root. Fortunately the surgical operation had been skilfully done and now there is only the slightest mark on the face, and all the other symptoms have long since disappeared.

The PRESIDENT then called upon Mr. R. Edwards for his paper, entitled "Pain." (See page 537).

After a very hearty discussion, in which most of the members present took part, Mr. Edwards was thanked for his contribution, and the meeting was adjourned.

Mr. Dall, of Glasgow, has promised to give a Lantern Demonstration on his Methods of Inlays for the next meeting, to be held January 15th, 1897.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

AN Ordinary General Meeting of the Society was held on Monday, November 16th, the PRESIDENT (Mr. J. F. Colyer) in the chair.

Some very excellent microscopic slides exhibiting the structure of the tooth pulp were shown by Messrs. W. J. May and Miller.

On Casual Communications being called for—

Mr. HEATH brought forward the case of a man who came to this hospital last week with ulceration extending round the gum line in both the upper and lower jaws. His breath was fœtid and foul. Both his wife and his child suffered in the same way. Mr. Turner had diagnosed the case as one of ulcerative stomatitis.

Mr. WALLIS showed and presented to the Society the model of the upper jaw of a patient. Two supernumerary teeth, simulating bicuspids, were present, and were situated external and anterior to the second molar tooth at either side.

Mr. GABELL brought forward a motion to alter Rule 23, and so change the time of meetings to seven instead of eight.

An amendment was proposed by Mr. HEATH and seconded by Dr. MILLER, that the time should be half-past seven.

This amendment was put to the meeting as a resolution and carried by more than two-thirds of those present.

Mr. GABELL also proposed to alter Rule 33, whereby any member holding Dental, Surgical or Medical Diplomas was not qualified to compete for the Students' Society prize. He suggested that the words "Surgical and Medical" should be struck out.

Mr. MANNING proposed as an amendment that any man who entered for his full course at the hospital should be allowed to compete, provided he did not hold a registerable dental qualification.

Mr. H. LLOYD WILLIAMS seconded this amendment.

The amendment was put to the Society as a resolution, and carried by the necessary majority.

The PRESIDENT then called upon Mr. Barnard for his paper on "Adaptive Modification of Teeth." (See page 542).

In the discussion which followed—

Mr. GABELL thanked Mr. Barnard for his excellent paper, and said that Mr Barnard seemed to say that there were opposing evolutions.

Mr. MAY said that someone had suggested that the reason that the female sus-barbirussa had not got long canines was because it always walked behind and with its snout between the hind legs of the male.

Mr. MORRIS asked if any trace of a diastema had been found in the jaws of men ?

Mr. BARNARD briefly replied.

The PRESIDENT then proposed a vote of thanks to those gentlemen who had taken part in the evening's proceedings, and announced that Mr. Padgett was unable to read his paper on December 14th, and that a Clinical Evening would be held on Monday, November 30th, at 7.30 o'clock.

The proceedings then terminated.

THE DENTAL RECORD, LONDON: DEC. 1, 1896.

THE RECENT EXAMINATION.

THE recent examination at the College of Surgeons of England has been disastrous to many candidates. The official list is not yet published; but the percentage of passes is not, we understand, so high as at some recent examinations. We have already pointed out in a previous issue that the ratio of failures to successes is lower for the L. D. S. Examination than for any other that this College conducts, and it may well be, with a much increased standard, that we must not expect this low percentage to be maintained. At the same time it must not be forgotten that those schools, which send up all their men for this examination, cannot expect to have so high a percentage of passes as those, which only send up their best men, the others reaching their qualifications through some wider portal. Not that we would belittle the success of any school, say of Liverpool, which with seven passed out of nine candidates took the lead, we fancy, at this recent examination. This was the more creditable seeing that the men were wholly taught at this school, a fact of which the teachers may be proud. But this does not affect the argument we have mentioned, for this must be taken into account when comparisons (which, as usual, are odious) should be made between schools engaged in friendly rivalry. With regard to the character of the examination itself, we may, in passing, note a want of precision in the wording of, at any rate, one of the dental questions, thus turning a test into a riddle; and it may well be doubted whether, in an examination whose rationale is to ensure the training of practical dentists, a question on trituberculism is of any practical good. It is interesting, believed by some, disbelieved by many, and at best a theory, which may possibly appear ridiculous to our children. Surely there are enough facts in Dental Anatomy of which to question

without wandering into the realms of speculation. In the *vica voce* the questions in General Anatomy seem to have been unusually wide of the head and neck. We can believe that such questions may be but slightly taken into account in awarding marks. Two reasons may be assigned for their being put. First to give a fictitious value to the standard of the examination; secondly, to act as a warning that in future the questions will be wider in character. Taking the second as the probable explanation, it raises a point of considerable importance to intending candidates. The curriculum enforces the attendance on a course of lectures on General Anatomy, and it is obvious that if this course is attended intelligently simple questions should present no difficulty. But it must be remembered that anatomy is, to a large extent, a question of memory, and the memory, like a lawyer, needs constant "refreshers"; hence, if these questions are to be expected, the final work of preparation becomes much more arduous. This brings back the question whether, if such be the case, the recent changes in the curriculum and examinations for the dental diploma have been judiciously made. We have already expressed the opinion that in one direction they have not. We urged that Anatomy, both General and Dental, should have been separated from the final examinations, which, under the new scheme, as of old, touches on many things, but allows the mastery of none. It must not be forgotten that the changes were made at the instance and under the advice of this same body of examiners, and if they now purposely enlarge the scope of the subjects, they may, perhaps, be acting within the letter of the stated curriculum; but they increase the objections to this same curriculum, which in their wisdom they have not seen fit to mend in this direction. One other rumour reached our ears as an explanation of the questions now under discussion: it was that the men had not been as regular in attendance on general lectures as they should have been. Hence the rod of chastisement. We mention this to express disbelief of it, for it is no part of the

examiner's duty to go behind the scenes of the work of preparation. Nor can we believe that those who sign the certificates would do so were they not assured that their action was right. To sign the certificate of a man as having done work which he has not, is, to say nothing of the moral obliquity of the action, so unkind a deed that we cannot well believe it happens. It would be unkind because it allows a man to meet an engagement to which he is not equal, and because others, seeing delinquencies are winked at, will fail to work when otherwise they might.

News and Notes.

THE following gentlemen having passed the necessary examination of the Royal College of Surgeons in Ireland, have been granted the License in Dental Surgery of the College:—A. G. Hudson (Leominster); S. R. Lane (London); J. Leventon (Dublin); R. Sievers (London); W. G. T. Story (Dublin). The following gentleman passed the Primary Dental Examination:—F. H. G. Pakenham (Dublin).

THE following is the list of Officers of the Birmingham Dental Students' Society for 1896-97:—*President*—Mr. J. Dencer Whittles; *President-Elect*—Mr. A. T. Hilder; *Ex-President*—Mr. Percy T. Naden; *Treasurer*—Mr. A. W. Shedden, 5, Belvidere Road, Walsall; *Secretary*—Mr. H. Percy Joscelyne, "The Bank," Redditch; *Committee*—Mr. C. C. Wood, Mr. E. E. Turner, Mr. C. H. Howkins. An interesting list of Papers has been promised. The following are the dates of Meetings:—(1896) November 26th; December 17th. (1897) January 28th; February 11th and 25th; March 25th.

WE understand that Lord Kinnaird has accepted the position of Trustee to the Dental Hospital of London, Leicester Square, and seeing that Mr. F. A. Bevan is another Trustee, we may well hope that the appeal now being issued for funds for the new Hospital, will meet with public approval.

FEDERATION is the order of the day, and many thinkers in the States are urging the need of a national dental organization. There are

at present many societies, some confined to certain States and others embracing larger districts; of the latter we may instance the Southern Dental Association, in the Gulf region; the American Dental Association, in the Atlantic region, and the Pacific Coast Association. The effort to fuse so many interests will prove a hard nut, but we wish our cousins success in their efforts to crack it.

THE resignation of the Treasurer of Guy's, Mr. Lushington, and the appointment of his successor, Mr. Cosmo Bonsor, will, it seems, be accompanied by changes in the system of management. Hitherto the Treasurer has resided at the hospital, and has been, we believe, a more or less autocratic official. Coincident with the formation of the new Sustentation Fund, the public will be given some direct control over the affairs of this hospital, and the Treasurer will cease to be a resident therein.

THE death of Sir B. W. Richardson is a matter for universal regret. The details of his distinguished life have been so freely published and commented on in the daily papers that it is needless for us to repeat them here, but it is well to recall the fact that Sir B. W. Richardson was a frequent contributor to the Odontological Society's papers, and that years ago he held official position in the now defunct College of Dentists. He was, indeed, one of its examiners. We share the loss which is felt by the general public, but we also lose one of those figures who served to connect us with the period of Reform now a generation since. We are pleased to note that the President of the Odontological Society attended the memorial service in his official capacity.

NATIONAL DENTAL HOSPITAL.

THE Annual Dinner of the Past and Present Students of the School of the National Dental Hospital took place on the 27th ult., at the Holborn Restaurant. Mr. Frederick Treves presided, and was supported by Mr. Tomes, Alderman Rymer, Professor Bradford, Professor Herbert Spencer, Mr. S. J. Hutchinson, Mr. Frederick Canton, and a numerous company.

The CHAIRMAN, in proposing the toast of the evening, "The National Dental Hospital and College," said it was impossible on

any occasion similar to the present to avoid the speculation why, in all civilized countries, anything that had to be celebrated was celebrated by eating, whether it was the opening of an hospital or the closing of a bogus company ; and even beyond the confines of civilization the custom not unfrequently prevailed, for the coming of a new missionary was made the occasion of a dinner, which also signalised his departure. But if the custom of public dinners were indefensible, speaking generally, it must be admitted that no body of men had a better excuse for dining together than dentists, for they met to use their teeth. Although circumstances had prevented his accepting the invitation of their Dean, Mr. Sidney Spokes, to visit the hospital a few days ago, he was not so ignorant of the work it was doing as might be supposed ; he knew of its admirable position and of the good work it accomplished, and he had a keen notion of the work done by the school. Some institutions had a great desire to be big ; he took it that the ambition to be large was not a very lofty ambition. The National Dental Hospital did not want to be big, but it did want to be good. Referring to the quite remarkable progress which had been made by dentistry and dentists within comparatively the last few years, he thought it would be allowed that surgeons, who were themselves engaged in the practice of a handicraft, were well qualified to judge of that progress, and he did not believe that the dental profession was so well appreciated by any body of men as the London surgeons. He would like to be able to bring home to dentists how much general surgeons owed to them ; it was extraordinary how many maladies were due to the want of a good set of teeth. He could give them many instances, but he would only mention one : a lady with a glandular swelling spent quite a gigantic sum of money in her endeavour to get cured : she tried a variety of remedies, and visited a number of watering places and Spas without any benefit, and finally she went to a dentist who put her teeth in order and the swelling of the glands disappeared. He felt that a very great good would accrue to patients if dental surgeons and general surgeons were more closely in touch with each other. He often heard people talk about cheap dentistry ; he had the impression there was no such thing as cheap dentistry—cheap dentistry was not dentistry. He did not think that dental surgeons, as compared with general surgeons, were overpaid. It was surprising that patients who would

cheerfully give five-and-twenty guineas, or more, for an instrument, professed amazement at a like sum for a set of teeth. The dentist, he believed, did literally more for his remuneration than did any other surgeon. He could not help thinking that the progress of the art and science of dentistry had raised the expectations of the public; what people expected from teeth now goodness only knew: they expected them to be absolutely indistinguishable from the real thing, they must enable the most senile old dotard to speak well, and digest well. It was said that there is a place far away in the future where there will be "weeping and nashing of teeth," it was impossible to say to what extent it depended on the dentist of to-day to realize the fulfilment of the prophesy. He could not help being reminded of the story of the lady visiting in the village, rebuking an edentulous old woman on her evil courses, and warning her, if she did not mend her ways, she would certainly go to a place where there would be weeping and nashing of teeth, whereupon, the old dame, showing her toothless gums, said, "let them nash as has 'em." Referring, in conclusion, to the alterations recently made in the regulations for the L.D.S. examinations by the Council of the Royal College of Surgeons, the Chairman gave the health of the Natio al Dental Hospital and College coupled with the name of the Dean, Mr. Sidney Spokes.

Mr. Sidney Spokes, in reply, said he would confine himself to the points touched upon by the chairman, However gratifying it might be to know the dental handicraft was appreciated by the consulting surgeon, there was still a great deal to be wished for from the ordinary general practitioner; to take only one instance, the general practitioners throughout the country were often called upon to administer nitrous oxide gas for dentists, and until they learned to distinguish between the legal and the illegal dentist the state of things could not be regarded as satisfactory; then the chairman had alluded to the growing appreciation by the dentist of general pathology and medical knowledge, that he thought was a thing which was being more and more appreciated year by year. In the past the student had merely to be signed up as having attended the lectures on those subjects; but in the future, under the new regulations, he would have to go through the test of being examined in them also. The Chairman had led his audience to anticipate that he (the Dean) would say a great deal about the National Dental

Hospital, but he did not propose to do so, he would only say that it was going on as well as might be expected. With regard to the accommodation, they had good elbow room, good light, good warming, and so on. He did not think they need wish to be a very large school. They had room for about 50 students, and until some half-dozen had qualified at the recent examinations they had about 40 students. There was one point in connection with the number of students in relation to the hospital as a charity, and that was the difficulty of getting through the immense amount of work of adequately providing for the patients; they wanted 50 students in order to cope with this difficulty, and when that time arrived they would have reached their millennium. He would say that the authorities had determined to do all in their power to keep out the patients who had no business to be there—he meant those who could pay, and ought to pay, for the services of the private practitioner. With respect to the present day student, he came to them precisely in the same way as the student of the general medical schools; he had to face the same preliminary arts examination, nd was drawn from the same class of society. As the Dean, he as perfectly satisfied with the gentlemen who were entering the school. In referring to the changes in the staff, the Dean alluded to the untimely death of Dr. Lapraik, and the great loss the consulting staff had sustained in the death of Sir Benjamin Ward Richardson. He again thanked the chairman for the kind way in which he had proposed the toast, and those assembled for the reception they had accorded it; if anything was needed to spur the student on in his work, the response afforded to the toast would be the means of doing so.

Alderman RYMER proposed "The Past and Present Students." When he saw a number of gentlemen before him, some of them practising their honorable calling to success, and others aspiring to do so, and when he saw them presided over by one of the most eminent surgeons of the day, he could not help contrasting the profession of to-day with that of 40 years ago. In lightly touching upon the Reform period, he spoke of the late Sir Benjamin Ward Richardson as one of the most prominent and active supporters in the movement. It was a great and generous heart that had ceased to beat. He had known him intimately for 40 years. Sir Benjamin Ward Richardson had great abilities, was a hard worker, and had a

wonderful memory ; this combination of qualities enabled him to acquire an immense amount of knowledge, which it was his greatest pleasure to impart to others and tell them how best to apply it. He concluded by wishing the students God Speed and every possible success in the future, coupling with the toast the name of Mr. Frederick Rose (of Liverpool), and Mr. Browne-Thomas who responded.

Mr. E. W. Roughton proposed the "Visitors," and Mr. Tomes responded.

Mr. George Cunningham gave the health of the "Chairman," who, in a happy and humorous reply, spoke strongly of the need of direct representation on the Medical Council, and warmly advocated it as the right of the dental profession. He regarded it as an anomalous state of things that the profession should be practically controlled by the Council and yet have no voice at its Board.

Songs were contributed by Mr. Alfred Smith, Mr. Rushton, and Mr. Browne-Thomas ; a violin solo by Mr. E. W. Roughton ; and recitations by Mr. Genet and Mr. C. W. Glassington.

GENERAL MEDICAL COUNCIL.

The Winter Session of the General Council of Medical Education and Registration was opened, in the offices of the Council, Oxford Street, London, on Tuesday, November 24th, when Sir Richard Quain presided, and there was a full attendance of members. The President, as usual, opened the Session with an address, in which, among other things, he announced that reports of the visitation by Mr. Charles Tomes of the examinations of the four bodies granting a license in dentistry would be submitted in the course of the Session. The Council, he said, was greatly indebted to Mr. Tomes for the great pains he had taken in the preparation of the reports, and for the ability therein displayed. One could not help feeling, he added, that each of the licensing or qualifying authorities might derive useful information from a perusal of the reports. The President also announced that a report on the whole subject would be presented by the Dental Education and Examination Committee.

Charge Against a Dental Practitioner.

At the meeting of the Council on Thursday, November 26th, further consideration was given to the case of Clement Henry Sanders, who, during the Summer Session of the Council, was charged "that being a duly registered dental practitioner, you act as cover of and by lending your name and assistance, enable an unqualified and unregistered person named Müller to carry on a dental practice and to practise dentistry and dental surgery in all respects as if he were a duly qualified dental practitioner." When the charge was investigated in June the Council found it proved, but adjourned the further consideration of it until the present session.

Mr. Sanders appeared before the Council represented by Mr. Johnston Watson, while Mr. R. W. Turner appeared for the British Dental Association.

Mr. Farrer, solicitor to the Council, explained that Mr. Sanders had been employing an unqualified person at his practice in Exeter, while he himself was carrying on practice at Aldershot, and that when the matter came before the Council last June they gave him time to appoint a qualified man to conduct the practice at Exeter, and Mr. Sanders was present to say whether he had complied with the direction of the Council.

Mr. Sanders, interrogated by Mr. Farrer, said he had employed a duly qualified dental practitioner named Bolpe for the Exeter practice, and Müller, the unqualified person mentioned in the complaint, was now employed only as a mechanic. He was quite prepared to give an undertaking not to employ an unqualified person in the future.

Mr. Turner said that the British Dental Association quite recognised that this was the first case of the kind brought forward, but they wished it clearly understood that there was to be, what he would describe as no humbugging, about the terms operating and acting as a mechanic. If this were clearly understood then the Association would have nothing more to say.

Several members of the Council then addressed questions to Mr. Sanders, and, in reply to these, the latter said he did not wish, nor did he intend, to employ any unqualified person for operating purposes, while in the matter of administering anæsthetics he employed a qualified medical man.

The Council sat in private for some time considering the matter, and when the public was re-admitted, the President announced that the Council had come to the conclusion not to adjudge Mr. Sanders guilty of "infamous conduct in a professional respect," but they wished to caution him that in future he should be extremely careful and should not employ an unqualified assistant.

Mr. Sanders thanked the Council, and said he had already given this undertaking.

Abstracts and Selections.

PART OF THE SECOND LECTURE ON THE STUDY OF ANATOMY AND ITS APPLICATION TO THE PRACTICE OF MEDICINE AND SURGERY.

Delivered at Guy's Hospital, by W. Arbuthnot Lane, M. S., F.R.C.S.

The body of the same labourer illustrates in a wonderful manner a function which the organism possesses. I refer to its capacity to form a perfectly new mechanical arrangement, or to produce a modification in an already existing one where it is obviously of great advantage to it to possess it. The sweated shoemaker, as he sits daily for twelve—and probably a larger number of hours—sewing, holds his head in a sloping position, so that it is tilted obliquely to one side. It would obviously be of the greatest service to him, in that it would relieve him very considerably of muscular strain in fixing his skull during the abrupt and powerful movements he is

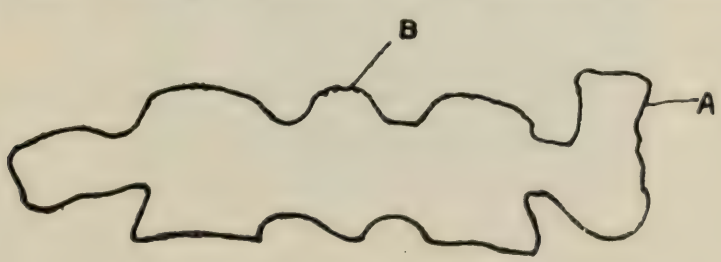

Fig 1 represents the anterior aspect of the atlas, showing the prolongation upwards of the anterior arch from the margin of the odontoid facets which develop in consequence of habitual and excessive pressure—B; also the large quadrilateral mass of bone projecting from the upper part of the lateral mass referred to in the text—A.

constantly performing, if he had projecting up from the upper surface of the lateral mass of the atlas, on the side to which his skull is tilted, a pillar of bone which articulated with the jugular process of the occipital bone, and formed with it a secure joint through which much of the superjacent weight is transmitted. This is exactly what takes place, and these diagrams illustrate the condition of the atlas and of the occipital bone. (Figs. 1 and 2.)

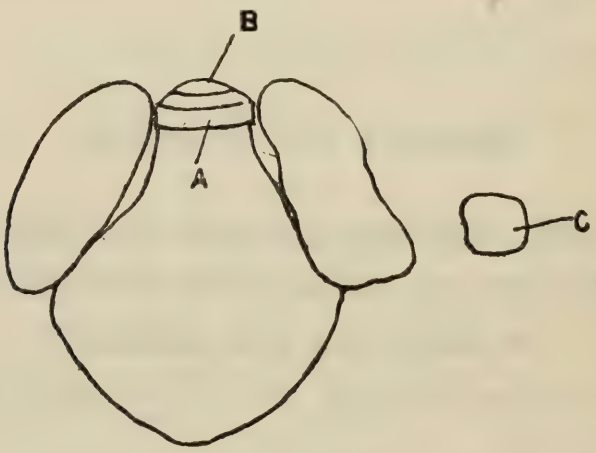

Fig. 2 shows the foramen magnum and condyles of the occipital bone. B indicates the groove which received the sharp free edge of the articular facet on the atlas. A, a transverse ligament which lay behind this upward prolongation, and C the facet on the under surface of the jugular process which articulated with the column on the lateral mass of the atlas.

This represents a new formation quite independent of any pre-existing joint, and therefore serves my purpose in demonstrating this function very clearly to you. Yet, though this exists independently of any joint, if you examine the various changes that take place in the several joints in the labourer and in the subject whose mechanics have been altered by disease of bone or joints, or by fracture of a bone or bones, you will find the same law in evidence everywhere.

We take advantage of this law very largely in surgery. Occasionally the temporo-maxillary articulation becomes ankylosed in consequence of some septic infection, either from its becoming involved in some adjacent inflammatory process or because of its infection through the circulation as part of a pyæmic process. In such cases the articular and interarticular cartilages are destroyed, and the condyle of the jaw becomes united by bone to, and is practically continuous with, the temporal bone. The jaws are fixed on one another in the position in which they are normally closed, so

that the molars and bicuspids come into accurate apposition, while the incisors of the lower jaw project into the roof of the mouth considerably behind those of the upper jaw. The patient is therefore only able to swallow food of a fluid consistence. If ankylosis takes place early in life the portion of the jaw represented by the condyle and neck becomes very broad and thick, and also shorter than its fellow. The jaw not performing its normal function does not develop in the same proportion as the rest of the bones of the face, so that the chin loses altogether its normal prominence. The lower incisor teeth, missing the habitual pressure exerted by the upper incisors in biting the food, become abnormally long, and project into the mucous membrane of the roof of the mouth, so interfering still further with the introduction of food. This difficulty is even more exaggerated by the over-growth of the upper incisors from the same causes.

The treatment of such a condition consists in cutting down upon the temporal bone and upon that portion of the jaw which is

Fig. 3.

continuous with it, and in cutting away a piece of bone from the junction sufficiently large to enable the mouth to be opened. Within a few days of the operation the child is encouraged to bite and chew, and by the mutual friction of the bones upon one another they alter in form, become covered by articular cartilage, and a

synovial membrane is developed. In this manner a perfectly new joint is evolved, and it performs the function of the normal temporo-maxillary articulation more or less perfectly. Perhaps I will interest you more in the manner in which such a joint is formed if I illustrate it by the report of a case, its treatment, and the result obtained.

E. H., aged 13, was admitted under my care into Guy's Hospital in September, 1893. When 18 months old she was stung on the left upper eyelid. Much inflammation of adjacent parts followed, with free suppuration, some of the skin of the lid with the subjacent orbicularis muscle coming away in the slough. Shortly after this it was noticed that the child could not open her mouth, and much difficulty was experienced in feeding her. On admission the face was much deformed by the fact of the lower jaw being very ill-developed. It was immovable on the upper jaw, and the incisor

Fig. 4.

teeth of the lower jaw were very long, and projected into the roof of the mouth, pressing on the mucous membrane. (Fig. 3 represents her condition at this time).

Chloroform was administered on September 19th, when it was found necessary to open the trachea at once, as the tongue fell back and occluded the upper aperture of the larynx. After considerable difficulty the upper part of the ramus of the jaw and the portion of the temporal bone continuous with it were removed. There was no indication of the presence of the original joint. Owing to the angle of the ill-developed jaw coming into contact with the front of the spine, it was impossible to obtain a greater interval than $\frac{3}{4}$ inch between the teeth. This afterwards increased to an inch. Associated with the more perfect development of the new joint, the lower jaw increased in size so that the present condition, as shown in Fig 4, though still very deforming, is not nearly as striking as it was originally. Here you have developed during a fraction of the lifetime of the individual a perfectly new mechanical arrangement having all the structure and functions of a moveable joint, the only foreign factors which determined its development being movement and pressure of bony surfaces on one another, the organism itself providing the necessary structures under their influence.

I will now show you how a bone will vary in form in a normal subject when its functions change at different periods of life, and the lower jaw again affords as good an illustration as any. This bone in the infant performs no function other than that of moving forwards and backwards upon the temporal bone during the process of sucking. If you examine the temporo-maxillary joint of the infant you find it possesses a fibro-cartilage and two synovial cavities, the condition differing from that of the adult in that the head of the bone is less developed and is flatter on its upper surface, the eminentia articularis is less prominent, and the fibro-cartilage does not present the same variations in thickness. These are just such differences as you would expect to find between the joint of the infant which is arthrodial or gliding and that of the vigorous adult which is ginglymoid or hinged in character.

The jaw of the adult is very large and strong, and the angle has quite lost the obtuseness of the infant and approaches a right angle in size. This is the result of traction exerted upon this part of the bone by the very powerful masseter muscles in forcibly approxi-

mating the teeth in biting, this movement being absent in the edentulous infant, while the general density and strength of the bone is consequent upon and varies directly with the amount of pressure it sustains in mastication.

The head of the bone is large and convex from before backwards, the eminentia articularis is very prominent, and the fibro-cartilage is dense and strong, and varies in thickness, so that when the jaws are separated, it forms a suction socket for the head on the eminentia articularis, while in the lateral gliding movement of chewing it forms a smooth elastic surface on which the head of the bone moves. It also serves another very important function during chewing or scrunching of hard food, in that it acts as a buffer, breaking the abruptness of force transmitted suddenly through the jaws. You observe that the condyles of the jaw bear a very important relationship to the brain, any constant succession of jars upon which might result in damage to this very sensitive organ. The pugilist is thoroughly cognisant of this fact, and finds that he can most effectually knock out his opponent by striking him under the jaw. The amount of force required to do this is comparatively small as compared with the strength of blows usually delivered, but the whole of the force is transmitted through the condyles of the jaw to the skull and brain within a very limited area.

Let us pass on to the examination of the jaw of the edentulous subject. The angle again becomes obtuse since the factor which diminished its size, namely, the severe and habitual strain exerted by the masseter muscles has ceased to exist. The alveolar process has disappeared since the mechanical conditions that determined its development and continued existence, namely, the presence of the teeth, no longer exert influence upon it. What are the functions performed by the edentulous lower jaw ? They consist in gripping the material between the gums and in breaking it up as much as possible in this manner. Every one of you must have seen such a subject eating, and must be familiar with the great freedom of movements of the lower jaw upon the upper in a horizontal plane. The anæsthetist is fully aware of this. The jaw of the vigorous adult as a lever of the third order differs altogether mechanically from that in infancy and edentulous old age.

This movement results in a complete alteration in the anatomy of the temporo-maxillary articulation as it exists in the vigorous

adult. The head of the bone becomes flattened on its upper surface, the fibro-cartilage is first perforated and then removed, and the eminentia articularis is flattened. If the nutrition of the old subject becomes very much impaired, the head of the bone and the flattened glenoid cavity become deprived of articular cartilage and then the opposing surfaces of bone, by their mutual friction, are gradually rubbed down and altered still further in form apparently by a process of decalcification and fibrillation.

Each condition of joint is perfectly normal to the subject at a certain period of life. What variations exist result simply and solely from changes in the physiology or function of the part. You can readily understand that, if such a considerable change takes place in the normal subject during a portion of a lifetime in obedience to mechanical factors only, enforced alteration in diet will readily produce such differences as exist in the jaws and dentition of animals which are closely allied, as, for instance, man and the higher apes. In other words this helps to substantiate the truth of the view I would place before you, and which I hope to strengthen by subsequent evidence, namely, that the sole factor in evolution is a mechanical one.—*British Medical Journal, to whom we are indebted for the use of the blocks.*

FOREIGN BODY—PLUM SEED—IN THE ŒSOPHAGUS: PERFORATION INTO PLEURAL CAVITY.

C. W. Richardson (*Nat. Med. Rev., 1896, vi., 17*) reported the following case :

The child was four years old. Eight days before the patient was brought under observation it was said to have swallowed a plum seed. The child was well nourished and active for its age. The mother states that while feeding her child with preserved plums she observed that there was considerable difficulty and then inability to swallow the food.

On succeeding days the inability to take food was followed by rapid emaciation, great restlessness and indications of febrile reaction. The desire to take food and drink was constant, and all efforts on the part of the little one were in vain. Food was immediately ejected and liquids returned through the nasal passages.

It was emaciated, showing marked evidence of a septic condition. The examination of nose, pharynx and larynx gave negative result with regard to the possible location of a foreign body. It was interesting to note the little one's effort to aid in every way in these examinations. The inspection of the pharynx and larynx was rendered somewhat difficult on account of the great amount of pus that was constantly welling up, apparently from the œsophagus. When the child was given water to drink it was interesting to note that it was immediately regurgitated through the nostrils ; the child continuing to drink with the stream of pus and water returning into the glass from which it was drinking. The column of water evidently passed onward to the seat of obstruction and then returned up the pharynx and through the nasal chambers. It now became evident that the seat of obstruction was high up in the œsophagus. At the first attempt to pass a small sound, after passing about three inches below the cricoid cartilage, the sound was firmly arrested. The breath had the sweet alcoholic odor of sepsis.

The next day the sounds were passed without difficulty and without meeting any obstruction ; nevertheless the obstruction to food and drink was as great as ever. On account of the possible location of the foreign body, of the inability at this second examination to locate it, and from the desperate condition of the child, it was decided that endoœsophageal or external operations were not to be considered. The child died early Tuesday morning.

Postmortem.—Rigor mortis was moderate and the body emaciated. The thorax was opened in the usual manner. Left side of thorax was first exposed. Left pleura, lung, pericardium and heart were normal. Right pleura discoloured and filled with pus. Right lung collapsed. On exposing œsophagus it was found to be intact throughout its whole course. It was then divided at the diaphragm and dissected away. On raising the tissue up, when between about the third and fourth dorsal vertebræ, the seed dropped into the right thoracic cavity. It was not possible afterwards to locate exactly which of two rents in the œsophagus the foreign body came through. It is quite evident that the irritation of the seed set up an inflammation of the œsophageal wall which terminated in the formation of an abscess which ruptured into the pleural cavity.—*Pediatrics.*