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DENTAL RECORD:

A

MONTHLY JOURNAL

OF

DENTAL SCIENCE, ART, AND LITERATURE,

DEVOTED TO THE INTERESTS OF THE PROFESSION.

EDITED BY

W. H. DOLAMORE, L.R.C.P., M.R.C.S., L.D.S.

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INDEX.

Description of Plate VIII.

Fig. 1.—This and the accompanying figures are intended to shew three of the chief varieties of dentine. *Osteo-dentine.*—Longitudinal section of an anchylosed tooth of the pike (Esox lucius), decalcified: stained carmine: 1 inch objective and A ocular: shews (*a*) free surface of dentine: (*b*) osteo-dentine: (*c*) inter-trabecular spaces: (*d*) bone of attachment.

Fig. 2.—*Plici-dentine.*—Transverse section of a tooth of the basking shark (Selache maxima), decalcified: stained carmine: 2 inch and A ocular: shews (*a*) folded free surface of tooth: (*b*) large tubes: (*c*) pulp chamber soft tissues not retained: (*d*) plici-dentine.

Fig. 3.—*Vaso-dentine.*—Longitudinal section of a tooth of the hake (Gadus merlucius), prepared by the author's process: stained picro-carmine: $\frac{1}{4}$ inch and A ocular: shews (*a*) free surface of tooth: (*b*) vaso-dentine: (*c*) naturally injected capillaries traversing canals in dentine (Tomes' thorn-like processes of canals not shown): (*d*) layer of connective tissue fibre bundles: (*e*) pulp tissue.

PLATE VIII

Fig. 1.

Fig. 2.

Fig. 3.

A. Hopewell Smith del.

West Newman

THE DENTAL RECORD.

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Original Communications.

DENTAL MICROSCOPY.*

BY

Mr. A. HOPEWELL SMITH, L.R.C.P.Lond., M.R.C.S.Eng., L.D.S.Eng.

(Continued from page 530.)

ON PHOTO-MICROGRAPHY.

THE drawing of an object made with the help of a camera lucida, or reflector, is obviously in many respects incomplete, no matter how skilful the draughtsman may be. Such a diagram is not useless, for its chief points being brought into prominence, by this very lack of detail, its clearness may be more serviceable for teaching purposes than would an elaborate reproduction. But when an exact copy of a section is required the outline sketch fails, and the application to microscopy of photographic processes can alone produce the desired effect. Photo-micrography is the term applied to the art by which enlarged images of microscopic specimens are permanently recorded.

Use of Diagrams.

And of Photo-microscopy.

It is not possible, in a work like the present, to give a complete account of photo-micrography. The writer's aim, therefore, is merely to detail methods of working by which the beginner may obtain

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

satisfactory negatives and pictures of his dental sections. To amateur photographers the combination of photography and microscopy will be simple; but those who have no knowledge of the former will, at first, find it beset with many difficulties.

The subject may be considered under two heads, (A) a description of the necessary apparatus, and (B) methods of operating.

A.

Photographic Apparatus.

The room which the student intends to devote to photo-micrography should, if possible, be provided with arrangements both for taking photographs and developing plates. Spacious and well-ventilated, it should be situated in such a position in the house that no vibrations due to disturbances out of doors can affect the instruments, rigidity of apparatus giving freedom from tremor being a *sine quâ non*. Some workers prefer a concrete floor on which to place their tables. All windows should be fitted with wooden frames which are covered over with two or three thicknesses of orange or ruby coloured medium. The doors should close in such a manner as to exclude all light. A firm deal table, measuring about seven feet long by two or three feet wide, standing in the centre of the room, supports the baseboard of the camera at the height of three or four feet from the floor. There should also be a plentiful supply of cold water, a large table on which to place the developing and other dishes, and a dark room lamp.

Fittings of Room.

A very important piece of apparatus is the photo-micrographic *camera*. This is not of the usual form, but has a long bellows body. It should be adapted for taking either $\frac{1}{4}$-plate or $\frac{1}{2}$-plate

Description of Camera.

negatives—*i.e.*, pictures measuring $3\frac{1}{4} \times 4\frac{1}{4}$ inches, or $6\frac{1}{2} \times 4\frac{3}{4}$ inches. The accompanying figure illustrates its chief parts.

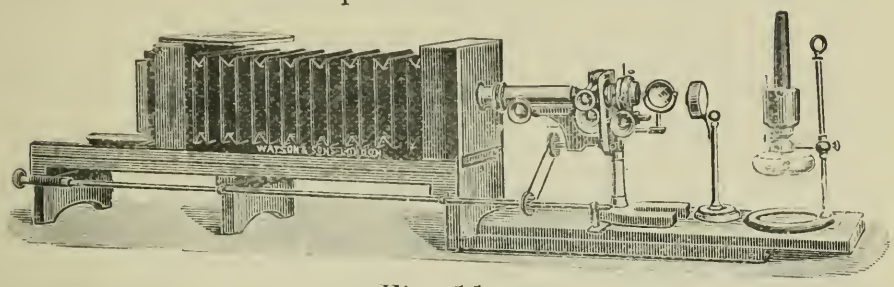

Fig. 11.

COMPLETE PHOTO-MICROGRAPHIC APPARATUS, SHEWING THE ADJUSTMENT OF THE PARTS.

The bellows body extends 30 inches or more, on a mahogany baseboard which has a scale let into it, so that the distance between the objective and plate may be accurately known, and the desired amplification of the object readily ascertained. The microscope, illuminant, and paralleliser (bull's-eye condenser) are placed on a projecting board at the fore part of the camera, the sliding front of which allows any microscope to be fitted to it. A rod running from back to front of the apparatus is attached to the grooved milled head of the fine adjustment of the microscope by means of a thin india-rubber ring, and allows fine focussing to be done when the student is standing at the back of the camera. A dark slide with two carriers for $\frac{1}{4}$ plate negatives, and three masks—circular, square, and oval, for making neat pictures, comprise the rest of the camera outfit.*

Any good *microscope* may be employed for photo-micrographic purposes. The advantages derived from the use of apochromatic lenses† are very great, *Lenses.*

* The ingenious student can make, with the expenditure of but little time and money, a camera suited in most respects for all his requirements.

† In apochromatic objectives, the fringe of colour or other aberrations of light, seen in the field when ordinary lenses are used, is practically abolished.

but objectives that have not been specially manufactured for photographic work may be used, and will yield excellent results.

If the actinic (optical) and visual foci are not perfectly coincident, they can be "corrected" at a small cost by any competent optician.

Source of Lighting.

The oxy-hydrogen limelight is by far the best *illuminant*, as the light which passes through the objective emanates from a mere point (approximately); but the student will find a paraffin microscopic lamp, with a flat wick very serviceable, especially if a small piece of camphor is placed in the oil, to render the light whiter and more actinic.

A bull's-eye condenser throws very nearly parallel rays of light on the section, and if centrally placed, illuminates it uniformly.

It is advisable not to use an eyepiece, the chief objections being a great restriction of the field of view, and marked loss of light.

Other Apparatus.

The accessory apparatus needed are glass stoppered bottles to hold the developing and toning solutions, a graduated glass measure, three or four ½-plate porcelain developing dishes, and a larger one to contain the "fixing" solution, and also several printing-frames.

B

Methods of Operating.

Preliminary Steps.—Having already placed a box of sensitive dry plates on the table and opened the dark slide, the student should light the dark room lamp, and turn the flame down so low as to give only a very faint illumination. Then standing some distance from the light, he should, as quickly as possible, put a sensitive plate in one of the carriers of the dark slide. The edges only of the plate must

Placing Plates in the Slide.

be touched, and its shiny non-sensitive side lie uppermost when in position in the carrier. In the course of time it becomes quite easy to transfer the plates to the slide in absolute darkness, a touch of the fingers at one extreme corner of the plate indicating which is its film side. If this transference is accomplished in the dark, so much the better, as there is then no risk whatever of "fogging" or injuring the sensitiveness of the film. The operation is repeated with a second plate, and the dark slide tightly shut and wrapped for a few moments in a black photographer's cloth.

Kinds of Plates.

The plates specially recommended for photomicrography are Edwards' "Isochromatic Instantaneous," or the Ilford "Isochromatic Medium" for using with stained sections. Ilford "Ordinary" plates answer remarkably well for unstained objects.

Arrangement of Instruments. — The body of the microscope is placed horizontally and the eye-piece removed. A piece of thin dull black or brown paper is then inserted in the draw-tube, to prevent the production of what is technically known as a "flare" on the sensitive plate. The draw-tube is fitted firmly to the front of the camera, the microscope stand being securely fixed to the projecting portion of the base board. The lamp is then brought into position; and the wick having been trimmed to make the edges of the flame parallel, it is placed opposite the substage condenser, with one edge of the flame turned towards it, in such a manner that the long axis of the flame and the optical axis of the microscope coincide—the centre of the flame exactly corresponding with the centre of the field-lens of the objective. The mirror should be turned aside, and the substage condenser used with high power objectives only. The student is recommended to employ

Illuminant.

nothing but his 1-inch objective, until the initial difficulties have been overcome. A bull's-eye condenser is now interposed between the illuminant and the section which has been clamped on to the stage of the microscope; it is then centralized, and the whole section evenly illuminated. The importance of centralization cannot be too much insisted upon. An examination of the ground-glass screen of the camera will show whether the lighting of the object is uniform; if it is not, the focus of the paralleliser must be altered, till the desired degree of brightness and uniformity is attained. The camera bellows are finally extended to the necessary distance, and a suitable mask placed in the end of the camera, so that the enlarged aërial image of the section is projected on the screen in the required form. Focussing is the next step: and this is accomplished by slowly turning the long focussing rod. When the image appears well defined, the ground-glass screen should be removed, and replaced by a piece of transparent glass, ruled with diamond cut lines, and a magnifier used to make certain that every portion of the image is perfectly clear and sharp. The circular edge of the image may appear out of focus; this will necessitate the employment of a diaphragm which will cut off the scattered rays of light, and give it a better definition. To counteract the diminution of intensity of the light, a longer exposure must be given.

Condensing the Light.

Focussing.

To prevent Blurring.

Exposure.—The student having satisfied himself with the sharpness of the image, must exclude the passage of all light through the microscope by means of a thick screen of black cardboard, which is to be placed between the lamp and bull's-eye, or section and objective if there is room. This being done, the dark slide containing the sensitive plates is substituted for the glass screen, care being taken

not to shake the instruments; the shutter is opened and the plate exposed by removing the cardboard screen. *Fig.* 11 shews the arrangement of camera and microscope when this stage has been reached.

Exposure.

The exact duration of exposure required to produce a strong negative is very difficult, at first, to estimate. No hard and fast rules can be laid down, though many attempts have been made; the student's carefully recorded experience will prove to be the only sure guide. The author has obtained excellent negatives by using Edwards' "Instantaneous Isochromatic" plates under the following conditions:—

Camera extended 24 inches, 1 inch objective used, no substage condenser, no diaphragm, ordinary lamplight: for hæmatoxylene stained sections—*exposure ten seconds*: for sections somewhat feebly stained with carmine—*twenty-six seconds.*

Ilford "Isochromatic Medium" plates will require under circumstances similar to those first named, 20 to 50 seconds, and Ilford "Ordinary," 4 to 10 seconds. It may also be stated that the image projected by a $\frac{1}{6}$-inch objective will require an exposure of 50 to 60 seconds, and $\frac{1}{12}$-inch oil immersion, 3 to 6 minutes. The beginner will be much assisted in his judgment of the proper length of exposure, by first experimenting with a few plates. He may adopt this plan:—

To obtain approximate duration of Exposure.

The shutter of the dark slide, on being drawn out a short distance, will allow only a portion of the plate to be influenced by the action of the light. This exposure must be timed in seconds by a watch. The shutter should be further opened and the time again noted, and the operation repeated at intervals of 5 or 10 seconds, till the whole of the plate is exposed. On subsequent development *one* portion

of the negative will probably be seen to have been correctly exposed, and the right length of time to give to similar sections thus ascertained.

Developing Negatives.—The plate having been exposed for the correct length of time, the cardboard screen must be again used to shut off rays of light, and the shutter of the dark slide immediately closed. The microscope lamp is then turned out, and the room faintly illuminated by the light from the ruby lamp. The negative is carefully removed from the dark slide and placed filmside uppermost in a developing dish, and then flooded with a developing solution.

Removal of Plate.

Developing Solutions.

Of developers there are many kinds—pyrogallic acid combined with soda or ammonia salts, hydroquinone, metol, amidol, &c. The formula given for use with Ilford plates is good, its only objections being that it stains the fingers if used carelessly, and it does not retain its properties for any long period of time. A stock solution consisting of pyrogallic acid 1 ounce and water 6 ounces, with the addition of 20 drops of nitric acid should have been previously prepared, and two separate solutions, made as follows, contained in labelled stoppered bottles :—

A.	B.
Stock Solution, 2 ounces. Water, 18 ounces.	Carbonate of Soda (Crystals), 2 ounces. Sulphite of Soda, 2 ounces. Bromide of Potassium, 20 grains. Water to 20 ounces.

Immediately before using, 6 drachms of A solution are added to the same quantity of B solution, and a colourless mixture results.

Removal of Stains.

Stains from this developer can be removed by the application of a weak solution of citric or hydrochloric acid : but as cleanliness of the hands and

fingers is a matter of great importance to the dental student, he is recommended to use hydroquinone. It has the advantages of not staining the fingers, can be used repeatedly, is suitable for plates and papers alike, and the negatives exhibit more detail, and are altogether softer than those obtained under like conditions, with pyrogallic acid. A convenient formula is :— *Hydroquinone: its advantages.*

A.	B.
Hydroquinone, 160 grains. Potassium Bromide, 30 grains. Sodium Sulphite, 2 ounces (Avoirdupois). Water to 20 ounces.	Sodium Hydrate, 100 grains. Water, 20 ounces.

For use, take equal quantities of each solution.

The developer is to be poured evenly over the plate so that all its surface may be covered at once. The solution is kept in motion by a rocking movement of the dish, which should be held at some distance from the light. An occasional rapid glance at the plate will suffice to tell how the development is proceeding; the criterion of complete development being afforded by the appearance of a faint black image seen *through* the glass, on the reverse side of the plate. *Development of Plates.*

The negative must now be removed from the developer, washed quickly under water, and at once placed in a bath of hyposulphite of soda, ½ lb., and water 20 ozs. After a few minutes, fixation is complete, and the negative can be examined in full light. *"Fixing."*

Copious washing of the negative should next take place, and the plate be afterwards put into a rack to dry. *Washing.*

Printing.—The clearness of detail observed in prints made on Ilford Printing Out Paper, or Eastman's "Solio" render these classes of papers

suitable for photo-micrography. The student is recommended to use these papers, and to follow the instructions, as to manipulation, suggested by

Toning Bath. the manufacturers. Toning in a bath consisting of chloride of gold, 3 grains; sulphocyanide of ammonium, 30 grains; and cold water, 18 ounces, should be allowed to proceed until marked contrasts between the blacks and whites are noticed.

Finishing Prints. *Final Treatment.*—A finished glossy appearance may be given to prints by adopting the following simple method:—A sheet of clear glass, free from scratches or other defects, should be thoroughly cleaned by brushing with soap and water. It is then dried, and French chalk powdered over it. This is removed by wiping with a dry clean rag, and the print, after having been soaked in clean water, is squeezed face downwards on to the glass, without excessive pressure, care being taken to remove all air-bubbles. If the print is then put into direct sunlight, it can be stripped off the glass, without sticking or tearing, at the end of two or three hours. Slip-in mounts are useful for holding the finished prints.

The Causes of Failure.

The chief causes that interfere with the production of satisfactory photo-micrographs, other than those arising from defective apparatus, may be here enumerated, and remedies suggested for the prevention of failure.

Sections. (1) The section may be too thick, or incorrectly stained, or improperly mounted. Only uniformly thin sections can be satisfactorily photographed—they must not be thick in some places and thin in others.

Correct Staining. The more commonly used stains for sections to be photographed may be divided into two classes—

good and indifferent. To the former belong aniline blue black, Bismark brown, and hæmatoxylene, especially when this is of a clear dark blue colour. Of the latter class, picro-carmine, eosine, and rubine are perhaps the best. The staining must not be too dense. In certain cases where objects present only shades of a single colour, the interposition of a coloured screen (which can be purchased at opticians) between the illuminant and the section, produces better negatives than the employment of isochromatic plates alone. The tint of the screen should be the complement of the colour of the stain—that is, one which nearly reduces the colour of the image to a neutral grey. Thus an orange tinted screen is to be used when a blue stained preparation is to be photographed. Picro-carmine gives good results alone, but is improved by using a light green screen. The length of exposure will, under these circumstances, be necessarily prolonged.

Correct Mounting.

The mountant should be colourless or nearly so. Canada balsam sometimes acquires a yellow tinge after having been kept for a long period, but it is the best medium to use. The section must be perfectly flat. It is advisable always to use a strong clip to press down the cover glass uniformly, immediately after mounting.

(2) There will be blurring of the image on the sensitive plate, if precautions are not taken to keep the apparatus firmly fixed, and free from vibrations. The cardboard screen should always be used.

Under and Over Exposure.

(3) Plates may be under or over exposed, by which is meant that negatives may either be lacking in detail, or "flat," that is, present no degrees of contrast. It is useless to endeavour to improve an improperly exposed negative, either by intensification or any other method. Experience alone will enable

the operator to judge the correct length of exposure: he must take into account the intensity of the illuminant, the size of the diaphragm, the power of the objective, and the staining of the section.

Developers. (4) The plates and developing solutions if old, will not yield such good results as if they are new. small quantities of both should be obtained at a time.

By careful attention to the foregoing details, the difficulties of making sharp, bright negatives should be removed.*

Method of ascertaining the amplification of an object. —The approximate camera magnification of an object may be learnt by means of very convenient rules suggested by Mr. G. P. Vereker in the *Photographic Quarterly*, Vol. III., No. 10. He writes:—"In using a microscope it must be looked upon as a double lens, or if the objective alone is used, a single lens. Many different magnifications can be got out of one objective and eyepiece. The initial power of the lens is found by dividing 10 (the nearest average distance of distinct vision in inches) by the focus of the objective. Thus 10 divided by $\frac{1}{4} = 40$, which is the initial power of $\frac{1}{4}$ in. objective. Multiply this by the power of the eyepiece, and the magnifying power of the combination results. Thus, if the eyepiece magnifies 5, the combination with the $\frac{1}{4}$ inch objective will equal 200 diameters.

Vereker's Rules.

If eyepiece and objective are used:—

Rule. As 10 is to the camera length, so is the microscopic amplification to that of the camera. Thus, if

* For a fuller account of the art, the reader is referred to Mr. Andrew Pringle's excellent work, "Practical Photo-micrography," 1894.

$\frac{1}{4}$ objective and A ocular are used, and the camera extends 12 inches, then :—

As 10 : 12 :: 200 : 240; magnification = 240 diameters.

If objective alone is used, the length of the microscope tube is added. Thus, if $\frac{1}{4}$ inch objective is used, and the microscope tube is 10 inches in length, and the camera extends 12 inches :— *Rule.*

As 10 : 12 + 10 :: 40 : 88; magnification = 88 diameters.

The rules above indicated are sufficient for the purpose of enabling the student to approximately compute the magnifications produced by any objectives he may employ.

CONCLUSION.

It need only be added that in practical dental microscopy, as in other scientific pursuits, common sense, thoroughness, attention to detail, and perseverance, will lead the enquirer to the not-far-distant goal of success; and instead of becoming a mere *dilletante*, he will develope into an enthusiastic worker in the science and art of dental microscopy.

A NEW PROCESS AND APPARATUS FOR CONTINUOUS GUM WORK.

By J. H. Gartrell, Jun., L.D.S.Eng.

Mr. President and Gentlemen,

When asked by our energetic secretaries to read a paper on "Continuous Gum Work," before this Society I was rash enough to accept the honour conferred, since then I have been able to contemplate some of the responsibilities of such a duty, and feel my inability to do justice to a subject of which we hear and see so little, but which is, notwithstanding, regarded by the profession as the

best method of constructing artificial dentures. Although it has been so long before the profession, and gives, when properly constructed, such excellent results, it has never been generally adopted. The difficulties connected with the construction, especially the firing of the gum body and enamel, appear to have been effectual dampers on the enthusiasm of those who have attempted this work. Several attempts have been made in the United States and this country to improve the process and make it sufficiently practicable to bring it within the range of every-day work. In this country Mr. Verrier introduced a furnace and gum facings for rubber plates, Mr. Cunningham, Mr. Cummings, Mr. Rose, and others, have been working in the same direction. But the process is still regarded as impracticable.

1. The chief difficulties in the past appear to have been the firing of the gum body and enamel.

2. The liability of the fire-clay muffles to crack, thus letting in the gasses and spoiling the gum body and enamel, is so great that the most enthusiastic get disheartened.

It certainly is very discouraging to have the work nicely carried out to the last and finishing process of firing the enamel, to find on withdrawing it from the muffle that the piece is "gassed," through some minute crack, probably in the muffle. I do not propose therefore to describe the process as described in the text-books, but the methods adopted in my father's laboratory, and which he finds as practicable for both complete and partial cases, as plate-work, or vulcanite.

To begin from the impression, this is nearly always taken in plaster of Paris, and the plaster model for upper sets, is scraped where there are soft parts in the mouth, but no air chamber is used. The metal models for striking up the plate are made from a special alloy of tin, copper, antimony, and aluminium.* It has scarcely any shrinkage, is harder, less brittle, and melts at a lower point than zinc. This model should be kept to test the piece for shrinkage during the subsequent stages. The platinum recommended has always been soft or pure platinum. There does not appear sufficient reason for this. For hard platinum is as much to be preferred to soft, as 20 carat gold is to pure gold for plates. My father has for some time been using perforated hard platinum,

* Can be obtained for the present at 101, Bolsover Street, W.

No. 6 gauge, and much prefers this form to any other. The advantages are (1.) that greater stiffness is obtained for the weight of platinum used ; (2.) That the gum body is thoroughly united to the platinum ; (3.) That the edges or rim do not require a wire for the abutment of the gum, consequently the margins may be ground away after the plate is in use to relieve any part, without marring the appearance or finish of the plate.

This is an important point, as most plates require easing a little somewhere to relieve undue pressure, especially in the case of lower sets. After the plate has been swaged, it is better to try it in the mouth, to see if it gives free play to the frænum and other ligaments. The bite and articulation are made in the usual manner for gold plates. The teeth are mounted upon the platinum plate similarly to rubber work. Vulcanite or plate teeth can be used in most cases and are as suitable as continuous gum teeth. Bits of paper are placed between the teeth to prevent them touching each other. The next step is to attach a platinum wire for uniting the teeth to the plate. This is also a new modification to take the place of the backings described in the text books.

In order to do this the teeth are invested with plaster carried on to the model which is oiled. After the plaster is set it is divided between the centrals and removed, the teeth coming away with the plaster. The wire is next soldered to the plate in a series of loops, extending from one condyle to the other, and passing beneath the pins of the teeth. The plaster copies being applied to the model from time to time to see where to solder the wire. The pins of the teeth are next bent to touch the wire loops, and cemented to them with hard wax and the plaster investment, cut away so that when removed the teeth remain attached by the cement to the plate. These are next invested in plaster and quartz sand or the ordinary soldering investment. The pins are then soldered to the loops with pure gold, or what is better alloy of $8\frac{1}{2}$ parts pure gold to $1\frac{1}{2}$ platinum. The body and enamel are applied in the manner described in the text books. Two coats of body being generally required and one of enamel. These are baked in a furnace with a nickel muffle. Being introduced upon a sheet of nickel plate, which takes the place of a fire clay slab. No investment is used for the plates to rest upon, but a piece of platinum wire bent to the required shape is sometimes used

to support the plates upon the nickel slab. This muffle has been found invaluable for this purpose as it can be used hundreds of times without cracking, and then if a minute crack should appear it can be pugged with fire clay, and still be almost as good as before.

"Gassing" the work is a thing of the past, and this muffle without other improvements should make continuous gum work a success. The method of heating the furnace with ordinary petroleum under pressure, is also a great improvement over coke and gas furnaces. There are no foot bellows or blowing apparatus of any kind. No long flue required, no ashes and no trouble. It will bake anything in dental porcelain, including continuous gum dentures, crowns, or bridges. The gum body and enamel are also the result of several years' experiments and will be found stronger and better in colour, and free from checks which is the great drawback to the American gum enamels.

Method of making partial sets in continuous gum.

If it is intended to cover the palatal portion of the plate with enamel, it is better to make the plate of perforated platinum. But if the gum is confined to the alveolar ridge only the plate should be made of ordinary hard platinum No. 4 or 6 gauge. The bands should be made from platinum alloyed with 20% iridium. And will be found to be as stiff and elastic as the best gold plate bands. The solder should be the alloy already mentioned as there will then be no risk of unsoldering during the baking process. A small oxygen and coal gas blow-pipe is used to solder the bands and teeth. When soldering the teeth to the plate they are invested and heated to a red heat in a little furnace with the petroleum blast, then the furnace is usually taken by the handle to the bench, and a whole upper set is usually soldered in about a minute, the solder having been placed in position before heating up. A piece usually requires three bakings, two for the body and one for the enamel, each baking taking about fifteen minutes, being allowed an hour to cool down, the last baking being allowed to remain longer. Hard corundrum files are used to smooth the edges after baking.

The combination of continuous gum blocks or facings with vulcanite is not approved of except in rare cases where a platinum plate cannot be made to answer. There is quite as much or more trouble in making it, and the difficulties of repair are obvious. While cases constructed after the manner described may be easily

and perfectly repaired, which can hardly be said of any other work. Air chambers and suction valves are never used. A box of gum tragacanth is given to the patient to use on the plate for a week or two. This is worth far more than all the air chambers and suction disks ever invented. Several of my fellow students have suggested that I should describe the method used by my father of constructing crown and bridge work with continuous gum materials. We will take for an example an ordinary pivot without a collar. The first stages do not differ from that of an ordinary pivot. The post and cap (made of platinum) are fitted and soldered. But instead of cutting the post down flush with the cap it is left long enough to reach the pins of the tooth. An ordinary plate or vulcanite tooth is then fitted in the usual way. Its pins adjusted so as to embrace the post, and are then soldered to it. The space between the tooth and cap, which is ordinarily filled by solder, is now packed with gum body, to the shape desired and the piece introduced into the muffle and baked until the body is glossy. If necessary another coat of body may be added. The body for these cases is specially prepared to allow of its surface fusing smoothly, and is also made in three shades to suit the various shades of teeth. By this method a pivot may be constructed having all the natural appearance of a Logan crown, and possessing also the advantage of being perfectly adapted to the most abnormally shaped root. It has often been suggested that a pivot constructed after this manner would not be sufficiently strong. If the tooth depended for its support solely upon the body this might or might not be true. But an ordinary backed tooth has really only two points of attachment, *viz.*, its pins, the backing serving as a protection. And as the pins of a pivot, constructed after the manner just described, are soldered to the post and as the tooth substance is in absolute continuity with the gum body. It would be theoretically stronger than an ordinary pivot, besides being more clearly; crowns and bridges are constructed in a similar manner.

In conclusion, gentlemen, I must thank you for the kind attention which you have given my paper, and am only sorry that owing to the time at my disposal I have not been able to give a practical demonstration, which is after all a more instructive and interesting way of dealing with a practical subject like Continuous Gum Work, than any number of papers.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ORDINARY MONTHLY MEETING was held on the 3rd ultimo, the President (Mr. F. Canton) in the Chair.

The minutes of the previous Meeting were read and confirmed.

Mr. W. Simms, L.D.S.I., Manchester; Mr. T. L. Nash, L.D.S.E., Inverness, and Mr. Ernest H. A. Mackley, L.D.S., Eng., Norwich, were nominated for membership.

Messrs. A. B. Densham and George Thompson were balloted for and duly elected.

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

The Curator (Mr. Storer Bennett) had received from Mr. Shillcock, for the Museum, three very small, right, superior teeth.

Mr. SEFTON SEWILL showed some forceps, with an adaptation of the French lock joint, which enables the blades to be separated. He had found them extremely satisfactory, and thought it a considerable advantage to separate the parts for the purpose of cleaning and sterilizing. It, also, in the event of one blade breaking, enabled its immediately being replaced by a new one.

Mr. W. HERN exhibited two instruments similar in construction, the one for removing pivots that had broken off short in the root, and the other for removing parts of a flexible bur, which had broken off in a like manner.

Mr. ROBBINS mentioned a case of a reunited fracture of the maxilla. The patient had been farming in Canada, and the accident causing the fracture occurred when returning from his ranch in an American trotting car. That part of the vehicle upon which his feet were resting gave way and he was immediately precipitated between the hind quarters of the horse and the vehicle. He was discovered in the road in an insensible condition, with his head much knocked about, and his face cut open from the angle of the mouth to within an inch of the eye. The left upper lateral incisor and canine were missing, and the jaw was fractured in front of the first bicuspid, the posterior portion being dislocated, as far as Mr. Robbins could gather, outwards and backwards; the extreme cold stopped the bleeding. He was rapidly driven to the nearest

railway station, fifteen miles off, and his journey home was continued by rail. He fortunately got into the hands of an able and muscular Scotch practitioner, who got the fractured parts into position, though not till after the third try, then they went into position with what the patient described as a click. The face was stitched up, the chin bandaged, and recovery was rapid and satisfactory. Some few weeks later an ordinary vulcanite plate with three teeth instead of two, owing to the space being somewhat larger than before, was fitted. It would be seen that the occlusion was thrown out by the elongation of the first bicuspid, but by judicious grinding of the cusps the bite was at length brought back to the normal.

Another case he had some hesitation in speaking of, a case of fracture in his own practice in November of last year. It was easy to speak of success, but not so easy to admit failure. The patient, a young lady, aged 25, came to him for the removal of a superior wisdom tooth. The six-year-old molar had been lost for some time, but the twelve year old molar was standing. Gas having been administered, he endeavoured to remove the tooth with a pair of bayonet stump forceps in the usual way, when unexpectedly opisthotonos made itself evident. Discovering that something more had given way than he intended, he immediately released hold, and found that a severe ripping of the gum tissues had taken place. He allowed the patient to come round, explained as much as was necessary, and then found he would be compelled to dissect the tooth out of its membranous surroundings. After that there was no difficulty in taking away the tuberosity. He had now three large ugly long flaps to contend with, one split running in the soft palate about an inch, one on the buccal aspect, and a posterior flap almost involving the anterior pillar of the fauces. He placed a large compress of moistened cotton wool over this, and got his patient into the next room. Going into his workroom he selected a model having a molar as near as he could tell the size of the six-year-old molar remaining in the mouth and hastily had a deep gold collar turned up, on the posterior aspect of which was soldered a fish-tail flange. In ten minutes he was able to get to his patient, and to adjust the collar on the molar so that it went in with a spring. The flange of gold was heated and covered with gutta percha to form a splint. The three flaps were collected together by his fingers, and the collar was sprung on the molar, where it seemed to nestle nicely

into place. Three days later he was able to remove the splint, when it was found that the healing process was going on as by first intention, except a small place in the palate, which was healing by granulation. The splint was retained for a fortnight when the patient returned and the model which he now exhibited was taken. An accident like that might occur to anyone, but he had been bold enough to own up to what looked like a piece of roughness because he thought an expedient which had occurred to him might prove helpful to someone else in similar circumstances.

The PRESIDENT remarked that it would be agreed that they were very much indebted to Mr. Robbins for bringing the matter under their notice.

Mr. H. BALDWIN asked if the hamular process was attached to the sphenoid. Some time ago, a case was brought before the Society of a tuberosity of the maxillary bone being removed with the teeth, and although it was not mentioned at the time he formed the opinion that this tuberosity was actually penetrated by the antrum, and in such a way that a very slight amount of force would have brought it away.

Mr. F. J. BENNETT asked if Mr. Robbins had come to the conclusion that it was absolutely necessary to remove the tuberosity, or whether it might have been possible to leave it in the hope of its re-uniting again. He had seen cases where the tuberosity had been broken off, a condition likely to occur to any practitioner, but in such cases, seeing that the nerve would be broken by the force necessary to break the jaw, when possible to leave a tooth there was not much risk of further aching of the tooth itself, and it would act as a very good support on which to place a splint. When the part was healed up, he imagined the end of the mischief was not quite certain, because the cicatrix might contract and draw up the parts all round, resulting in some damage either to the sense of hearing or to the parts themselves.

Mr. ROBBINS replied that the unfortunate accident occurred in November last. The patient had been seen quite recently, and made no complaint whatever. It had not occurred to him at the time to keep the tuberosity in position.

Mr. W. A. MAGGS stated, that he once saw a case in which the tuberosity was out of place. The operator recognised the difficulty, and he (Mr. Maggs) helped him to replace it; no further attempt

was made to extract. The patient was an old lady. The case did very well, and there was no hæmorrhage.

Mr. H. BALDWIN remarked that since speaking, he had examined the specimen, and found that the hamular process was not attached, and, therefore, there was no likelihood of deafness.

Mr. FRANK ROBINSON mentioned a case in which he removed the tuberosity of the upper maxilla in one week, and in the same week he removed an odontome. This seemed to him to point rather to removing than leaving the bone. It was quite impossible to remove the tuberosity after extraction.

Mr. W. HERN said that he remembered a case of his some ten years ago, when the right upper maxilla (carrying three teeth, *viz.*, the first and second molars, and the wisdom-tooth) was fractured, in an attempt to extract the upper molar. There was a good deal of hæmorrhage and laceration, but the case did perfectly well.

Dr. W. J. COLLINS then read a paper on

"ORBITO-MAXILLARY DISEASES."

As the topic on which he was about to speak was not wholly unconnected with that of his paper on "Associated and Related Ocular and Dental Diseases" read four years previously, perhaps he might be permitted to take up the thread of the narrative where that discussion left it. In the earlier paper he considered associated and related Ocular and Dental Diseases under two categories:—

Those due to direct pathological sequence, of which antral abscess from dental caries and necrosis of the orbital plate and cellulitis might be taken as a type, and (2) those due to indirect pathological sequence, almost necessarily nervous in mechanism, of which certain spasmodic affections of muscles of the eye might be regarded as typical. And his own conclusion was thus stated:—"I am aware that while some regard all oculo-dental disorders with a wholesome scepticism, others are apt to concede to them an undue importance. I have attempted to decide justly between such extremes; I am led to emphasise the importance of orbital and ocular troubles with direct pathological relation to dental diseases; to relegate to a less proven category reflex amaurosis and the like, while recognising the undoubted existence of certain reflex spasms and radiated neuralgiæ, which oculists must look to dentists to explain and cure."

Busy in the intervening four years seeing opthalmic patients in Hospital and private practice, he had been keenly on the alert for reflex amaurosis and reflex ocular paralysis which should stand minute investigation. He had also looked out for such cases in medical literature, had searched the volumes of the Opthalmological Society, had glanced through their own transactions, and was forced to conclude that the position he maintained in 1891, still held the field. He had come across an interesting paper, read by Dr. Maughan before their Society in February, 1893, on "Remote Pain in Dental Deseases." Dr. Maughan appeared to cite two cases—and only two—of his own, both of which trenched upon the question of reflex ocular effects arising from dental causes. Quoting verbatim, the cases were as follows :—

(1) "A patient complained of blurred vision in the right eye, and said it had lasted for upwards of twelve years. On examination the pupil was found dilated and irresponsive to light, thus indicating paralysis, temporary or permanent, of a few fibrils of the third nerve. On looking into the mouth a right upper molar was discovered carious ; this was extracted, and three weeks later the pupil was normal and the sight perfect."

(2) "A woman, aged 45, slightly presbyopic in both eyes, came to the National Dental Hospital complaining of impaired vision in the right eye, and a painful first right upper bicuspid. On closer questioning I found that her trouble was suddenly increased presbyopia in the right eye, and that if she closed her left, she could not accommodate her vision at all for near objects."

The offending tooth was removed, and the accommodation restored equal to the left. Dr. Collins gathered that Dr. Maughan explained this case by the suggestion that "the patient's centre for accommodation was getting tired out, and dental irritation further inhibited the flagging centre." Did the two cases just quoted contradict his thesis ? Although in the first case "blurred vision" was present for twelve years, and cured in three weeks by tooth extraction, he did not gather Dr. Maughan regarded the case as one of reflex amaurosis, for in his reply he said :—"In connection with oculo-dental symptoms, he had paid a good deal of attention to one line of enquiry, *viz.*, whether failure of sight could be traced to dental irritation ; but hitherto he had never been able to obtain affirmative evidence."

With a view to clear up the nature of these two cases, he wrote to Dr. Maughan for further particulars. He replied that he had no notes of the cases referred to, and in a P.S. added: "Since Feb. 1, 1893, I fancy my ideas have been very much modified on this subject."

On the other hand, undeniable evidence continued to accumulate establishing the great importance of orbito-maxillary diseases; cases where abnormal or diseased condition of the upper jaw affect the orbital contents, and in some rarer instances in which the reverse order of events obtained. The anatomy of the parts concerned should always be borne in mind: seven bones form one orbit and eleven bones form the two, owing to the contribution to each afforded by the frontal, ethmoid and sphenoid. Next to the frontal the superior maxilla exposes the largest surface to the orbit; its orbital plate, grooved by the infra-orbital branch of the superior maxillary nerve, may be regarded as the plane of demarcation between the ophthalmic and the dental specialist. The plate is of no great thickness, but is rarely fractured, though its perforation in paracentesis of the antrum is not unknown. Permanent infra-orbital anæsthesia might result from fracture of the upper jaw, or operations upon it. He had notes of a case of acute neuralgic pain referred to the region over the upper jaw, though the skin was anæsthetic, and he stretched the nerve with beneficial result. Recently he had a case of herpes zoster affecting the area of distribution of the nasal, labial and palpebral terminal branches of the left superior maxillary nerve, and also the supra-orbital of the same side accompanied by coincident increased of tension in the eye and reduction of vision to J. 8 with correcting glasses; eserin drops to the eye, and poppy fomentation to the face, restored the vision to J. 1., and the tension to normal, and the herpes died away. An elastic, and evidently superficial, swelling in the region of the right upper jaw encroaching on the right nostril and right lower eyelid, attributed by a patient (a woman aged 40) to an attempt at removal of some upper stumps, by a chemist, some two years previously, was satisfactorily treated by puncturing in the first instance, and afterwards (under an anæsthetic) cutting away the walls of the cyst, scraping and plugging the site, and extracting the stumps. Cases of both dacryocystitis and epiphora vary greatly in their amenability to probing and the use of styles; where there is bare or carious bone felt by the probe it would be doubtful policy to persist in its continued use.

The next class of cases requiring consideration are those arising from periostitis of the upper jaw. Salter long ago called attention to necrosis of the alveolar process following the exanthemata in children, but the same cause might also lead to necrosis of the margin of the orbital plate of the maxilla or malar bone. Such cases were not very rare in opthalmic *cliniques*, and he had several times performed plastic operations for the cure of the ectropion of the lower lid which resulted from its cicatricial adhesion to the bone.

In the antrum and its diseases they had the *pièce de résistance* of orbito-maxillary diseases. He need not dwell upon its anatomy, the small and high placed orifice by which its contents drain into the middle meatus, the often loculated condition of its floors, the occasional intrusion of the dental fangs from the canine to the wisdom, and the consequential potentialities of disease thereby occasioned.

Electric illumination of the antrum, had no doubt provided a means of detecting the presence of morbid contents of the sinus in a stage earlier to that in which its walls are expanded. Hydrops, empyema, non-malignant polypi, which were more common than Paget originally thought, and perhaps dentigerous cysts too, may occasion elevation of the antral roof and encroachment on the orbit. Dr. Collins believed the inflammatory or necrotic process, either started in the maxilla by a periodontitis or accompanying acute antral abscess, spread by contiguity to the orbital periosteum or cellular tissue, and orbital or ocular symptoms supervened. When the vision was thus effected the lesion might be erroneously set down as reflex amaurosis as notably in the case quoted by Sir W. Laurence and Mackenzie, from Galenzowski, spoken of as the most brilliant case of the kind on record; but in this case there was a repeated discharge of pus in the neighbourhood of the lower eyelid. Such another is that of Pasquier where fracture of the alveolus in extraction of a right first upper molar was followed by necrosis, orbital pain, tumefaction of eyelids, amaurosis and dilated pupil—then there followed abundant, thick, greenish, puriform, fœtid discharge from the right nostril, and the vision returned in eighteen days. In these cases he submitted the pressure and traction of inflammatory products on the optic nerve occasioned *temporary* amaurosis, and the extension of inflammation to the nerve itself might occasion permanent amaurosis, just as was seen in cases of cellulitis arising within the orbit. Dr. Collins quoted several similar cases.

Heath quoted from White Cooper what he called a unique case of "falling in of the antrum" with epiphora. It seems to Dr. Collins, however, to be similar to, if not identical with, the rare though well recognised *Hemi atrophia facialis*, of which an account of two cases, with excellent photographs, would be found in the volume of *St. Bartholomew's Hospital Reports* for 1882, in both of which vision was interfered with by corneal changes, and the upper jaw had fallen in. Non-malignant tumours of the upper jaw might invade the orbit and damage its contents, or obliterate the antra and close the orbits, as in Howship's well-known case. During the last two years three cases of sarcoma of the orbito-maxillary region had come under his care, for all of which he had performed operations. The first was that of a man, aged 48, admitted to the Royal Eye Hospital, Southwark, on March 10, 1893. Examination disclosed proptosis and outward deviation of the globe, occasioned by a swelling about one inch in largest diameter, fixed, semi-elastic, and non-fluctuating; digital examination of the orbital margin detected a further swelling above the inner canthus; the conjunctiva was thrown into prominent infiltrated rugæ. There was epiphora, but no nasal obstruction nor palatal or faucial implication. The temperature was normal, and there was no syphilitic history nor malignant inheritance, but he had lost flesh latterly. The vision of the right eye was normal, that of the left $= \frac{6}{12}$ and with + 2.50 Ji.

Exploration revealing the sarcomatous nature of the growth, excision of the eye and clearance of every particle of soft tissue in the orbit were effected, and the patient made a rapid recovery. Subsequent microscopic examination showed the growth to be a round-celled sarcoma. Supra-orbital and infra-orbital anæsthesia is noticeable in cases when the orbit has been thus evacuated, owing to destruction of the first and second divisions of the fifth.

The next case of the kind came to him at the London Temperance Hospital, in August, 1893. Phœbe S., aged 15, had been treated in May of that year at another hospital for "a tumour of the eye," which had, it was said, disappeared. The floor of the right orbit was found on admission to be occupied by a hard mass extending to the malar bone; the eye was pushed upwards and proptosed, causing diplopia; she was unable to close the lids, and the ocular conjunctiva was in a condition of gelatinous œdema. Vision was nearly perfect. The same method of operation was adopted in her

case, and she made a good recovery. Within two months, however, some suspicious growth was observed at the most posterior part of the orbit, Zn. Cl_2 paste was re-applied, but there was again return, evidently extensive and beyond reach. Dr. Collins heard of the patient's death in June, 1894. Probably here, as elsewhere, sarcoma in the earlier years of life is more certain and rapid in its recurrence than at later ages.

The last and by far the most interesting case, was that of William W., aged 42, who had been on and off under his care at the London Temperance Hospital during the present year. Six weeks prior to admission a small tumour had been removed from the lower margin of the left orbit, and also some "polypi" from the left nostril. Microscopically these proved to be sarcomatous, and recurrence *in loco* had already taken place. The patient stated that he had had ague and rheumatic fever and jaundice; the "polypi" had troubled him since June, 1893; there were sharp shooting pain in the orbit, a discharge from the left nostril, and an unpleasant taste in the mouth. He had lost flesh rapidly. The left eye was normal, but diverted, and there was diplopia when the lids were separated; the skin over the swelling was red, adherent, and evidently involved. The left nostril was blocked by a fleshy growth, and the septum deviated to the right. He snored at night. The roof of the mouth appeared to be healthy, but the finger encountered growth in the pharynx.

Dr. Collins then described in detail the operation performed under chloroform four days after admission, which included the division of the upper lip in the middle line, the opening up of the nose and antrum and clearing out the orbit. Growths reappearing in March and April were satisfactory treated by local applications of chloride of zinc paste. In May, a small packet of infected glands were dissected out of the neck under chloroform. The cavity left by the operation was supplied with a silver plate having a glass eye let into it and secured by a pair of tinted spectacles. On August 7th, the patient presented himself for inspection, looking robust and well, and showing no sign of recurrence anywhere; he had lost the cachectic tint he previously had, and had gained 5lb., his weight then being 9st. 6lb. In October, however, he was again sent up to Dr. Collins, who found a suspicious spot just inside the left nostrils which he scraped out with a sharp spoon and applied paste to the

raw surface left. He also found two more enlarged cervical glands which he excised, and he was glad to be able to report that an inquiry sent to Newcastle last week, elicited the reply that he was quite free from any further local or glandular recurrence and was gaining in weight.

Mr. S. J. HUTCHINSON said that, so far as he could follow the paper, Dr. Collins seemed to have taken up the following position. First: he did not admit that there could be a reflex amaurosis. Secondly: there might be reflex pain, but not reflex lesion. Thirdly: that where there was disease it was due to the direct spread of periosteal inflammation. They were of course very much indebted to Dr. Collins for the interesting series of cases he had quoted. He (Mr. Hutchinson) admitted that since 1891 he had been very much on the look-out for an opportunity of controverting the assertions of Dr. Collins on that occasion, but he was bound to say he could not produce a single case proving that ocular disease was due to dental irritation.

Mr. ROBBINS appealed to Dr. Collins as to whether the deductions made in the following case were correct. A very anaemic patient, aged 36, who had been suffering for nine years with extreme neuralgia came to him for an artificial denture. He found in the lower jaw on the right side a molar which did not give any reflex signs, but was partly encircled with erosion. As the tooth leaned forward and would have thrown the case out entirely he suggested its removal, but had considerable difficulty in its extraction. He found after the removal that erosion, exostotis, and absorption were present, the neuralgia was better, but she localized it in a superior six year old molar on the right side. The tooth was very much stopped, and in attempting to remove the mass of gutta percha he took off the crown. The roots were divided on the removal one at a time. He had considerable difficulty for they were all exostosed very badly, and then a strange thing happened; the patient lost the sight of the eye on that side. She had consequent and extreme lachyrmation and an increase of the neuralgic symptoms, but as the large wound healed up the signs subsided, and in less than a fortnight she had perfectly recovered.

Mr. F. J. BENNETT was extremely pleased when Dr. Collins read his previous paper because a case referred to which interested him personally, and it had been put down as reflex amaurosis.

It occured when he was a student, and was originally brought before the society by Dr. Coleman, and subsequently alluded to by Mr. Power. It was a case in which there was some irritability at the apex of a root which had been prepared for pivoting. Two days later there was a good deal of photophobia and irritation. Thinking it possible that it might be of dental origin the patient was taken to Mr. Lawson, who was convinced that the condition had nothing whatever to do with the root, but was a case of iritis. Mr. Colman still was most positive that it was put reflex amaurosis, the case being henceforth quoted as one of the best illustrated cases. Dr. Collins took an opposite view, and seemed to have good grounds for doing so.

Dr. Ernest Clarke thought that though dental irritation of itself would not cause trouble in the eye, nevertheless, it might be the last straw which in a lowered condition of the system might start ocular trouble. He quoted cases in support of his contention.

Dr. Collins having replied at some length the meeting adjourned after the usual votes of thanks.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

Ordinary General Meeting, held Monday, December 16th, the Vice-President, Herbert Clarence, Esq., in the Chair.

The minutes of the previous Meeting were read and confirmed.

Messrs. Bell, Young and J. C. Douglas, signed the Obligation Book, and were admitted members.

The Vice-President then asked some member to propose two gentlemen to audit the accounts for the year.

Mr. D. P. Gabell proposed and Mr. Mackley seconded, that the auditors of last year, Messrs. Pidgeon and Macdonald be appointed. They were elected unanimously.

On Casual Communications being called for Mr. Norman presented a specimen of a supernumerary tooth.

Mr. Nowell showed a wisdom tooth which illustrated the extent to which decay would go on under a filling. The dentine was also remarkable for its peculiar pigmentation.

The Vice-President then called on Mr. J. H. Gartrell for his paper on "Continuous Gum Work." (See p. 13.)

The VICE-PRESIDENT, after thanking Mr. Gartrell for his very instructive paper, said continuous gum work was a subject about which he knew very little. The great objection seemed to be the liability of the teeth after being subjected to a high temperature to change their colour, thus teeth, which before baking matched the natural ones perfectly, very often came out too dark after the case was fired.

Mr. D. P. GABELL thanked Mr. Gartrell for his interesting paper, and asked if the gum base used by him was lighter than the ordinary.

Mr. TORPEY asked if the pins used were the ordinary platinum and iridium pins.

Mr. DAY said that he should like to know whether Mr. Gartrell found Ash's teeth melt up when being baked, and if American were better. He should like to know whether the pieces were baked on the models, and also what was the composition of the investing material.

Mr. MOUNTFORD asked if the body was the same composition as ordinary artificial teeth.

Mr. TURTON said he should like the method of repairing a broken tooth explained.

Mr. WORKMAN wanted to know if the solder kept in place or whether when subjected to a high temperature it was liable to run over the plate.

Mr. NOWELL said he should be very pleased to hear what was the proper temperature for baking a case, and how one was able to tell when a case was sufficiently cooked.

Mr. MOSELY asked if it was possible for Mr. Gartrell to give a practical demonstration.

Mr. GARTRELL in answer said, that the body is about the same weight as the ordinary body, but being stronger, and combined with the hard perforated platinum plate, not so much of it is required for strength, as when soft platinum is used. The posts of the pivots are composed of platinum and twenty per cent. iridium, a larger quantity than ordinary hard platinum contains. Temperature required for baking the body and the enamel is about that of coin gold, any make of teeth may be used without danger. Mr. Gartrell has not found the teeth melt. The pieces are not baked on the models, but simply introduced into the furnace on a slab of nickel

plate. The investment which he has been accustomed to see used, and which give excellent results, is quartz-sand two parts, plaster one part. The quartz-sand being obtained from the China clay works. But any other investing material would no doubt give good results. The body is composed of the same materials as artificial teeth, but not in the same proportion. Repairs can be easily and successfully done, especially if the cases are made with the perforated platinum plates. With the ordinary plates, the fluid of the mouth, when heating up, escape as steam and gas from the porcelain side of the case. Moreover, in most cases, the porcelain shrinks away from the plate in places forming a vacuum, in which fluids find their way, and which being converted into gas and steam, when heated up, blow off pieces of body and enamel. With the perforated plate these spaces do not form, and if they did, the gases formed are able to escape from both sides of the plate. The repair being performed in the manner described in the text books. Owing to the high melting point of the solder used, there is no danger of its melting or softening during the baking process. This is well seen in the partial cases, in which the bands were soldered to the plate, and the body and enamel baked subsequently. The body and enamel require a temperature at the melting point of coin gold to bake them, and if a strip of this metal is placed in the indicator and introduced into the muffle with the case, it will melt when the body or enamel are sufficiently baked. In conclusion he promised to give a mechanical demonstration later on.

A vote of thanks was accorded him and to those gentlemen who had brought forward Casual Communications, and the Vice-President then announced that the next meeting would be the ANNUAL GENERAL MEETING on January 14th, when Mr. S. J. Hankey will read a paper on "Causes of Failure of Fillings."

WE regret to notice the sudden death of Mr. King, of York. He settled in York in 1851 as assistant to Mr. Horner, whom he joined in partnership in 1857. Mr. King was one of the first to join the Odontological Society, and was keenly interested in matters concerning the Church of England. He retired from practice in 1880.

THE DENTAL RECORD, LONDON: JAN. 1, 1895.

FAILURES!

It often strikes us that there is something sheepish in the manner of those, who come before a Society to tell of a failure, or of an accident, that has befallen them. Uriah Heep in all his "umbleness" could scarcely be more deferential than are these. We are bound to say we cannot quite understand this shamefacedness, and still less the mock heroic attitude in which the speaker often concludes his communication by claiming credit for his boldness in making such an admission. It seems to us that the speaker usually proceeds on one of two absolutely false postulates, either that failures are quite rare, or, if of more frequent occurrence, that they are never openly spoken of, still less communicated at one of our Society meetings. All have heard of "cooked accounts"; these are, unfortunately, not absolutely peculiar to bogus companies but are apt to even find their way into reports of learned societies, and more especially into papers dealing with some new line of treatment. But who is deluded save the author of the paper? Failures we all have, why then be ashamed of them? Why try to make out we have none? We have heard of a man, who boasting that he had never broken a tooth, in attempting its extraction, was met by the obvious and appropriate retort that "his experience must have been extremely limited." But we do not admit that the better class of practitioners are so backward in owning up to their misfortunes, on the contrary, with a fair acquaintance with the transactions of many Dental Societies, we call to mind many such admissions. We know the worth of a man, not by his uniform success, which some call luck, but by the way he meets his misfortunes, when they come, and by the way he guards against them. Failure is, perhaps, a better

schoolmaster than success, only, to fully profit by it, the cause must be thoroughly elucidated, and for this no method is so successful as discussion with our friends at a Society meeting. For, although we are prepared to affirm that failure is no reason for undue regret, it may be quite otherwise with the causes that have led to it. These may be divided into the preventable, of which, ignorance or carelessness are the chief, and those which in the present state of our knowledge, we are obliged to admit are unpreventable. The former are the torment of the early student days and are the giants which we are then expected to struggle with and slay, for carelessness in the actions of a professional man is likely to bring him perilously near to being a criminal, and ignorance is likely to stamp him for a fool. Human wit is prone to err and doubtless failures, due even to carelessness, may happen to good men, and for these they should take themselves to task. But the second group of causes are wholly blameless, and furnish the foundations of a more complete knowledge and of a better method of practice, and he who contributes most to these will *certainly* not be met with derision, nor *probably* welcomed as a hero, but may *possibly* earn the thanks of his compeers as a useful worker in the common cause.

News and Notes.

J. A. Wood, L.D.S.Eng has been appointed house surgeon to the Liverpool Dental Hospital, *vice* L. J. Osborn, resigned.

The date of the dinner of the Odontological Society has been *altered*. It will be held on February 2nd.

At an Ordinary Meeting of the Council of the Royal College of Surgeons, England, held on December 13th, 1894, the following regulation was adopted, *viz.*:—"A candidate who is referred at the

examination for the licence in dental surgery will be required to produce, before admission to re-examination, a certificate of three months' additional study at a general hospital and a special dental hospital, the precise attendances required at each hospital being left to the discretion of the respective hospital authorities."

At the same Meeting the following gentlemen, having passed the necessary examinations, were admitted Licentiates in Dental Surgery:—*Students of Charing Cross and Dental Hospitals:* Charles Herbert Ackland, Charles Cannell, George Edward Frost, John Herbert Gartrell, Herbert William Hardy, George Silva Jones, William Johnson Leigh, Herbert George Newland, William Harry Norman, Edwin Picton, Walter James Pike, Charles Sidney Prideaux, Alfred Reeve, John Percival Rogers, Charles Talintyre, Herbert James Torpey, Robert Watson. *Middlesex and Dental:* Keith Foster Lane, Frederick James Faukland Rooke. *Cambridge University, St. George's and Dental:* Norman Godfrey Bennett. *Guy's Hospital:* Urban Edward Cave, Thomas Godfrey, Herbert George Hewitt, Edward Hutson, Francis Ernest Lewis Lambert, Lionel Frederick Morris, John Pilcher, Edward William Stabb-Johnson. *Middlesex and National Dental Hospital:* Ernest Fogg, Norman Reeve, Walter Thomas Day Timms. *University College and Dental Hospital, Liverpool:* Walter Eriencus Partridge, Joseph Ainsworth Woods. *Mason's College and Dental Hospital, Birmingham:* Francis William Hands, Arnold William Steynor. *Owen's College and Victoria Dental Hospital, Manchester:* John Butterworth, John Parsons Headridge, Percival Reginald Sibson.

The Annual Dinner of the past and present students of the Dental Hospital of London, was given on December 1st, in the Whitehall Rooms, Hotel Metropole, when a goodly company, including many guests, sat down. The toast list was not unduly long and the speeches excellent, especially may we mention that of the chairman, Mr. S. J. Hutchinson, who specially dwelt on the need of the school for the new buildings, and the desirability of having a dental representative on the Medical Council, which he thought they were the more entitled to seeing that there were now some 1,400 qualified

dental practitioners. Sir J. Crichton Browne's humorous remarks were exceeding happy, and Sir Dyce Duckworth's reply to the toast of "the Visitors" ably proposed by Mr. E. Lloyd Williams, was listened to with attention, the more so as he appeared to be anxious to impress on those present the determination of the Medical Council to carry out the provisions of the Dentists' Act without fear or favour. The other speeches were by Messrs. J. H. Badcock, L. G. Bennett, Allen Stoneham, C. S. Tomes, and R. H. Woodhouse. The excellent musical programme was under the superintendence of Mr. Herbert Schartau.

The Annual Meeting of the Birmingham Dental Hospital, was held at the Council House, the Mayor (Alderman T. S. Fallows), in the chair. The committee's report stated that during the year £108 10s. had been received in subscriptions, £50 had been received from the Hospital Saturday collection, and the income from rent, charity boxes, registration fees, &c., raised the total receipts to £647 1s. 4d. Against this amount were payments amounting altogether £696 0s. 4d., but £106 10s. 2d. of this was balance due at the end of the previous year. The report of the Surgical Committee set forth that the number of operations under ether had decreased during the year by 501, whilst those under nitrous oxide had slightly increased. The fillings in gold had increased twenty per cent., and all the operations for the preservation of teeth had increased largely. In moving the adoption of the report as a whole, the Chairman said, that although the charity was a small one, it was performing a great amount of good work. The financial position was not so bad as it appeared to be at first sight, because, although there was a balance to the bad, it was not half so large as at the end of 1893. If they had only received a donation or legacy of £50, as they did in 1893, they would have been in a much better position than formerly. Whilst the subscription list of most charities was decreasing, it was satisfactory to note that that of the Dental Hospital was increasing. The increase was small, the total amount of the subscriptions being £108 10s., as against £104 6s. last year, but still it was gratifying to find that financially the charity was improving. Mr. William Thomas seconded, and the report was adopted. On the motion of Lieutenant-General Phelps,

seconded by Mr. J. A. Jones, the best thanks of the meeting were given to the honorary hospital staff and officers "for the zeal and ability with which they have performed their duties during the past year." Mr. Breward Neale moved the election of the following honorary officers for the ensuing year:—The Mayor (Alderman T. S. Fallows), president; Lord Calthorpe, vice-president; Mr. J. W. Wilson, hon. treasurer; and Mr. Arthur Addinsell, hon. secretary. The resolution was adopted, and the staff re-elected.

With reference to the proposed new buildings for the Dental Hospital of London, the Secretary writes that, in reply to appeals made to the staff of the hospital, the past and present students, and the dentists in Great Britain, a sum of £6,000 has been promised. The public have subscribed £5,000, which, in consideration of the benefits the institution affords to the suffering poor, is but a small sum. The estimated cost of the site and building will be £40,000, against which there stands the estimated value of the present site, £15,000 to £20,000. Contributions paid or promised amount to £11,000, and thus the amount required may be reckoned at £14,000. Towards this sum Mr. F. A. Bevan, one of the trustees, has contributed £100. The new site is purchased, and the houses upon it let at such rentals as pay the interest on the money advanced by the bank. The value of the present site cannot be realized until the new building is erected.

We have received a copy of the "Portfolio of Microphotographs of Dental Histology," which have been prepared and published by Charles Röse, M.D., of Freiburg and Alfred Gysi, D.D.S., of Zurich, Switzerland. They can be obtained from the latter, price £1 4s. For these photographs we have nothing but praise, they are beautifully prepared and mounted, and the twelve fairly represent the normal tissues of a human tooth. On each of the mounts a lithographic drawing is printed below the photograph, which must be of considerable help to the students in interpreting the structures represented in the photograph. If called on to criticise we would remark that the odontoblast cells drawn in plates 4, 5 and 6, are far too regular in shape and arrangement, but it is a minor point and

one which a glance at the accompanying microphotograph shows to be but a diagrammatical rendering of the actual condition. We would congratulate the authors and, indeed, all dental students on this most artistic publication, which should find its way into the hands of all workers in dental microscopy, and we sincerely hope that sufficient support will be given to enable these able authors to proceed with the suggested pathological series. We would add, that the above mentioned price is exclusive of the postage and will only apply to those orders sent before Feb. 1st.; we gather that after that date it will be raised.

In the case, before Judge Bacon at the Bloomsbury County Court, in which Mr. T. Penfold claimed against Miss Foister for the sum of £24 3s.—the value of a set of false teeth, one point was especially emphasized, *viz.*: the importance of retaining old sets intact till we have the consent of the patient to otherwise dispose of them. We fancy that *this is* the "custom of the profession," but it may as be as well to mention it for, though we are glad to say Mr. Penfold gained his case, yet the fact that he had broken up the old set and so could not return it, gave the defendant an argument, it would have been wise to deny her. We notice in the evidence that the question of cost of making the plates was entered into, what this has to do with the matter is difficult to see any more than one would reckon, a barrister's fee by the wear and tear of his wig and gown, or a journalist's by the ink he wastes and the paper he spoils. We notice that some other man giving evidence, said he would have been glad to have made the piece for £5 5s., we wonder what fee he would have asked if the patient had gone to him in the first instance? rather more than £5 5s.; we expect. Doubtless he was not familiar with the fable about the fox and certain grapes. Or, at least had not pondered on its moral.

THE NATIONAL DENTAL HOSPITAL AND SCHOOL.

The Annual Dinner and Distribution of Prizes took place at the Holborn Restaurant, on the 30th ult., Sir Walter Foster. M.P., presiding. The gathering was a more than usually large one, and included Sir William MacCormac, Drs. Vivian Poore, S. Coupland, H. R. Spencer, Messrs. S. L. Rymer, H. G. Howse, J. Langton, A. E. Barker, S. J. Hutchinson, F. Canton, J. Smith Turner.

The loyal toasts having been duly honoured, the DEAN (Mr. Sidney Spokes) said that he did not propose to read any formal report. Having briefly reviewed the work that had been done, he called upon the Chairman, who presented the prizes, as follows:—

Dental Anatomy—(Medals), J. C. Arnold, H. W. Tice; (Certificates), T. C. Reece, N. Reeve. *Dental Surgery*—(Medal), S. F. Rose; (Certificates), N. Reeve, T. G. Jenkin, W. Sunderland. *Dental Mechanics*—(Medal), H. J. Relph; (Certificate), H. W. Tice. *Dental Metallurgy*—(Medal), J. C. Arnold; (Certificates), W. Sunderland, E. A. Wheeler. *Dental Materia Medica*—(Medal), T. C. Reece; (Certificate), T. G. Jenkin. *Operative Dental Surgery*—(Medal), E. Fogg; (Certificate), W. E. Hill. *Histology*—(Certificate), A. E. Relph. *Rymer Gold Medal*—Norman Reeve. *Students' Society Prize*—Norman Reeve. *Ash Prize*—H. J. Relph.

Mr. SPOKES, after naming the winner of the Rymer Gold Medal, gracefully alluded to the presence of the founder of the prize (Mr. Alderman Rymer), who, at the wish of the Chairman, presented it to Mr. Norman Reeve.

The CHAIRMAN then proposed the toast of the evening, "The National Dental Hospital and College." After referring to the excellence of the new building, to his early experience in dentistry, and to the advances made by the profession since that time, he continued: But I have had experience of you in another capacity. Among the first things that came under my cognisance when I became one of Her Majesty's Ministers, were reports about the condition of the teeth of children in certain schools. When I looked over these documents, full of statistics and peculiar hieroglyphics, I began to wonder at the troubles of a Minister, and whether part of the Local Government Board's responsibility was for the teeth of the rising generation of the nation. But I found from it that you had been looking after the teeth of the children in the Board Schools, and collecting important information, and one of the most remarkable reports was in the case of Hanwell Schools, for which the Dean was largely responsible. That document caused me an hour of unpleasant and difficult reading, and the intention of that report was to show that a large amount of public good can be done by giving proper attention to the teeth of the rising generation, and thereby bringing them up in a way that is likely to make better

citizens of them. By attending to their teeth you make them better and stronger than they otherwise would be. Dr. Cunningham gave me papers with reference to this matter, and from investigations he has made with reference to recruits for the army, and also for the navy, I think I am right in saying that he found that only five per cent. of a certain number of these recruits had healthy teeth, and that no less than sixty-one per cent. had bad teeth. Now one would not think this was a subject on which rested not only the health of thousands of soldiers and sailors, but almost the supremacy of this great Empire. Gentlemen, believe me when I tell you it is as essential that the soldier should be able to chew, as that he should be able to march, for if he cannot chew well, he will not march well or fight well. A man will fight all the better after a good meal if the food is properly assimilated than he will after a badly masticated meal; so that your profession in relation to the State is an important one, tending to make healthier and stronger men of our soldiers and sailors. I have heard with reference to a training ship from which young persons enter the navy, that, since their teeth have been carefully looked after, the percentage of recruits taken for the Naval Service from that ship was increased six or seven fold. This shows what a large amount of material for the defence of the Empire and for the maintenance of its greatness is possessed by the dental profession. I therefore congratulate you in having turned your attention to this question of the teeth of the rising generation, and I hope in the Board Schools and in those Schools under Government control, you will have opportunities of adding to the health and welfare of the population. In these places, I think there is a large field for the practice of your profession. Although a man puts his name on the doorpost and waits in a back or front room for patients, they often do not come to him in my profession. I think in your profession he may succeed more rapidly than in mine, and I hope in the meantime you may empioy yourselves by carrying on your profession in various public institutions. There are no hospital appointments or schools, except the dental schools, in which you can exercise you abilities, but there are Board schools and other public institutions in connection with the various municipalities or School Board districts, in which you may live, in which you may do useful work in looking after the teeth of the children, and I hope all the members will avail themselves of

such opportunities as offer of making observations useful to science as well as to the State. I think, also, Dr. Cunningham has told you that this is a question not only of physical prowess but of intellectual or mental prowess, and that many a student at Cambridge, which he knows so well, has lost a position in the honours list from bad teeth. I do not understand how any man with an aching tooth or a bad gumboil, can do a good examination paper. In another capacity I have referred to your calling. I have referred to it in connection with the position I hold in the medical profession as a physician, and in reference to the position I hold in the Government, and in those connections I have found you doing useful work. And there is another aspect in which I have been brought into contact with you and that is as a member of the Medical Council. I sit there by the votes of the medical profession, and a large number of medical dentists, and I consider myself as owing service and attention to the medical and surgical art which you represent, and I have endeavoured from time to time to carry out in the Medical Council, as far as possible the wishes of the dental profession. We are responsible on the Medical Council for your registrations. We are also responsible for doing all we can to maintain a high and honourable tone in the profession you practice. I hope the Council has never failed in either of these duties and that we shall be able to keep it pure as regards the names of the men enrolled. I think you have shown a proud and honourable spirit, since you have been registered, to keep the profession as high and noble as it ought to be. I have been struck by the desire of dentists not to be associated with men who carry on practises not worthy of an honourable calling, and representations have reached the Medical Council from time to time showing that you are very jealous of the profession of dentistry. You cannot be too jealous because in your calling, more than in mine, there are opportunities for a man not animated by a spirit of high professional honour may take advantage of, and you are right in endeavouring to maintain a high standard of honour among your profession, not so much for your own benefit as for the benefit of the public. People who call out against trade-unionism and professionalism only see one side of the question. The man who is surgeon, dentist, or doctor is trusted very often with some of the interests of his fellow-men or fellow sisters, and I am glad to come here this evening

and I esteem it a pleasure to be placed in the position in which you have placed me. I hope every member of this gathering will go away determined to maintain the high position of their calling.

The DEAN in responding said he felt he must not trespass upon their time at anything like the length it was permissible for the Chairman to do. It would perhaps be hardly good taste as an individual, but in the name of his colleagues he might refer with satisfaction and pride to the new building, and to the excellence of the work done within its walls. With regard to giving appointments in schools to the younger men in the profession, remembering the official capacity of the Chairman in connection with the Local Government Board, he would venture to point out the danger involved in these appointments in the present unsatisfactory state of things. Perhaps he might in the first place be allowed to correct the Chairman's statement in regard to Board Schools, at present they had not been able to get a footing in these schools. All their statistics were collected from the parochial or pauper schools in which the mouths of more than 10,000 children were examined, but he hoped that appointments would be made on the same footing as the appointments of Medical Officers with proper inspection by the Local Government Board officials, otherwise there would be great danger of the wrong men getting the appointments, who would accept them for the little *kudos* they would bring, and not necessarily do much work. If the appointments were officially recognised under well defined regulations of the Local Government Board, such as monthly statements to the House Committee, annual reports to the Board, and carefully kept records of every operation performed, then he thought that the appointments would go to the dental practitioners turned out from their schools, well qualified, and in the possession of a diploma. He concluded by thanking Sir Walter Foster for the way in which he had alluded to the school, and those present for the manner in which they had received the toast.

Mr. ALDERMAN RYMER in an excellent and sympathetic speech, dwelt upon the fact that thirty years ago he congratulated the students of the Metropolitan School upon their transference to Great Portland Street, and now, after having been spared that long period he had the gratification to see them transferred from the old building in Great Portland Street, to the splendid premises placed at their disposal through the munificence of the noble lady alluded to

by the Chairman. With regard to the profession itself, after the eulogium of Sir Walter Foster, he need say nothing, but he certainly entertained a very high opinion of the profession to which they had the honour to belong, he believed in the future it would rank as high as any profession, indeed its status had so improved, that at the present time It was an honour to belong to the profession of Dental Surgery. There was no doubt that it did much to promote longevity, and he would say that having taken great interest in sanitary matters for the past thirty-five years, he thought with their knowledge of what to eat and drink, with improved and improving knowledge of sanitation, and especially when the teeth of the children in elementary schools were looked after in the way that had been suggested, people ought not to die of disease at all, but should live to at least 100 years.

Mr. WARD responded on behalf of the "Past Students," and Mr. Fox replying for the "Present Students," said that when asked at the beginning of the week to respond to the toast of the present students he did not exactly relish having to perform the operation. When a surgeon contemplated an intricate operation he makes a point of looking it all up before beginning, but neither under the heading of "hospital dinners" or "toasts" did he find a word of guidance in any of his medical text-books. In the field of general literature however, a dental infant finds some analogy in Mark Twain's response for "the babies." You will remember how he bid the grizzled warriors around him recall the fact that they had been vanquished in combat with their nurses in byegone days, and that a famous astronomer seated on his left had once fixed his anxious gaze on another "milky way." He feared to breathe a scientific word for fear of mispronouncing it, and as for propounding theories, their whole time is occupied just now in swallowing other peoples. They had heard of the beautiful hospital, of the crowds of patients, and the distinguished staff, but though some people may go to a theatre to see the building, and others are attracted by the reputation of the prompters and stage managers, he believed it to be the performers that are the chief attraction. The Present Students are the performers at the National Dental Hospital. Doubtless much of the popularity of the institution is due to a succession of exceptional house surgeons. He began his course under the genial and brilliant "Farmer," the best of demon-strators, and demon-extractors and in

fact in the words of his countrymen "a divil of a bhoy for the work." They all had thought it would be hard for any man to follow him, but the bold and burly "Burroughs" took the reins with a firm hand and guided the coach along manfully. And now we are under the regime of the wise and courteous Nicholls, a man who can not only tell you what to do but how to do it, and explain the reason with the embellish of all the latest scientific terms. Concluding he returned thanks on behalf of the students.

Mr. RUSHTON proposed the toast of "The Visitors," to which Professor VIVIAN POORE very humorously responded.

Mr. SMITH TURNER also replied, and in the course of an able speech, specially addressed himself to the extreme importance of the Medical Council, setting a hard face against all efforts made by different people in different places, on the plea of hardship or some other kind of plea, being placed upon the Dental Register. The present tendency amongst them was to enlarge their curriculum, and make their examinations more stringent, but that of itself would not do if men were admitted to the Register who were not qualified as they desired they should be qualified. It was a most serious question, and he commended it to their illustrious Chairman, knowing that he, above all men on the Medical Council, had been foremost in maintaining the necessity of dental education. He thought, too, that it was unwise of the Medical Council to receive any certificates from any Colleges where they could not direct a thorough investigation as to the merits of these certificates. In conclusion, he expressed the great interest he felt in the National Dental Hospital, and was delighted to see it so flourishing in that connection, he desired to say what a high place in the estimate of his professional brethren their Dean had won for himself by his abilities.

Dr. CUNNINGHAM suitably proposed the health of "The Chairman," and congratulated him on attaining Ministerial rank.

The CHAIRMAN having replied, the remainder of the evening was devoted to an excellent programme of music and recitations.

Herr NAMAAN H. KEYSER states that he has soldered aluminium, without the use of any flux at all, by heating the metal and scraping the surface so as to remove the oxydising film until the metal is what is called "tinned." Then union takes place easily enough. The alloy used consists of tin 50, silver 25, aluminium 25, and melts at 750°, but almost any tin solder will, it is stated, serve equally well.—*Inventions*.

OPENING OF THE EDINBURGH NEW DENTAL HOSPITAL AND SCHOOL.

The opening of the new and central premises of the Incorporated Edinburgh Dental Hospital and School, Chambers Street, took place on December 13th in presence of a large number of the friends of the institution. The Dean of the School (Mr. Bowman Macleod) presided, and was supported by Lord Provost M'Donald, Sir Charles Pearson, Q.C., M.P., the Revs. Dr. MacGregor, St. Cuthbert's, and Dr. Blair, St. John's ; Dean of Guild Miller, Baillie Kinloch Anderson, Sloan, and Pollard ; Councillors Mitchell Thomson, Brown, James Robertson and Lang Todd ; Professor Sir Douglas Maclagan, Dr. J. Smith, L.L.D.; Dr. Peddie, Dr. Peel Ritchie, Dr. Stevenson Macadam, Dr. Ivision Macadam, Emeritus Professor Struthers, Mr. Macgregor, dentist Mr. D. Lowe (Heriot's Hospital), &c. A number of ladies were also present.

The Rev. Dr. MacGregor opened the proceedings with prayer, after which Mr. G. M. Stuart, W.S., the hon. secretary, intimated letters of apology from the Marquis and Marchioness of Tweeddale, Lord Low, Lord Rutherfurd-Clark and others.

Mr. Bowman Macleod said—My Lord Provost, ladies and gentlemen, in making a few introductory remarks on behalf of the directors, I am fortunate in not requiring to make any preparatory apology for requesting the good office of your lordship, and the presence and the assistance of so many distinguished citizens, at the formal opening of these new comfortable and commodious premises, I think we are justified in the course we have taken, seeing that the object and aim of our existence as a benevolent institution is the relief of suffering. That your lordship has more than a magisterial interest in us we are all aware ; you have for years taken a personal and very active interest in our work, and have on many occasions given the Hospital the benefit of your business acumen and advice, and we deem ourselves fortunate indeed in having the Right Hon. Lord Provost M'Donald, one of our own directors, to come and declare this building open for the dental

relief of the necessitous poor. After the full statement which has already been made in the *Scotsman*, I need not trouble you and this company with further historical or other details, but would ask leave to append the work of this present year. During the eleven months ending November 30th we have treated upwards of 12,000 cases, 4,500 of these, or more than one-third, being teeth which, by appropriate treatment, have been restored to a sound condition and rendered capable of properly preparing the food for that unconscious digestion and assimilation so necessary to perfect health. To overtake this great and good work we have the unpaid services of eighteen dental surgeons (three dentists attending on each day of the week) and four medical gentlemen as anæsthetists, who are assisted in their work by forty-five students. This brief statement will, I trust, give the public some notion of the vastness of our labours, and will induce them to subscribe largely and heartily, and enable us to wipe out the debt of £4,000 with which we are at present burdened. The Dean concluded by requesting the Lord Provost to open the buildings.

The Lord Provost said he had great pleasure in being there that day to do anything he could to assist this institution. This institution, as some of them knew, had a small beginning; but there was this to be said for it, that since its establishment in 1862 it had always go e on increasing. It had occupied various premises in different parts of the city. It went to Lauriston Lane in 1889, and it was there that he first became acquainted with it. He had paid many visits to it there to see its practical work. In the early days of the institution those connected with it thought they were doing a great work when the number of people attended to was 250. Last year the large figure of 11,621 was reached. In the early days the free-will offerings of patients were only £6. Last year they amounted to £60. That went to show that the people who were attended to at the Hospital were of that class who could not have gone to a dentist to pay fees. It was not only doing a great work in that way; but the Hospital and School was also furnishing a thorough training to young men who were going into the dental profession, and to surgeons who desired to take the dental diploma. Any one used to be entrusted with the drawing of teeth. Now it was different. A friend told him a story, just an hour or two before he came to the meeting, which illustrated

this. It appeared recently in one of the comic papers. It was of a countryman who had come into town to have a tooth drawn. He went into a dentist's, and the offending tooth was out before the man knew where he was. "What's to pay?" he asked. "Five shillings," said the dentist. "Five shillings!" exclaimed the man. "Why, the last one I got pulled was by the blacksmith. He took over half-an-hour to it, and only charged me a shilling." That illustrated the two ways of doing a thing. Here the graduates who had been trained could draw teeth expertly, he might almost say pleasantly. The Corporation of Edinburgh, he was glad to say, had been very kind to this institution, and from certain government grants had been able materially to assist it on its educational side. They had not given that help without in the first place satisfying themselves that the institution was one deserving of support, and that the money would be well spent. The Hospital had recently to leave a very comfortable home in Lauriston Lane, and one on which a good deal of money was spent, as an extension of the Royal Infirmary was contemplated in that direction. For a while the directors were at their wit's end what to do, but he thought they would all agree that they had now secured a suitable house on a very central site. He did not think they could have got a better place for it, being, as it was, so near the Infirmary and the Medical School, and also in the heart of a district in which there were many poor people who would come to the Hospital for treatment. He thought he might strongly appeal to the public for financial aid for this institution. In the purchase and equipment of the building the directors had incurred a responsibility of £6,000, of which only £2,000 was paid, leaving £4,000 of debt on the Hospital. He was persuaded that if the citizens would visit the Hospital and see it for themselves in working operation, they would speedily make up their minds as to its worth and resolve to do something for its support. He was afraid that unless some very large subscriptions were received they could not expect to clear off the £4,000 in one year or in two years; but even if they cleared off £1,000 a year, it would mean a great relief of the present burden on the institution. He had great pleasure in declaring the new premises of the Dental Hospital and School open. And he was sure that in them great good would be done, first, to a large number of poor people who would come to it for gratuitous treatment, and, secondly, by giving a thoroughly

practical training to their dental students. He was told that already the fame of the Hospital and School was attracting students from over the Borders to Edinburgh. The institution was, as they would see, charitable on its one side and educational on its other, and he was sure they all wished it much success and liberal support in the good work in which it was engaged.

Mr. HEPBURN, dentist, proposed a vote of thanks to the Dean and to the directors for the labour they had expended in the work they were that day met to complete. He mentioned that for many years after the foundation of this institution in the form of a dispensary, it was largely dependent for support on the liberality of those gentlemen who were engaged in carrying out the daily work of the institution.

The DEAN shortly replied, and called on Dr. Smith to propose a vote of thanks to the Lord Provost. In doing so, he stated that Dr. Smith was really the fountain-head from which this Hospital had sprung. He was the first to give gratuitous dental service to the poor.

Dr. SMITH in proposing a vote of thanks to the Lord Provost, said his lordship had done much to promote the welfare and progress of the institution. An institution of this kind, Dr. Smith pointed out, had become indispensable in Edinburgh since the passing of the Dental Act, if the city was to maintain its pre-eminence for teaching all branches of the surgical profession. Had no institution of the kind been established, surgeons who wished to take a dental diploma would have had to go to London or elsewhere for it, and as an educational centre Edinburgh could not afford to allow such a thing to take place. It was quite true, as had been said, that since 1860 there had all along been very meagre support accorded to this institution. He did not know why that was so. He saw legacies every day intimated in the newspapers to objects not half so deserving. But leaving legacies out of view, was there not to be found in a city of 300,000 or 400,000 inhabitants 4,000 gentlemen who would give £1 a-piece and relieve the institution, at all events, of the debt which was upon it.

The proceedings thereafter terminated. Tea and coffee were served to the visitors, who before leaving had an opportunity of inspecting the new premises.—*The Scotsman.*

THE DENTAL RECORD.

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Original Communications.

A FEW CAUSES OF THE FAILURE OF FILLINGS. *

By Mr. S. J. HANKEY.

Mr. PRESIDENT AND GENTLEMEN,—I have the honour of reading a paper before you this evening, on a subject with which, as students, and, I hope, future practitioners, you have and will have, a great deal to do. The stopping of teeth now forms such an important part of our work, that I thought a paper on "Some of the Causes of the Failure of Fillings" might be acceptable. As the subject which I have taken up forms so often one of the topics at dental meetings, both at home and abroad, I am bound to bring before you many facts with which, as practical men, you are all well acquainted. No doubt many of you will think it presumption on my part to consent to read such a paper before a Society like this, and feel that it would have been a more fitting subject for a man who had seen the result of years of dental practice to wrestle with, than for a student like myself, who has only been able to see the results after a year or two, and who can hardly hope, even for the sake of science, to see his fillings fail in that period; but, as I accepted this title (which was suggested to me by our never-to-be-forgotten *confrère*, Mr. Main Nicol), when I had not the slightest idea what to write about, and also under pressure from your very energetic Secretaries, I can only hope that I shall be able to do the subject that justice which it deserves, and that you will derive some little benefit from it, and also from the discussion which I hope will follow.

In dealing with the subject before me, I am obliged to consider it from more than one point of view, because, although when one

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

hears a filling spoken of as a failure, you very probably think that the filling has fallen out, and, judging from some patients' ideas, a filling is only a failure when it fails to keep in the cavity, as is illustrated by the following: "Oh yes, he fills the bottom teeth well, but when he does the top ones, they don't seem to hold in." I am afraid the operator in this case did not take into consideration the force of gravity in the preparation of his upper cavities and insertion of fillings, hence the cause of his failings. I think we should take a wider view of the subject, and give as a definition something like the following:—A filling is a failure: (1) When it does not prove an efficient plug: (2) When it does not make the tooth into a useful member again (as by the insertion of materials too near the pulp which conduct thermal changes): (3) When it makes the tooth unsightly, as in cases of large contour golds, and amalgams in prominent positions in the mouth.

The causes of failure being as follows: (1) Improperly prepared cavities, including non-removal of all the caries, which, on account of the sensitive dentine, one is sometimes prone to leave: (2) The use of unsuitable filling material, as for example, the insertion of gold and amalgam fillings into cavities with weak walls, unsupported by dentine: (3) The position of the filling (i.) being too near the pulp and thus conducting thermal changes, and later on setting up chronic inflammation and causing death of pulp; this is undoubtedly the cause of failure with many fillings, even when the cavities have been cautiously prepared: (ii.) By using such materials as osteos and gutta-perchas in too prominent positions. (4) From mechanical wear, as caused by the action of clasps round teeth containing fillings, and here I must also mention the method, only to condemn it, of drilling cavities in sound teeth for the reception of the bar of a bridge case, and filling up the cavity with gold or other material: (5) Uncleanliness, and too great cleanliness. Uncleanliness: in allowing tartar to collect in such quantities round teeth with fillings in, especially round fillings that are not well finished, thus forming a continual source of irritation to the tooth substance, so that caries begins and often goes to the extent of exposing the pulp, and consequently leading to death of the pulp before the damage is found out. Too great cleanliness: I more especially refer to the use of very coarse tooth powders, and also the practice of always brushing the teeth in one direction, which is most detrimental to some fillings.

As amalgams are perhaps now used more than any other kind of filling, I think it will be advisable to deal with some of the causes of their failure first. The majority of amalgam fillings fail on account of the shrinkage that takes place while they are setting, however, this can be overcome to a great extent by using the best alloys, and also by the proper shaping of the cavities.

After the removal of the superficial caries, the cavity should be shaped as far as possible with walls fairly parallel, and, according to Dr. Dodge, the depth of the cavity should in all cases exceed the width, especially with those amalgams that have a very great tendency to assume the spheroidal shape, and thus come away from the edges. When the cavity is shaped with the long axis of the cavity in the direction of the root, then, during the contraction of the substance, the material has a tendency to be brought closer to the edge of the cavity, as explained by Dr. Dodge in his interesting paper in the *Cosmos* for July, 1894. Dr. Dodge advises that the outline of the cavity should be circular, as the spheroidal tendency is better overcome when thus shaped. As far as I have personally noticed, the fillings to fail the quickest are those small circular ones which you often have to fill on the buccal surface of molars ; if this is generally the case, it goes against Dr. Dodge's idea of having a circular outline. Another class of cavities which I find fail somewhat quickly, are those shallow ones that occur in the crown surfaces of molars (whether it is due to fissures being left I cannot say), and also some interstitial cavities, which, on account of their inaccessibility and tenderness, are often left rather shallow. On the other hand, I have often been surprised to see how well some of the large contoured ones last. Therefore, I think these examples fully support Dr. Dodge's suggestions and the experiments which he has made ; before leaving the preparation of cavities, I must impress upon you the necessity of not leaving a bevel on the edges of the cavity, but leave them square cut, or else when the filling material contracts, it will have a great tendency to crack, and in crown cavities being unduly bitten on will break, leaving the edge exposed.

Insertion of filling—Causes of failure: Cavity not being water-tight : Through not using a matrix and not separating teeth: Through not burnishing material well into the walls: Through not contouring filling: Through using material too moist: Through removing matrix too soon: Through using instruments too large ; Through failing to polish filling.

As regards the above causes of failure, the most important to overcome is that of getting the moisture in during filling operation, therefore, the first thing to do after roughly preparing the cavity (I say after the preparation of cavity, because I consider it only right that we should inconvenience our patients as little as possible, and it certainly is an inconvenience, speaking from experience, to have the rubber on for long, especially where lower teeth are concerned). I, therefore, prepare the cavity all but finishing the edges, getting rid of the *débris* by using the water syringe, and then adjust the rubber and finally finish preparation and fill. The difficulty of getting the rubber into position quickly can generally be overcome by practice and by the use of easily applied retractors (this pattern which I have had in use for some time, I find most easily applied).

The cavity should then be filled by first burnishing some soft amalgam into the walls and then by using the amalgam drier and drier in small pieces, and using small instruments the cavity should be finished. I have heard it suggested that tapping the amalgam instead of burnishing appears to condense it better. The next cause is by not getting the teeth, and in large contours the contour filling and the contiguous tooth in close apposition which is as bad as not contouring the filling because (1) On account of the space which is bound to be left, unless a matrix is used and the teeth are separated, food becomes lodged in this space, which besides being a source of irritation to the patient, has a tendency to cause a recurrence of caries in those teeth. (2) The teeth being separated, or in other words as the filling does not touch the next tooth the patient is almost sure to bite something just on the contour and so break or loosen the filling. The only way of overcoming these difficulties is by always using matrices (those made of platinum being the best as they can be left in position until the next day if necessary, without being a trouble to the patient) besides using a matrix it is best to separate the teeth so that after the filling is polished and separater removed, the teeth will knuckle close together. With Palladium it is almost always advisable to use the stone freely in finishing as they set so quickly, it is almost impossible to burnish.

Concerning the Osteo Amalgam Fillings which we are hearing a good deal about at the present time, I feel that the cause of some men finding them a failure is because they have not used the proper proportions of the materials; either using too much osteo and putting the filling too near the gum or else in putting in too much

amalgam and thus doing away with the advantage of having a less bulk of amalgam, and also the advantage of the whole filling setting quickly, according to facts gleaned from Mr. C. Tomes' Paper "On Amalgam Fillings," on Monday last. The chief things to be aimed at with amalgam fillings, are that they should set quickly and change form as little as possible, and stain the tooth substance as little as possible. The proper proportion of osteo and amalgam as far as I know is about $\frac{1}{6}$ osteo to $\frac{5}{6}$ amalgam, at least I have used them in these proportions and so far found the fillings wear well. I have heard it suggested to fill the greater part of the cavity with osteo amalgam and then put on a surface of amalgam, I certainly consider this a bad plan for we then get such a shallow layer of amalgam, which is sure to change form. Osteo amalgams are certainly most delightful fillings for frail teeth.

Now turning to Osteos—Their chief cause of failure is undoubtedly their not being able to withstand the action of the saliva, but as some patients have such a dread of gold fillings showing, and numbers of others can neither spare the time nor like to remunerate one for doing them, I expect we shall still have to put in osteos where golds should be. Only a week or so ago a patient said to me, "I should so much like to have my teeth filled with gold, but you must cover the gold over so that it will not show." Osteos are sometimes put in such prominent positions that they are sure to become a failure because they get regularly brushed away by some of our energetic patients, nevertheless, osteos when well inserted, will stand for years even in the most exposed positions, I saw one some little time since in a lower molar that had lasted for twenty years.

Inlays—These fillings which I now refer to, are, I believe not looked upon with much love by the "Profession" generally—as regards glass inlays, I consider that they have a very vulnerable point in that it is impossible to insert them without having a thin rim of the fixing material, generally osteo, showing, and as inlays are generally put in the front teeth of women who are usually very particular in cleaning their teeth and will of course persist in continually brushing them across, they gradually brush the osteo out, and therefore the inlay at once becomes a failure. With porcelain inlays, however, the cause of failure generally rests with the operator, because with an inlay of this description the inlay should fit tightly into the cavity prepared for it, so that when it is fixed none of the fixing material should show. The best way to get

a perfect fit being as follows: Get the inlays and burrs of the same size (there are special burrs made for inlay work) after having drilled the cavity with one of these burrs try the inlay in and it will probably be found just a shade larger, the inlay should then be mounted on a mandril in the Dental engine and a little should be taken off by revolving it quickly against a piece of corundum under water, then the inlay should again be tried in the cavity still attached to the mandril and have a few sharp turns with the engine (so as to screw it into position as it were), the cavity and inlay should then be undercut and fixed in the usual way.

Gutta perchas like many other fillings generally fail because they are put into cavities which are not absolutely dry, and also that they are sometimes put into very prominent positions so that they get either bitten or rubbed out. If carefully inserted, however, they will last for many years, I saw some of Hill's permanent gutta percha fillings which had been in some interstitial and lingual cavities in four upper incisors for three years, and then looked as good as ever.

Mastic in conjunction with cotton-wool forms a very convenient and comfortable temporary filling over dressings of various descriptions, including arsenic for devitalizing purposes.

I have heard this spoken of in a very disparaging manner once or twice of late by men who had used it, saying they were afraid to use it with arsenic for long, for fear of it leaking, and therefore the results they had were far from satisfactory, I myself used to think it abominable stuff to use at one time, but now I find it most useful and have had some very good results, I had the pleasure of speaking to one of the staff here the other day who has used it for some years and quite to his satisfaction. Those of us who have found it a failure most probably do so for the following reasons: (1.) The old complaint we do not get the cavity perfectly dry; (2.) On account of the affection the mastic and wool always appears to have for the instrument, there is no getting rid of it and it ends in either the dressing not getting into position at all, or else in its not being placed snugly at the cervical edge. The only way to overcome the latter trouble being to use fine pointed instruments and to keep dipping them in cold water.

After the very satisfactory results of the last examination, I hardly like to say much about gold fillings, however, I will name some of the chief causes of failure: (1.) Too much tissue is often cut away rendering the cavity weak and the tooth unsightly,

whereas by the use of a little osteo the walls might have been strengthened and a good filling not too prominently inserted ; (2.) Retaining points are often drilled too near the pulp or just at the junction of the enamel and dentine ; in the first case, causing in time either death of the pulp or else being such a source of irritation that the filling has to be removed, and in the second case by chipping or cracking the enamel ; (3.) With large contours, the general fault is of building the filling up too quickly before the edges are properly covered, whereas it is better to thoroughly cover the base and then to gradually build up, following the contour of tooth as much as possible, and also keeping the back wall well covered, using a sharp probe throughout to test the density of the filling ; (4.) In using too large a plugger, thereby not condensing properly ; (5.) By putting on too great a contour ; (6.) By not having the edges with a good bevel over which to build the gold, and therefore not having the proper protection for the sides of cavity during the process of malletting.

Before concluding, I should like to say a few words, more particularly to new men, as regards ordinary fillings. I have often heard it said that if a man can do a good gold filling he can certainly do any other kind of filling that comes before him. I think this is rather a wide assertion to make, as I have often seen men able to peg away and finish a gold very satisfactorily, but when it comes to putting in contour amalgams, osteos, gutta perchas and mastic dressings, all of which are very troublesome from small accidents which arise, they are at fault. Whether it is because men often devote more time to the practice of gold fillings to the exclusion of others, or that ordinary fillings often get left to make up the yearly total, and therefore do not have the proper amount of time devoted to them, I cannot say ; but I should recommend all, to give the same attention to ordinary fillings as to the filling which is really a luxury not indulged in by every patient, for after all, osteos and amalgams now constitute the greatest number in the general run of practices, and it remains with the operator most assuredly, in the majority of cases, whether the filling shall be a success or otherwise. Gentlemen, in conclusion, I hope what I have said has not been wholly without a little interest, to some, if not to all of you. I must thank you for the patience with which you have listened to me, and it now only remains for you to make the remainder of the evening a success, by having a very hearty discussion.

APPENDIX

To Papers on Dental Microscopy.

By Mr. Hopewell Smith, L.R.C.P., M.R.C.S., L.D.S.

NOTE I.

Nasmyth's Membrane.—Paul's Method of Preparation. This, the latest method of procedure, is the best yet devised for bringing out the reticulated appearance of Nasmyth's membrane, and is to be recommended in addition to the methods previously described.

In a 2 per cent. solution of Bichromate of Ammonium are placed several fully-developed unworn teeth of man, monkey, or sheep. They remain in this hardening fluid for a month, the fluid itself being constantly changed. After washing, they are transferred to two or three changes of alcohol and then placed in a mixture of 5 per cent. nitric acid and weak spirit. When the enamel is sufficiently decalcified, the tooth is immersed in water, and the membrane eased from off its surface with needle points. The membrane should be finally stained with eosine and mounted in Farrant's medium. In this manner its structure is rendered apparent, and the use of silver nitrate for staining purposes dispensed with. (*Dental Record*, Vol. XIV., p. 562.)

NOTE II.

Hæmotoxylene Staining Solutions.—The following formulæ will be found to be useful to the advanced student :—

(i.) Delafield's Stain—

Hæmatoxylene (crystals)	...	...	4 grammes.
Absolute alcohol	...	...	25 c.c.
To be added to			
Ammonia alum (Sat. ag. sol.)		...	400 c.c.

Expose to light and air for several days, then filter and add

Glycerine (pure)	100 c.c.
Methylic alcohol	100 c.c.

A sufficient quantity of this mixture is to be added to distilled water to make a very dilute solution.

This is altogether the most powerful and precise of all the hæmatoxylene stains yet introduced.

(ii.) Ehrlich's Stain—

Hæmatoxylene (crystals)	2 grammes.
Absolute alcohol	100 c.c.

To be added to

Glycerine (pure)	100 c.c.
Ammonia alum	2 grammes.
Glacial acetic acid	10 c.c.
Distilled water	100 c.c.

The stain retains its properties for years if kept in well-stoppered bottles, and can be used for staining *en masse*.

(iii.) Kleinenberg's Stain—

Hæmatoxylene (crystals)	$2\frac{1}{2}$ grammes.
Rectified spirits of wine	240 c.c.

To be added to the two following solutions:—

Calcium chloride (crystals)	20 grammes.
Distilled water	10 c.c.

And

Alum	3 grammes.
Distilled water	16 c.c.

The above is Squire's modification of the original formulæ. It is highly recommended for the certainty of its results.

Carmine Staining Solutions:

(i.) Beale's Stain—

Carmine...	10 grains.
Strong solution of ammonia	30 minims.

To be added, after boiling and evaporation, to

Glycerine (pure)	2 ounces.
Alcohol	$\frac{1}{2}$ ounce.
Distilled water	2 ounces.

A useful general stain.

(ii.) Grenacher's Stain—

Carmine	3 grammes.
Borax	4 grammes.
Distilled water	100 c.c.

To be added, after gentle heating, to

Alcohol (70%)...	100 c.c.

The student is cautioned against the use of Grenacher's *alum* carmine stain, as it has a dissolving action on all calcareous structures, and therefore soon destroys the hard parts of his dental sections. By the employment of the above, this inconvenience is avoided.

(iii.) Orth's Stain—

Carmine	$2\frac{1}{2}$ grammes.

To be added to 100 c.c. of

Carbonate of Lithium	7 grammes.
Distilled water	700 c.c.

This is both a nuclear and plasmatic stain. But if acidulated alcohol is used after staining, in the manner described on page 481, the colouring of the cell substance is removed, but that of the nucleus is still retained.

NOTE III.

Actinic and visual foci.—Actinic is the name given to that property of light which chemically affects the film of a sensitive photographic plate. The term "visual focus" means the sharpness and clearness of the image which is thrown on the camera screen, when seen by the observer's eye. But it sometimes happens that, although the image may appear sharply defined to the eye, it is not photographically in focus: the two foci are then said to be non-coincident. This occurs in "uncorrected" lenses. Should it be found that the foci do not coincide, the uncorrected objective must be slightly moved from or advanced towards the object, the motion which is necessary and the extent of it, being found by actual experiment and carefully recorded.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting was held on the 14th ultimo, the President, Mr. F. Canton, in the Chair. There was a large attendance of members. The election of the following gentlemen had been approved by the Council, Mr. A. E. Baker, Red Hill; Mr. Ridley Herschell, Eastbourne; and Mr. P. F. Henry. Dr. J. W. Pare and Mr. F. E. Davar, L.D.S., Bombay, were balloted for and duly elected.

Brief reports having been made by the Curator and Librarian, Mr. J. J. Andrew, Belfast, showed models and read notes of a case received from Mr. J. Royston of an odontome in the upper jaw of a youth aged 17. The narration was illustrated by a number of excellent photo-micrographs of sections thrown on a screen by oxy-hydrogen light. The odontome was removed during chloroform narcosis, it was more or less oval in shape with numerous rough projections on the surface; the weight, judging by the weight of a portion, must have been about 580 grains. Its length was $1\frac{5}{8}$ in., girth $4\frac{1}{2}$ ins., width $1\frac{1}{4}$ ins., girth $3\frac{7}{8}$ ins. Under Mr. Bland Sutton's classification it would be identified as "a No. 7 Composite Odontome." Mr. Royston prevailed upon the patient to allow him to extract the wisdom tooth (exhibited) the appearance of which, Mr. Andrew said, gave the strongest support to the theory advanced by Dr. Röse that each tooth is developed from a separate tooth germ. It was this point which constituted the most interesting feature in connection with the odontome.

Mr. S. J. Hutchinson asked Mr. Andrew whether he was prepared on the very complete exhibition he had just given of sections of this odontome to abandon the theory that the permanent molars were descendants of the temporary ones? If so, this was even more important than the very admirable illustrations which had been given. It was one of the most debated points at the present moment in dental morphology, and if Mr. Andrews would give his opinion, they would probably learn something from pathology which might help them with regard to physiology.

Mr. Andrew said he was not at all prepared to abandon the old theory as to development, which was rather a pet notion of his. Dr. Röse and others were very strong on the theory that each tooth was

developed from a separate germ, and they thought they had proved their point. This wisdom tooth, which he had shown, was one of the strongest points in their favour that he had seen, but he was not quite prepared to abandon the other notion.

Mr. MANSBRIDGE described two methods of drainage which he found useful in treating cases of antrum trouble. With a view to minimise the risk of food or foreign bodies being forced up into the antrum, he had adopted the plan of soldering at the end of the tube another piece at right angles with the opening, facing towards the cheek, so as to get the drain without the risk of the entrance of food. A case, however, presented itself in which communication between the palate and the antrum was exceptionally sensitive, and the patient could hardly bear the pressure of any foreign body against the sides. In that case the position of the opening also ran obliquely upwards and inwards and therefore a rigid tube was rather out of the question, as it produced a certain amount of pressure on the walls of the opening which was difficult to overcome. Here he adopted the plan of making a tube separate from the plate by soldering a small piece of metal to the tube, and taking a model of it *in situ*, then making a vulcanite plate to cap the whole. In that way there was no possibility of food being forced into the antrum, and the patient was able to syringe the antrum through the tube with the tube *in situ* simply by removing the plate two or three times a day. The model showing the tube and plate *in situ* was shewn. The second case was one that occured in hospital practice, in which the opening into the antrum was very high up on the outside of the gum, and closely impinged upon by the cheek. In this case a rigid tube fixed to a plate would have been very uncomfortable, and out of the question, he therefore adopted a movable tube, the opening being made at the side, so that all chance of food getting in by force was obviated.

Mr. H. J. BADCOCK preferred a solid to a hollow tube. It could be easily introduced, and more easily cleansed. If the plate was removed from time to time, the antrum could be syringed, and the opening maintained by the plug. In cases where it was difficult to insert a plate and plug in one piece, he often made them separate, attaching them by means of a little ligature.

Mr. MANSBRIDGE speaking generally, agreed with the last speaker in his preference for a solid tube, but in the cases he had referred to, the sensitiveness of the antrum made a hollow tube which could be syringed through, very necessary.

Mr. C. S. Tomes then read a paper entitled

"Notes on Amalgams."

The behaviour of amalgams was a subject which had interested him for many years. So long as twenty-two years ago he read a paper upon it before the Society. His earlier experiments were based upon the specific gravity method, and he found that paladium alone was free from the vice of contraction in hardening. As was well-known, paladium was far the best of all amalgams, but it was difficult to use owing to its irregularity of behaviour, and its rapid setting, which almost precluded its use in difficult situations. He thought it quite possible that some of its merits were due to this rapid setting, by which it resulted that the filling was hard, and no further change took place after it left the operator's hands. His present series of experiments had been devoted, not to the improvement of the constitution of amalgams, but to the means of getting the best results with those in ordinary use, and they had been for the most part conducted with Foster Flagg's Standard Amalgam, that being known to be a good one; it was common knowledge that it contained tin, silver, copper and gold. The experiments were made out of the mouth by borings in slips of bone or ivory, clamped on to a flat surface of ivory whilst being filled, and then at once plunged into Draper's ink (deemed by Dr. St. George Elliott as too severe a test) in every single instance he got more or less leakage. From a great number of carefully conducted experiments—which space prevents our giving in detail—Mr. Tomes arrived at the conclusion that granularity of the surface was not responsible for the leakage, and that he had to deal with a real shrinkage. He then tried lining the cavity with quite a thin layer of amalgam, filling the rest of the cavity with Harvard cement. For the first time, he got an absolutely perfect result, thereby conclusively proving that the surface of the amalgam was fine enough to be water-tight, and that it was to shrinkage or change of form that its faults were due. Experimenting further in the same direction he found it possible to line the cavity thinly with amalgam, fill up the great bulk with soft Harvard cement, and coat the free surface with amalgam. This gave a very good result. He had been asked, why line the cavity with amalgam at all? His idea was that the fluids of the mouth should at no point whatever get access, even in ever so small a degree, to the cement, which they would do if the cement cropped out anywhere. On the

other hand, he was anxious that the thin layer of amalgam against the edges should everywhere be held up to its place by the setting of cement, and not of a mass of amalgam, which would be likely to shrink and alter a little in form. A series of experiments were then made as to the possibility of embedding something in the amalgam which would prevent shrinkage, or compel it in some other direction. Rings of dental alloy, steel, and pieces of porcelain tooth were embedded in amalgam, but perfect results were not obtained. Then a number of experiments were tried with amalgam that had been used, that is, that had been once set, and had done their shrinkage. These experiments gave perfect results, but the rapidity of the setting was a great obstacle to its use in difficult cases. He found that if the cavity was filled so as to cover up the edges with amalgam it was possible to go on contouring with freshly mixed amalgam without interfering with its water-tight edges, and so the question seemed to be to some extent solved. It next occured to him that possibly some freshly mixed amalgam might be added to the old heated amalgam without altogether losing the advantages which the latter seemed to offer. A variety of experiments led to the conclusion that equal parts of old heated amalgam and freshly mixed amalgam thoroughly incorporated with each other produced a water-tight filling without shrinkage. Throughout the Paper he had used the term shrinkage as covering also change of form. He had not gone into much detail as to the actual experiments, but had given the results rather than the means by which he had been led to them, which would only be wearisome. As practical hints in using amalgam, he might mention that he had found in large cavities the support of a matrix invaluable. The easiest method of manipulation was to rapidly burnish a small quantity against the walls, then to take a large piece which would fill up the bulk of the cavity, and finish by the addition of small pieces. If during the accomplishment of this the amalgam had set, heat the final portions just as though the whole filling were being made with old amalgam, and use hot instruments. If the operator desired to use old amalgam for the whole portion, the best plan was to heat the whole amalgam in a spirit or Bunsen gas flame, and then lay it on a hot plate over the flame so as to keep it soft. As good results were only obtainable with rapidity of setting, it was necessary to dry the cavity and protect it from moisture before mixing up or heating the amalgam mass.

Discussion on Mr. Tomes's Paper.

Mr. F. J. Van Der Pant desired to ask what amalgam Mr. Tomes used.

Mr. Mansbridge enquired if Mr. Tomes attached any importance to mixing amalgam with the hand? and whether it could affect the ultimate result? Also whether there was any disadvantage in squeezing out, any excess of mercury before filling, or whether it was better only just to use the amount of mercury required.

Mr. Walter H. Coffin said it would be interesting to know if Mr. Tomes had been able to formulate any idea as to what really took place when old amalgam was melted? He had spoken of its being "decomposed," but he could not mean decomposed into its original constituents. There was a suspicion that amalgam was a resolution in mercury of one or more compounds of the metals, and of course the idea would suggest itself that this, so called, decomposition was really a resolution into new definite compounds which on cooling crystallized into each other with great rapidity. He had tried to make some investigations upon the point, but with very incomplete, puzzling, and wholly inconclusive results. If experiments could be taken in the direction of separating the more fluid and the less fluid portions from each other, one might arrive at some method of first producing the chemical compounds, and keeping them apart until they wished to produce the result that was obtained by heating. At present the great difficulty was in getting always the same physical result in mixing amalgams, even with the greatest care and accuracy. The paper had been most suggestive, and was full of a number of points from which many of them would no doubt try to make a new departure.

Mr. Beadnell Gill asked if Mr. Tomes invariably mixed the amalgams in his hand after using the mortar? and, if so, whether the condition of the hand was different on one occasion to that on another? He had noticed on some occasions, when tempted. being in a hurry, to rub the amalgam in his hand, it sometimes yielded good results packed as dry as he could possibly squeeze it between wash leather and pliers. On the next occasion, having done exactly the same thing, the results were unsatisfactory. He put this down to the fact that his hand on the latter occasion had some moisture which was conveyed to the dry amalgam, and brought about the failure. He had of late years invariably adopted the other practice, and it had reduced the number of his apparent failures.

Mr. E. Lloyd Williams thought the thanks of the Society were due to Mr. Tomes if only because he had brought home to them the fact that under ordinary conditions, and even by exceptional methods, a very large majority of amalgam fillings in anything like large cavities would fail after they had been in the mouth four or five years. Having had the privilege of an early perusal of the paper, he had only so late as that afternoon tried a very small series of experiments in a rough and ready way. Finding that Mr. Tomes advocated a plan of mixture of old and new amalgam, he took a good old specimen which he found in his drawer, a monument of somebody's skill, probably his own, which had failed and failed very badly, and heated it up over a hot spirit flame. He had not the remotest idea what amalgam it was, but he added to it an equal part of a medium mix in a tolerably plastic condition, not very thin, of Flagg's Submarine Amalgam. He tried to get this into a cavity, as it was stated in the paper that this would not be a very difficult matter; but although he had two very tiny cavities in the surface of a molar, and although this operation was performed out of the mouth, he still found a great deal of difficulty in getting the two little cavities burnished in before the amalgam set. In fact it was in a powdery condition almost before he got it into the tooth, but after it was in and they were burnished down, the results seemed to be very good. The second portion of the same amalgam was heated up on a hot plate, and meanwhile his ordinary mortar was heated up certainly so hot that it could not be held with any degree of comfort. He took another mix of submarine amalgam, a little thinner than the last, mixing it in the mortar, and he certainly found that one had a great deal longer to manipulate the fillings. He thought for flush fillings that could be easily kept dry, a good deal of use would be found for this method of putting in amalgams, but he was not quite so hopeful as Mr. Tomes appeared to be that contouring was to be done quite so easily. He would like to suggest with reference to the variation in results, in the first place the quantities of mercury originally mixed with the amalgam might have differed, secondly there may have been variation in the temperature applied to the amalgam over the flame; thirdly, possibly there was a variation in the quantity of mercury added to the fresh mix, and lastly a variation in the temperature of the mortar in which the amalgam was mixed. No definite data had been given on these points.

Mr. S. J. Hutchinson asked if Mr. Tomes had tried the effect of using gold to absorb superfluous mercury.

Mr. C. Robbins notwithstanding all that had been said on both sides of the Atlantic, still believed that amalgam was doing its work well if properly handled, in spite of the ink test. He would ask whether Mr. Tomes used as a lining a good pad of a mixture of oxy-phosphate and amalgam. In many cases it formed a splendid filling in fragile cavities used alone, but it gave a better result when it was surfaced with amalgam. He was interested in Mr. Hutchinson's question, as for the past three years he had been using heavy gold foil in conjunction with pressure over the surface of amalgam to absorb the excess of mercury. He never now put in a filling of amalgam without using this method, getting the last third of his cavity filled with amalgam as dry as possible, building it a little in excess, burnishing it down hard, and then, with a large loosely rolled gold cylinder, held end on, exhausting all the surface mercury possible. Again he burnished, and again used the Wolrab's cylinder the result being to his mind satisfactory, and the method yielded few failures.

Mr. Paterson remarked that he did not not notice that reference had been made to lining cavities with osteo made of the consistency of cream, and upon that plugging amalgam, at first rather moist but finishing off dry, and taking great care that in the plugging of the amalgam upon this creamy oxy-phosphate, the mixture oozing from the sides of the cavity was removed, and fresh amalgam carefully burnished into the edges, finally, seeing that the superfluous mercury and amalgam was wiped off at the edge. He had recently seen a bicuspid that was filled four years ago by this method, and with the exception of a little roughness on the surface of the amalgam, which was easily put right, the stopping was uncommonly good. With regard to the use of old amalgam, he remembered an old practitioner who used to break up every tooth extracted containing black amalgam, and put them into a bottle ; he invariably used the old stuff, mixed sometimes with a little new. With regard to Standard Amalgam, which he had used for the last five years, he had tried heating it but had never been able to make anything out of it in the way of stopping. It was very difficult to bind up, and he did not know how Mr. Tomes managed it.

Mr. J. J. Andrew remarked that in making a bar of amalgam out of the mouth, if the lower half was packed soft and the top hard, they got a warp in one direction. If the reverse was done the warp was in the opposite direction, that is to say, in the former case the warp was concave and in the latter convex.

Mr. Carl Schelling mentioned that a short time since he had the pleasure of seeing an amalgam filling which had been in a tooth for 73 years, and had every appearance of lasting many years longer.

Mr. Tomes, in reply, said someone had mentioned the great difficulty of getting time enough to manipulate, even with a mix of new amalgam. He should have mentioned that with equal parts of new and old, the mix of the new must be very decidedly more plastic than one would ordinarily use in making an amalgam filling. Mr. Mansbridge had asked if the amalgam was mixed in the hand ; in nearly every instance he mixed them by shaking them up in a tube, and then gave them a very brief rub in the palm of the hand. As to squeezing, in the majority of his experiments the original proportion of mercury was such that little or nothing could be squeezed out, even if wash-leather and pliers were used. When not using old amalgam re-heated he used the amalgam pretty dry to start with. In reply to Mr. Hutchinson, he had tried mopping with gold, but though the beading he had spoken of might be temporarily got rid of, it would re-appear in amalgam set in the ordinary way. Heavy gold he did not find so good as cylinder gold or several bits of thinner gold. Mr. Coffin had propounded an exceedingly difficult question as to what happened on re-heating and re-hardening the amalgam; he did not know in the least. When he said it was "decomposed" he had in his mind the idea, which was a loose one based upon no very accurate knowledge, that when the amalgam was mixed, they first of all got a solution of constituent metals in mercury. His notion was that in heating these amalgams they might break up the chemical compound, and again get a solution in free mercury as with other metals, but it was a thing which would be very difficult to investigate. Mr. Beadnell Gill asked whether in his later experiments he mixed amalgam with the hand ; it was very likely that the discrepancies found in his experiments were due to something of the kind. Mr. Lloyd Williams had suggested other reasons for discrepancies which were worthy of

consideration. Mr, Paterson referred to lining cavities with osteo plastic. He did not experiment in that direction, because they knew quite well that if a cavity was lined with osteo plastic it would be water-tight as far as the osteo plastic was concerned. Amalgam to be most advantageously used should be set as soon as ever it could be packed in, and if packed pretty hard, burnished then and there, the burnish would remain.

The PRESIDENT announced that Mr. Howard Mummery would read a paper on "Photo-Micrography" at the next meeting, and the usual votes of thanks concluded the proceedings.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

ANNUAL GENERAL MEETING, held Monday, January 21st, 1895, the President, A. E. CLAYTON-WOODHOUSE, Esq., in the Chair. The minutes of the previous meeting were read and confirmed. Messrs. Joseph Cooper and Cribb signed the Obligation Book and were admitted members by the President.

The President then declared the ballot opened for the election of officers for the present year.

Messrs. Hall and Parrot were appointed scrutators.

Our Casual Communication being called for, Mr. Hall showed the models of two regulation cases—one with a very underhung bite—and asked the opinion of members as to present treatment.

Mr. D. P. GABELL (in the absence of the Treasurer, Mr. W. M. Jones) then read the Balance Sheet for the past year, and also the Report.

Mr. BAKER then said he had a proposal to offer with regard to the insurance from fire of the Student's instruments in the Hospital. There were, he said, about 97 instrument cases, each containing on an average, about £20 worth of instruments, and 70 engines worth about £8 a piece, this together with the instruments used in the mechanical departments represented a sum of money a little over £2,500, he therefore moved "that the Secretary be empowered to obtain a policy of insurance against loss by fire upon the instruments of Student Members of this Society lying in the stopping and mechanical rooms of this Hospital." This would in his opinion be

another inducement for students to join the Society. He had made enquiries and found that an office was willing to insure the instruments to the amount of £3,000, at the rate of 2s. per cent., no one instrument to be of more value than £10.

Mr. PEARCE said that he should have great pleasure in seconding Mr. Baker's proposal, as he thought the idea was an exceedingly good one.

Mr. D. P. GABELL said he felt he must in the enforced absence of the Treasurer enter a protest against the expenditure of the Society's money in this manner. The object of the Society was mainly scientific investigation, and he failed to see how this came within its bounds. The matter seemed to him to come more within the province of the Student's Club.

Mr. FORSYTH said, as Secretary to the Student's Club, which was a club mainly for athletics, he must object to the matter being referred to that Club.

Mr. DOUGLAS asked whether it was not the duty of the Hospital Authorities rather than the Student's Society to look after the Instruments of Students working in the Hospital.

The PRESIDENT said that owing to some slight mistake the Secretary, although he had been spoken to about it, had not taken any steps in the matter, and so it seemed better to postpone the proposal until the next meeting, when he hoped there would be more members present, however if the members present wanted it settled at once, he would take the vote on it.

On being put to the vote, Mr. Baker's proposal was carried by a majority of 20.

The PRESIDENT then called upon Mr. S. J. Hankey for his paper on "A Few Causes of the Failure of Fillings." (See page 47.)

The PRESIDENT after thanking Mr. Hankey for his paper, in which he said he had almost exhausted the subject, said he was sorry no mention had been made about the use of Sullivan's amalgam in interstitial cavities, which he considered was a very bad practice, more especially where the cavities were in such situations that the tongue was not able to keep the surface clean. One of the great causes of the failure of fillings was, in his opinion, the general health of the patient. Judging from the manner in which the old fashioned gold fillings lasted, although they were not at all pretty to look at, being quite rough and full of pits, the one essential

element for a successful filling was the thoroughness of the preparation of the cavity. As regards the use of gum mastic for the sealing in of arsenical dressings, he thought too great an emphasis could not be laid upon the very great and serious risk that the patient ran of having some of it leaking on to the gums.

Mr. SEYMOUR, by means of a small diagram, shewed that one was very tempted in interstitial cavities not to cut away enough of the tooth substance. He had found by experience that an interstitial filling lasted much longer when the sides were cut to the lingual and labial aspect, and the filling either rested against a tooth or another filling, rather than were the cavity was left small and the tooth substance rested against another tooth or a filling.

Mr. SCHELLING said that the reason, in his opinion, why the old fashioned gold fillings lasted so long, was because they were so well burnished against the edges. The failure of amalgam fillings was in many cases due to the soft state in which they were inserted. An amalgam put in by Dr. Bonwill's method could be almost burnished before it left the operator's hands.

Mr. HOLFORD remarked that the reason why so many crown fillings failed was because the fissures were not cut out. The amalgams he had found to last best where those in which he had lined the cavity, except the edges, with osteo and then put in the amalgam. He himself should not care to have a mastic dressing put in his own mouth but would prefer the use of gum benzoin.

Mr. NOWELL said he had always made notes about his fillings, and he had come to the conclusion that in many cases the sides of interstitial cavities were not cut away sufficiently. Of all the amalgams he had used he preferred for cavities extending to the gum margin "Flagg's Submarine," the "contour" being liable to become rough. His use of gum mastic to seal in an arsenic dressing was not very satisfactory, as in one case after fourteen days the pulp was as lively as ever, this was no doubt due to the soaking in of the gum mastic on to the devitalising fibre.

Mr. GABELL said Mr. Woodruff always made use of gum sandarach for sealing in arsenical dressing, and his method was to place cotton wool over the dressing before putting in the gum.

Mr. SCHELLING said his method when applying a devitalising dressing was, if the cervical was well excavated, or if it was at all low down, he put in gutta percha, whereas, if it was not well

excavated, then he used gum sandarach. The caps he used for preventing pressure on the pulp during the process were made of copper.

Mr. HANKEY then briefly replied.

The PRESIDENT, having said a few words of farewell, announced that the name of the winner of his prize for the best Casual Communication would be given out at the next meeting.

Mr. NOWELL then proposed a vote of thanks to the President for his many kindnesses during his term of office, saying that he was sure no one was so popular as or could have taken more interest in the Society than Mr. Woodhouse.

Mr. MARSTON seconded the vote of thanks, which was carried with acclamation.

The names of the newly elected officers were then read:—*President*—Mr. F. J. Bennett; *Vice-Presidents*—Messrs. Herbert Clarence and D. P. Gabell; *Treasurer*—Mr. R. McKay; *Secretaries*—Mr. H. W. Trewby and W. S. Nowell; *Curator and Librarian*—Mr. S. Colyer; *Second Year Councillors*—Messrs. Marston Turton, Bates, Baker, Bonnailie; *First Year Councillors*—Messrs. Malone, Turner, Douglas and Heath.

A vote of thanks was then accorded to Mr. Hankey for his paper, and to those gentlemen who had brought forward Casual Communications, and it was announced that the next meeting would be on February 11th.

The Proceedings then terminated.

IN our issue of September last, we referred to a description of ancient bridge-work, given by V. Guerini in a paper before the Rome Medical Congress. It was with special interest that we noticed a duplicate of the specimen, now in the museum of Corneto, in the Oppenheimer collection of Roman Medical Antiquities which was exhibited at the Annual Conversazione of the Harveian Society. The specimen having been described, we need not repeat, but we should like to testify to the correctness of the description, and again to marvel at this old-world dental effort.

THE DENTAL RECORD, LONDON: FEB. 1, 1895.

A DEATH DURING NITROUS OXIDE NARCOSIS.

DEATHS during the administration of Nitrous Oxide are rare. So rare, that if we wish to express the proportion of deaths to administrations in the form of a vulgar-fraction we must take for our denominator not thousands, nor even tens of thousands, but millions. Speaking without the book, we believe that a death has never occurred when gas has been given by a skilled anæsthetist, but, though it is thus possible for a man to, as it were, live in the very midst of it, and go through life without seeing a death, yet there is a possibility. It is this possibility which, ever present in the mind of the wise man, quickens his feeling of responsibility, and so is directly concerned in his uniformly good results. It is the forgetfulness or ignorance of the possibility of accident that leads another to neglect to take wise precautions, with now and again a lamentable result. Such an untoward result it is our painful duty to record this month, and as we do so, the fact suggests itself that it comes as a ghastly commentary on our remarks on "Failures" in the last issue. Here is a failure of a serious kind. What can we learn from it: Condemnation of the administrator of the gas? Certainly not! "Let him who is innocent cast the first stone." Rather let us consider the cause that it may help us to avoid a like result in the future.

In Dr. Hewitt's excellent book, "Anæsthetics and their Administration," the dangers connected with the administration of Nitrous Oxide are conveniently grouped under four headings. 1. The Administration of an Overdose. 2. The Passage of Foreign Bodies into the Larynx or Trachea. 3. Respiratory Failure occurring independently of the Causes referred to in 1 and 2. 4. Circulatory Failure: Syncope. Of these the second and third groups are by far

the most frequent cause of trouble during Nitrous Oxide Anæsthesia, and are, at the same time, due to causes for the most part preventable. Heart failure as a primary phenomenon is rare, thus Dr. Buxton states: "Whether death from syncope has ever taken place under nitrous oxide is doubtful"; whilst Dr. Hewitt has been "unable to find any reliable account of grave or fatal syncope from imperfect anæsthesia under nitrous oxide." But in weakly and old people with feeble or diseased hearts it must be perfectly obvious that the extra strain coincident to respiratory obstruction may in many cases lead to fatal syncope. But the stoppage of the heart being in these cases secondary to the respiratory trouble, it is evidently possible that, if we can prevent the latter, we may hope not to be troubled by the former.

This case under discussion may be briefly described. The patient was a girl, age twenty-three, who apparently appeared to the administrator to be in perfect health; gas was administered, a tooth was extracted and the patient recovered consciousness (therefore obviously not an overdose), but remained in a listless condition. Shortly, however, she commenced breathing in a spasmodic way, there was lividity around the nostril, and in spite of every aid in about an hour she was dead. Measurement showed her stays to be five inches smaller than her waist, and her internal organs showed that tight lacing had been habitual. In the account to hand, there is much omitted that we should have been glad to learn, but even from this each will see how the respiratory movements must have been impeded by a corset of this description. Unfortunately, as a sequence of events, this case does not stand alone, for it will be remembered that a fatality under similar circumstances happened at Edinburgh, in 1889, the patient being a lady of rank. Here, then, we have two cases of death due in the first instance to respiratory failure, the result of tight-lacing. Surely they teach a lesson. It would seem as if this impediment to respiration escaped notice, yet it is

one which should be apparent. We take it that no man would think of administering gas without first examining the mouth to see if there be any actual or potential impediment to respiration therein. He should also be careful to see whether there be any obstruction to the respiratory movements of the thorax, especially tight corsets. It would be a useful rule to always see that these are undone, nor need there be any indelicacy about the matter, especially if the patient be requested to take her seat in the chair, and then be covered over with a large towel or one of the waterproof aprons specially made for this purpose.

News and Notes.

THERE is, at present, no dental school in Holland, but this is to be rectified, for we read that, at a recent meeting of the Dutch Dental Association, it was resolved to form one. A committee was appointed to arrange matters.

THE Annual Meeting of the Plymouth and District Dental Society was held on Tuesday, January 8th. The Secretary stated in his report that meetings had been held seven times during the last year for social intercourse, the former part of the year being taken up with discussion of rules, &c., for the government of the society, and topics of interest were brought forward at the latter meetings, which were the subject of debate. At the last meeting the President gave some Dental reminiscences. The Secretary is glad to find, from a perusal of the journals, that other local associations have followed their example in getting the Medical Societies to pass resolutions making it unprofessional conduct to give anæsthetics to unregistered men. A special meeting was held in November to consider Mr. Blandy's circular, when a subscription was voted to enable him to carry on his crusade. Attention was drawn to the difficulty experienced by those who are seeking to purge the Dental Profession, that arises from the apathy and non-assistance of those

who fail to recognized any direct benefit to themselves. The officers elected were:—*President*—A. S. Hambly; *Secretary*—A. H. Mountford; *Committee*—A. R. Brittan, R. Maw, A. Taylor.

We welcome a new dental contemporary *The Dental Digest.* The first number is to hand. Its bids fair to take its place among the best of Dental Journals. We understand it is edited by Dr. A. W. Harlan, late of the *Dental Review.*

The Third Meeting of the present session of the Edinburgh Dental Student's Society, was held on the evening of January 14th, Mr. Sewell Simmons, L.D.S., the President in the Chair. After the minutes of the previous meeting had been read and approved of, Mr. J. Y. Jameson, of Newcastle, read a paper entitled "On the Use of Gum-body in Crown Work." He had prepared many specimens of finished and unfinished crowns, and in passing these round for inspection, added many practical hints not contained in his paper. Mr. H. B. Ezard followed with a paper on "The Bichromate Primary Cell: How to make and use it as a Dental Motive Power." This paper was also illustrated and led to a good discussion. Mr. Blandy, L.D.S., has kindly granted the loan of his collection of dental advertisements for exhibition on March 4th, when a paper will be read entitled "The Position of L.D.S. *v.* The Unqualified Practitioner."

Probably, a good many of our readers know that for some time past efforts have been made to establish a school of "Dental Technology." The idea has now taken definite shape and premises have been taken in the Langham Chambers. These are in process of adaption to the purpose, therefore, though we have visited the building, and have been impressed with its general suitability, we defer any detailed account till the alterations and fittings are complete. For the benefit of those who may not be familiar with the scheme of the founder, Dr. Cunningham, we quote the following statement of the "Objects of the Institute." The technical education in the Art and Science of Mechanical Dentistry of (1) Persons who wish to receive a scientific and practical training during pupilage (3 years) as required by the various licensing bodies for the L.D.S. (pupils).

(2) Person desiring to acquire such a scientific and practical training as will enable them to act efficiently as dental mechanicians with qualified practitioners of dentistry (apprentices). (3) Pupils, apprentices and mechanicians engaged in private practice during the day time and practitioners who wish to supplementary instruction in the theory and practice of mechanical dentistry, or some special part thereof. (4) Practitioners desiring facilities (*a*) for original research, (*b*) post graduate instruction. The curriculum is to include a "General Manual Course" (drawing, joinery, metal work, &c.), a "General Science Course," and courses showing the application of these to the special object of the Institute, Mechanical Dentistry.

THE American Journals, just to hand, give an interesting account of the meetings at Hartford, Conn., to celebrate the semi-centennial of modern anæsthesia. Most of our readers know that a tablet has been erected in that city in memory of Horace Wells. The oratory, of which this event has been the occasion, is somewhat remarkable, not only for the many happy thoughts and expressions to be found therein but for the somewhat unequal manner of its flight. We are at times carried out of ourselves by the pictures drawn of the benefits accruing from the use of anæsthesia, and anon left floating in mid air, wondering where we are, and what its all about, and if it is not perilously near bathos. But it seems to us a pity, at this late hour to drag in any discussion as to the relative claims of Sir Humphrey Davy and of Horace Wells. Facts are facts, and they are simply these, that Davy knew something of the effect produced by inhaling nitrous oxide, but his work and his thoughts were directed to other ends than the discovery of an anæsthetic for dental or surgical purposes. The chemist tells us the property of drugs, the physician sees the application. Horace Wells was the happy man to see and to teach the use of nitrous oxide as a narcotic agent.

THE Dental Manufacturing Company send us some "Compound Capsicum Plasters" prepared from the formula of G. W. Watson, L.D.S. They are nicely put up in tin boxes, and small envelopes are provided with directions printed outside, for their distribution to patients. We have tested the plasters in several instances and find them to be very efficient counter-irritants.

Abstracts and Selections.

A CASE OF COMPOUND FOLLICULAR ODONTOME

Invading the Right Antrim of Highmore and Obstructing the Corresponding Nasal Fossa.*

By A. W. De Roaldes, M.D., New Orleans.

Daniel A., aged nine years, of Natchez, Miss., was brought to my office in the first days of February, 1894.

Previous history, by Dr. George W. Rembert, of Natchez.—"It was in July, 1892, in the office of Dr. N. L. Guice, and by his invitation, that I first saw the little fellow. An examination revealed *two points* of disease, separate and apart, and differing in pathological conditions: 1. On the socket of the previously lost deciduous right central incisor (superior) was found a *fibrous* tissue completely filling the interspace and extending considerably below the line of the adjacent teeth, it also extended above the alveolar border. For some reason (possibly the result of pressure) there was found a deficiency of osseous structure at this point, while the surrounding bone did not appear carious.

2. "Beginning opposite the right canine and extending posteriorly alongside the internal plate of the alveoli to near the tuberosity of the maxilla, and covering a considerable portion of the right palatal bone, was found located an osseous tumour (ossteoma) evidently of several months' development. An appointment was given for the day following and both tumours were removed, with the result that there has been no return of the fibrous, but a partial reproduction of the other growth.

"I again," continues the doctor, "had this little boy for a patient in the spring of 1893. At this time I found an osseous tumour located on the external plate of the alveoli, right side, superior, and covering a portion of the external surface of the right maxillary in the region of the canine fossa. With the kindly and skilful assistance of Dr. Lamkin and Dr. Beekman, this growth was removed on June 20th, 1893, and we had hoped a speedy cure might result from it; but in a very short while we discovered that

* Read before the American Laryngological Association at its Sixteenth Annual Congress.

there was necrosis of the maxilla at the point operated upon; and in September following, with the patient chloroformed, we succeeded in removing different fragments of dead bone, resulting in an exposure of the antrum of Highmore. At this time we saw no osseous deposit within the sinus, but noticed the growth that is now most noticeable, being external to the antrum and encroaching upon the orbital and nasal regions. Not knowing for certain whether this enlargement was a reproduction of the original disease or but a hypertrophied condition due to the inflammatory action incident upon the necrosis, we deferred to operate, thinking it wisest to await further development. We are now convinced it is the same in character as the tumours previously removed, and agree with you in advising active surgical interference."

Upon actual examination I find young Daniel A., to be a well-built child of sound parentage, who has always enjoyed good health. No indication of any rickety tendency in early age, nor any history of a fall or blow on the face. Occupying the front of the right cheek is a uniformly hard, painless tumour, covered by sound skin, evidently springing from the superior maxilla, and limited externally and superiorly by the malar bone and by the upper wall of the antrum of Highmore, without, however, any apparent encroachment of the orbit, although upon inquiry the child it found affected with diplopia. The growth is limited toward the middle line by the nose, which on that side of the face is somewhat flattened and more continuous with the cheek than on the other side, as if the ascending process of the maxillary bone has been lifted up slightly. An examination of the right nasal fossa reveals a marked stenosis due to the bulging in the lumen of that channel of the external wall of the fossa. There exists a slight chronic rhinitis, but no exposed bone is found by the most careful probing. The voice is somewhat nasal; there is no perversion of the sense of smell; no lacrymation; no neuralgia, and there are no ganglionic enlargements. By digital examination, the post-nasal space and especially the right choana are found to be free of all swelling. Upon examination of the buccal cavity, a hard tumefaction of the palatal portion of the right superior maxilla is observed, which measures an inch and a quarter antero-posteriorly and nearly an inch transversely. The external and anterior boundaries are fused with the alveolar border. This process is very much increased in

width, especially in its posterior half, and on its border are to be found the following teeth, to wit: the right central incisor of second detention (scarcely erupting), the lateral incisor, the cuspid, the second molar of the deciduous set, and the first or sixth year molar of the permanent set. In the place of the canine is to be seen an oblong, hard, exposed structure, looking like a piece of necrosed bone, but perfectly fixed in its position; between it and the second molar is a small, irregular depression, leading in the direction of the antrum, in which the patient generally packs a plug of absorbent cotton. There is no discharge of consequence, and the probe when introduced is soon arrested by a hard, denuded, bony resistance.

By forcing water through with a small antral cannula, a few drops are observed to dribble out from the right nostril. Heryng's lamp reveals an absolute opacity of the right cheek and there was a total destruction of perception of light in the corresponding eye. The diagnosis of a benign neoplasm of the maxilla, probably an osteoma, was made with reserve. A modified Vallet's* operation was performed under the influence of chloroform. This Dr. de Roaldes described.

The main mass of the tumour was found on the floor of the antrum corresponding to the canine fossa. Considerable difficulty was found in chiseling it out on account of its eburnated consistence, and also in avoiding fracturing the alveolar border and hard palate, which, when used as a fulcrum to dislodge the growth, showed manifest weakness. On the surface of the tumour were tufts of hard, adherent tissue, resembling the lining of an alveolus; a large number of smaller masses, to the number of fifty or more—as a few were lost during the operation—some of them tooth-shaped, were found sequestrated in various parts of the surrounding bone under the orbit, and as far back as the tuberosity. They were, however, gouged out thoroughly and easily. The growth had invaded and dilated the whole antrum, leaving no vestige of its lining membrane. After a complete curettage of this large cavity it was carefully packed with iodoform gauze, and the soft parts neatly brought together by six points of suture, with a harelip pin passed through the upper lip, over which an antiseptic dressing was applied.

* Résection parteille de l'os maxillaire supérieur pour l'extraction de polypes volumineux des fosses nasales, du pharynx et du sinus maxillaire, par M. Vallet d'Orleans. See *Gazette des hôpitaux*, March 31st, 1859.

Outside of a slight attack of otitis which developed on the third day in the left ear, due to a nasal injection when the right nasal fossa was completely occluded, the case progressed rapidly toward recovery, and the patient was sent back home on the 23rd of March, since which time he has been attended by Dr. George W. Rembert, who, on May 14th, kindly writes: "It has now been ten weeks since the operation, and the cavity is probably two thirds filled." He thinks it will be necessary, later on, to adopt an obturator in connection with the dental plate. "The right corner of the mouth is slightly drawn backward and upward," adds the doctor, "and quite *likely* will increase *in the future*, but I do not anticipate any great disfigurement; on the contrary, considering all things, I accept it as fortunate indeed for the young man that it is not much greater. Should he, in after years, wear a moustache or beard, it will be next to impossible to detect the shortening of the right side of the face and the changes in the mouth that will *probably* follow.

Report of microscopical examination of the tumour, by Dr. W. C. Borden:

"The specimen received, and I beg to report that it is a compound follicular odontoma. It consists of hypertrophic tooth cap ule which ossified in places (sporadically), producing a number of denticles which had originally probably all be bound together by periosteum, the denticles being imbedded in the fibro-vascular structure, much as plums are in a plum pudding. The denticles consist entirely of cementum. A photo-micrograph of a ground-down slice of one shows a structure indentical with that of cementum of teeth. This osseous structure is very hard and identical with that of the roots of a tooth. The denticles appeared so hard that before I made a section I thought they consisted of cementum, dentin, and enamel, but they have neither of the latter histological structures. I notice that Sutton states that these denticles may consist of either cementum or dentin, or may even be ill-formed teeth, having all the structures of those organs. In this case the neo-plastic centres developed in the fibro-vascular structure, grew as cementum only, and did not progress as far as dentin or enamel formation, or rather, as enamel is of epiblastic origin odontomata of this type are probably hypertrophic growths from cementum centres. The tumour is a very interesting one."

If we accept J. Bland Sutton's classification of odontoma, which, in my opinion, is more advanced and much more satisfactory than Broca's, this growth as removed and presented to you belongs to the division called by him a "compound follicular odontoma." In regard to these he writes in his last work on *Tumours, Innocent and Malignant* (1893), page 36: "If the thickened capsule ossifies *sporadically* instead of *en masse*, a curious condition is brought about, for the tumour will then contain a number of small teeth or denticles, consisting *of cementum or dentine* or even ill-shaped teeth composed of three dental elements, cementum, dentine, and enamel.

The number of teeth and denticles in such tumours varies greatly and may reach a total of three or four hundred. This last number, however, has never been found, to my knowledge, in the human subject. His citation concerning such numbers refers to a case in the horse, mentioned by Logan (*Jour. of Comparat. Med. and Sur.*, New York, 1887), which contained four hundred denticles. He himself has reported the case of a compound follicular odontoma from a thar, which had growth in each upper jaw, the denticles numbering in all three hundred. After careful researches on the subject I do not know of any case that can be compared, as to the number of denticles, to the one I to-day bring before you.

The case of Sims contained forty, the one of Tellander twenty-eight, and the one of Mathia's fifteen (all figured in Sutton's work).

Henry L. Albert and Hildebrand are quoted by Sutton as having reported a similar case, but referring to the original observations, I find no mention made of the number of denticles. Strange to say, the growth in almost every one of these five cases was located in the upper right maxilla. I know that Sutton, who was rather arbitrary several years ago in his assertions of the extreme rarity of the odontoma of the superior maxilla, as compared with those which develop in the lower jaw, has now modified his views, as more cases are published and a more thorough microscopical examination is made. The fact is that evidently before Broca, in his remarkable memoir, called the attention of surgeons to this subject, a great many cases described as fibrous tumors and exostoses of the antrum were nothing else but odontomata. Such cases are now very well defined by careful microscopical investigation, and shown to be neoplasms composed of dental tissues (enamel, dentine, and cementum) in varying

proportions and different degrees of development, arising from tooth germs or teeth still in the process of growth in fact, real odontomata. While unable to substantiate the statement on histological grounds, it is to be presumed that in this case what was described by Dr. Rembert as a fibrous growth and removed by him, without any reproduction since, was a fibrous odontoma in connection with the right central incisor, which was supposed to have been lost by premature dissolution of its fang, but which I am more inclined to believe had not erupted. If this view is taken, the location of this odontoma in the incisor region would be a real curiosity, as Professor von Metnitz, of Vienna, in describing a case of that kind, *believed it to be* unique (see abstract of case in the *British Journal of Dental Science*, 1891, vol. xxxiv, page 211).

It is more difficult to explain why, as has been observed, these tumors should more generally affect the right upper and lower jaws. As to the growth which came under my observation for operation, it was undoubtedly connected with the canine tooth which had not erupted. Even that connection is very unusual, as Broca can only cite one case of odontoma developed in the canine region. As a rule, the points of selection for these growths are the pre-molar and molar teeth, and in these last more particularly.

It is to be supposed that the two growths were independent and represented two distinct odontomata. Cases of double odontomata on the same subject are on record, but the growth do not generally develope on the same side of the maxilla. In regard to the diagnosis, "it is a curious fact," says Sutton, "that up to this date there is no instance on record in which an odontoma, other than a follicular one (dentigerous cyst), has been diagnosticated before operation." This assertion is too sweeping, as can be proved by the case of Panas and two or three others. It shows, however, how difficult is a positive diagnosis, especially when the growth remains imbedded in the thickness of the maxillary bones.

The factor which must outweigh all other considerations in the mind of the surgeon is the one relating to the age at which the tumour makes its first appearance; it is pretty safe to assert that any neoplasm which presents itself in the maxillary bones after the completion of dental evolution is not an odontoma. This consideration, coupled with the young age of the patient and the absence of one or more teeth, will assist materially in overcoming

our doubts. It is most important, however, to arrive at a precise diagnosis, as the study relating to the literature of odontoma is very instructive, inasmuch as it shows that patients have in many instances been subjected to operations needlessly severe and dangerous.

Before proceeding to excise a portion of the mandible or maxilla, the surgeon must satisfy himself that the tumour is not an odontoma, for this kind of growth generally requires only enucleation and vigorous gouging.

Although the result has been as satisfactory as possible in my case, I now think that a more conservative procedure, through the mouth and canine fossa, might have been adopted with equally as good results.—*New York Medical Journal*, *November 17th*, 1894.

DEATH IN A DENTIST'S SURGERY.

The Evils of Tight-Lacing.

Last evening, Mr. Parker, county coroner, held an inquest at the Preston Infirmary touching the death of Amy Budden, twenty-three, who died on Saturday night, January 12th, at the surgery of Mr. Nathaniel Miller, dentist, Fishergate, Preston, after having inhaled gas.

Edmund Budden, cashier, Stainhill Park, Hampton, Middlesex, said his daughter was a domestic servant, and had been employed by Mr. Willan, solicitor, of Preston. Deceased's mother died suddenly, and there was an inquest on the body.

Mrs. Willan, wife of Mr. Willan, above mentioned, of 25, Ribblesdale place, said deceased had been employed by her since last July, Deceased went out about seven o'clock on Saturday night, but did not say she was going to the dentist's. About two months previously deceased said she thought of going to the dentist's, and witness told her to let her know before she did so. She said this because she did not think deceased was strong.

Mr. Miller said he had heard that the deceased seemed to be tight-laced, and he wished to ask Mrs. Willan if this was so?

Mrs. Willan said she had noticed it, and taxed her with it, but she had denied it, and always seemed able to run about without any difficulty.

Mr. Nathaniel Miller, dentist, L.D.S.I., of 95, Fishergate, Preston, said deceased came to him shortly before seven o'clock on Saturday and requested him to draw two teeth. He saw that all the pain came from one tooth at the bottom, and prepared to extract it. Deceased asked for gas, which, from her appearance, he had no hesitation in administering. He administered nitrous oxide gas, and deceased became unconscious in about thirty-five seconds after inhaling about $3\frac{1}{2}$ gallons, the average quantity being about $3\frac{1}{2}$ gallons to 4 gallons. The gas was administered in the presence of his maid, Mary Adeline Ritson, who always assisted him. The tooth was extracted, and deceased's breathing was normal throughout the whole operation. She recovered consciousness about two and a half minutes after the tooth was extracted. Patients were usually listless after the operation, and he was not surprised that deceased exhibited these symptoms. The first morbid symptom he noticed was a slight pallor down each nostril and spasmodic breathing, symptoms which alarmed him, and he at once applied nitrate of amyl. This was always given in cases of heart affection. He despatched his maid for Dr. Collinson, and while she was away resorted to artificial respiration. Dr. Collinson arrived within three minutes, and injected ether. Deceased was then placed on the floor and they began to remove her clothes, but they were unable to remove her corsets and they had to be torn off. Hot towels were applied to the region of the heart, but all their efforts were in vain, and at twenty minutes past eight they found that she was dead by applying the stethoscope and a cold mirror. In answer to the coroner, Mr. Miller said he had been in practice twenty-five years, and had administered gas certainly over 100,000 times. Deceased had previously had gas with him, but he could not say how long ago.

By the Foreman : Had he noticed that deceased was tightly laced he would not have administered gas without asking her to loosen her corsets.

Dr. Collinson, of Winckley Square, Preston, corroborated the evidence of Mr. Miller as to the efforts to restore deceased to consciousness. The measurement of deceased waist under the stays was twenty-three inches, while her stays measured only eighteen inches, a difference of five inches. He and Dr. Turnbull-Smith made a post-mortem examination on Sunday morning. The liver

was nine ounces above the normal weight, and was transversely compressed. He further described the appearance of the internal organs, which he said, denoted that tight-lacing had been habitual.

The Coroner: Would you call drawing in to the extent of four and a half inches excessive? Witness: Distinctly.

The Coroner. Excessive tight-lacing?

Witness: Yes. Continuing, the witness said death was due to asphyxia, under the conditions stated, which interfered with proper breathing. Deceased had recently had a full meal, which would further interfere with respiration.

By the Foreman: He thought it probable that the deceased might have gone successfully through the operation had it not been for tight-lacing.

A juror asked witness if it was possible for the gas to be too strong? to which he replied "not too strong; it might contain impurities, but Mr. Miller had used it successfully during the day."

Dr. Turnbull-Smith fully corroborated the statements of last witness.

The coroner, addressing the jury, said the matter had been fully investigated, and it seemed to him that death had resulted from misadventure, through gas being administered while deceased was suffering from the effects of tight-lacing.

The verdict of the jury was as follows:—"That deceased died from misadventure, while under the influence of nitrous oxide gas, from suffocation or stoppage of the heart's action, caused by excessive tight-lacing; and we consider Mr. Miller in no wise to blame, as he conducted the operation satisfactorily."—*Liverpool Mercury.*

THE LEEK CASE.

In the October *Dentist* it was editorially explained how J. J. Leek had attempted to force the California State Board of Dental Examiners to issue to him a license to practice dentistry in the State of California, by virtue of his having been in practice in said State on the date of the enactment of the dental statute, *viz.*, March 12th, 1885. Being non-suited in this it was further explained, at the same time, how he and his attorney, one

George D. Collins, developed a scheme to marshal the forces of the non-licensed and by a combined effort secure a pledge of five hundred dollars, which amount was to be paid to said Collins within ten days after he had "had" the law "declared null and void."

In pursuance of this mighty scheme, on the 23rd day of November, J. J. Leek caused himself to be arrested on a warrant sworn to by one of his employees, O. C. Jenkins, charging him with a misdemeanour for having commenced the practice of dentistry in the State of California without first having secured a license from the State Board of Dental Examiners. The case was assigned to Judge Low, Department No. 4 of Police Court. On the day of Leek's arrest, his attorney appeared before the Supreme Court and filed a petition for a writ of *habeas corpus*. In his petition he alleged that Leek was illegally deprived of his liberty by the Chief of Police of the city and county of San Francisco.

He attacked the Act of March 12th, 1885, on constitutional grounds, but the Supreme Court was evidently of a different mind, for on the 27th day of November it refused to issue the writ of *habeas corpus*. The attorney was expecting such a refusal on the part of the Supreme Court, for on the same date an appeal was made to the Court for a writ of error on Leek's behalf. The Court denied this on the date of the application. While the Supreme Court did not prepare an opinion declaring the Act of March, 12th, 1885, known as the Dental Act, constitutional, its action in denying the writs referred to amounts to the same thing, and we may consider that it has by this action practically declared the act constitutional.

When the case was returned to the police court, Leek, by his attorney, appeared and had the hearing continued until December 21st, and the Court admitted him to bail in the sum of fifty dollars.

It will be impossible for Leek to proceed any further in the State Courts, and any remedy he may have from this date must be granted him in the United States Courts. The fact that the Supreme Court denied both a writ of *habeas corpus* and the writ of error leaves him without further standing in that tribunal. Undoubtedly his object in applying for the writ of error was that the matter might be carried to the United States Supreme Court. We have not learned whether he intends to apply to either this

Court or the United States Circuit Court of this district. It being certain that he can secure no relief from the State Courts, unless the United States Courts comes to his rescue, which is not probable, he will be compelled to stand trial before the police court for practicing dentistry without a license.

It is really hard that so beautiful a scheme should be so ruthlessly thrust aside by the Courts. This lack of appreciation of counsel's intellect is discouraging, to say the least. It is not frequent that men willingly set traps with themselves as bait, but when they do they deserve to play the part of the victim as well.—*The Pacific Coast Dentist.*

MAKING STEEL CROWN DIES.

By Frank B. Norris.

The making of steel crown dies and the use of a block of wood as a counter die, has not, to my knowledge, appeared in any of the dental journals.

To make a steel die that will never wear out, procure a piece of round stuff, half-inch for molars, three-eighths for bicuspids. Take them to a blacksmith and have them cut into as many three-inch pieces as you want dies. Each pieces is then heated to redness and one end driven into the crown die plate, which will give a steel cameo of the cusps and sulci complete. The dies are afterward placed in a vice and filed to any shape or size desired, being careful not to get the neck smaller than the crown.

For either the steel or fusible metal dies, a block of close-grained pine or spruce is all that is necessary for a counter. By driving the die into the end of the block you have as fine a counter as one could wish. A little oil placed in the counter will prevent crown from sticking.

A draw-plate is very handy with these dies, but is not necessary, as a piece of plate may be drawn down into shape over a series of hard wood mandrels, driven carefully into different sized holes in the block.—*Items.*

SOME THOUGHTS ABOUT THE FIRST PERMANENT MOLAR.*

By H. A. PALMER, D.D.S., Janesville, Wis.

THE first molar is the largest tooth in the series, and in outline is the most perfect. In structure it is generally inferior to the others of the same mouth, being less able to withstand the ravages of disease, and hence is more often extracted than any other. Dr. Taft says that 37 per cent. of all decayed teeth are first molars. Tables given by Tomes, Hitchcock and Magitot, showed that over 25 per cent. of 35,000 carious teeth were first molars.

There are several reasons why this tooth is of an inferior structure. It is growing and erupts during the time when the whole system of the child is demanding an extraordinary amount of support. There is only so much nutrient matter in the system at one time. The appetite of the average child is almost constantly calling for support for all parts of the body, and of course the first molar can only receive its share. Its neighbours are all demanding nourishment and can only be supplied at the detriment of the first molar. All around it are tissues that are irritated and inflamed by every act of mastication which causes the child to avoid using that part of the mouth, and thus cheats the tooth of its rightful exercise.

Dr. E. J. Wetzel, of Germany, says, "Physiologically the first molar is the most useful tooth in the whole arch, and presents the largest area of crown surface, and is situated in a position where mastication is greatest and is admirably adapted to bear strain."

Dr. Black says, "We owe more to parents and their children in an educational way, with this tooth than with any other, that we may treat it before it is destroyed."

It is not only of great importance to the child because it is so liable to decay, but because of its position in the arch. It is situated just where the force of mastication is greatest, and thus assists the individual most in his trituration of food. Its position in relation to the form of the features is of the utmost importance.

Nearly all of the elongation of the jaw is from the second temporary molar backward. Now it is reasonable to conclude that

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* Read before the Wisconsin State Dental Society, 1894.

if the first molar is allowed to decay and be extracted in early life, that the jaw will not be as thoroughly developed as it would be if the tooth was there to hold its place and keep the others in position during the development of the jaw.

If the first molar is extracted, the second will almost invariably tip forward into the place of the first, and thus not only arrest development of the jaw, but cause an irregularity which will be a great hindrance to mastication, as well as cause a marked change in the form of the features. Dr. Talbot says that "the habit of extracting the first adult molar during the past forty years has done more to cause arrest of development of the alveolar ridge, than any other one thing," and I think we can also safely say that nothing in nature, or in the work of dentists, has caused so many irregularities, as has the extracting of this tooth.

It is important that the first molar be saved, for the occlusion of the jaws comes upon these teeth during the eruption of all the permanent teeth anterior to them, and if the molar is gone, the other teeth will not erupt as fully as they would if the molars were in place to keep them from occluding too soon; consequently the face is very materially changed in its length. A shortened bite causes a great difference in the roundness of the features.

A tooth tipped out of position may cause a great irritation of the gums and surrounding tissues, and thus lead to other complications or troubles.

The lower arch may be narrowed or caused to become misshapen if the upper molar is extracted and the occlusion becomes abnormal. An irregularity which will make a great difference in the facial expression, may be caused by extracting one or both molars on a side and leaving those upon the other side. The child's face may become something like the domestic relations of certain households—rather one-sided. The deciduous molars ought also to be retained the proper length of time, or this first molar may drift into their place and thus cause trouble. Dr. Dwinnelle reports a first molar that had drifted up to the cuspid.

Having now considered its construction, environment and importance, with the unhappy results of removal, let us suggest that it is our duty as dentists to try to impress upon the minds of our patients, the great importance of preserving these teeth.—*Review.*

THE RELATIVE PENETRATING POWER OF COAGULANTS.

By James Truman, Philadelphia, Pa.

It has been clearly evident that the inner tubular portion, fibres of Tomes and Neumann sheaths, form no insignificant part of the organic matter of the tooth substance, and that death of the central organ means necessarily the death of the whole and subsequent decomposition of this tissue, or at least the central protoplasmic portion, the sheaths being almost indestructible. Hence the treatment of the pulp canal, however perfectly accomplished, must fail to reach the microscopic elements in the tubes, and the decomposition taking place therein results in the discoloration of the entire tooth, and may act disastrously by septic emanations upon the vitality of the entire structure. The importance of this has not been lost sight of by intelligent operators, but the difficulties of manipulation have been serious. It has been plain that but two methods could be relied upon to overcome the difficulty, the property of coagulation and the diffusibility of various essential oils, aided by osmotic action. Both methods have had decided advocacy, and it is very probable that both have a positive value, the extent of which has as yet to be determined, for as far as I am aware, the relative values of the systems of treatment have not been settled with satisfactory experimentation, or, if so, have not been divulged in the papers upon this subject. All the points defended by the writers seem almost entirely to be based on assumptions, imperfect experiments, or upon clinical observations.

The difficulties surrounding the subject, and the many errors of observation to which experimentation in this direction is liable, have led to criticism, and have thrown a shadow of doubt upon those made by several observers.

It is not the purpose of this article to show, if it be possible, that the arguments maintained with so much vigor and pertinacity, that coagulation furnishes its own barrier to diffusion, is an error of observation and to demonstrate that the various coagulants have relative degrees of value.

My intention was to endeavour to show that coagulants would penetrate tubes of the minutest character possible to be handled satisfactorily, and that this penetration was independent of circulation. My earlier investigations seemed to warrant this belief. Diffusion

is recognised in the living tooth as performing an important and continuous part in its nutrition. It seemed certain, as the tubulated portion of the dentine invaribly imbibed finely divided coloured matter in solution, that therefore it must take up any other fluid, if of equal solubility, with the same facility. This beyond question is true, the main difficulty here being to demonstrate that the coagulation was continuous without the aid of diffusion.

The earlier experiments abundantly proved this to be true, but but they were carried on, at the time, with difficulty.

The effort was, as before stated, to find results in tubes not exceeding a millimeter in diameter, and if coagulation occurred it must be through absolute contact of the agent with the albumen or gelatin used in the experiment. It was necessary to fill the minute tubes with the albumen and then seal the ends. Both processes were accomplished readily by nearly filling the tubes and then quickly melting the ends in a Bunsen burner. This proved entirely satisfactory. It was found, however, that the albumen in the tubes dried and contracted upon itself, leaving spaces. To meet this difficulty, the albumen was combined with twenty per cent. of glycerin. This served an excellent purpose, and proved no interference with coagulation either in large or small tubes, with all the agents known to be positive coagulants, with one exception. It was found that mercuric chlorid had little or no effect apparently on albumen and glycerin. This was repeated a number of times. It was then applied to albumen without glycerin, and coagulation was immediate. It was found, however, that glycerin simply delayed coagulation, for in the course of a few days the effect of the mercuric chlorid was plainly visible in flocculent masses. This fact necessitated a repetition of all the experiments to determine their correctness.

These experiments have occupied several months, and constantly repeated. The tubes were drawn to varying lengths, not exceeding, as a rule, over 0·5 millimeter in diameter. The unit of time was fixed at 10 days. The first series exhibited some variation in the number of centimeters ; but, as the measurements of the fluids had not been exact, it was determined to try the most important coagulants a number of times with greater accuracy. This gave more satisfactory results. Whenever possible, the effort was made to have coagulation proceed in opposition to gravity.

What does the work as a whole teach? 1. That coagulants do not prevent by their own action the diffusion throughout the entire tube.

2. That the penetrating power of such agents as creasote, carbolic acid, and zinc chloride, those most frequently used, varies materially. That creasote is a very poor coagulant when compared with carbolic acid, and the latter, for this purpose, is not to be compared with zinc chlorid or silver nitrate.

3. That in proportion to the coagulating power of the agent will be its penetrating force, independent of gravitation.

Creolin gives but slight coagulating effect, oil of cloves about the same, carvocrol shows slight cloudiness, sanitas oil slight coagulation, mercuric chloride no coagulation in this tube (glycerin and albumen). Tannic acid shows extended coagulation; oil of cinnamon, action marked but limited; oil of cajuput, no result; caustic potash, no result in this or other tubes; zinc chlorid in gelatin, no result; phenol sodique, partial coagulation. An attempt was made to carry staining with the coagulation. Zinc chlorid was colored with carmine, with the result that the coagulation left the stain and proceeded down the tube. Eugenol is but a poor coagulator; on thymol the effect is but slight and not continuous.

The oxychlorid, of the same consistency used in filling pulp-canals, was placed in the funnel portion of the small tube. It soon hardened, but the coagulating process was marked upon the albumen. It began immediately, and has continued without interruption to the present time. The line of demarcation between the oxychlorid and the coagulation is distinctly shown. This, probably, is one of the most satisfactory of the tests, as it abundantly proves that contact with albumen is all that is necessary to produce coagulation with zinc chlorid, and if this be possible out of the mouth, how much greater must it be under more favourable conditions in the tooth.

Caustic potash was experimented upon not as a coagulant, but to observe the effect on albumen and gelatin. Though several tests were made no visible results were produced, though this does not antagonize the recognized quality of this agent as one of the most deeply penetrating and uncontrollable caustics used on the tissues.

The action of nitrate of silver in repeated tests was rather a surprise. It has generally been regarded as a superficial coagulant, but in every instance it has proved deeply penetrating and

coagulating with rapidity and certainty, very nearly equal to zinc chlorid. This fact assumes some importance in connection with the use of this agent in teeth. It seems as though a risk equal to that assumed in the use of zinc chlorid is taken when placed in children's teeth for the prevention of caries.

The experiments were extended to the penetration of the tooth-structure by a number of coagulating agents. A large number of teeth were kept under the action of these, the pulp-canals being first slightly enlarged and filled with the agent daily. The result has not been entirely satisfactory; microscopic examination shows decided action throughout the dentinal tubes, in several sections being nearly obliterated and indicated only by fine lines; but while this demonstrates a positive change in the organic contents of the tubes, it does not absolutely show that this has been caused by the coagulant. Thus far I have been unable to carry the stain given the agent along with the coagulation. Silver nitrate in several sections penetrated in seven days two-thirds the length of the tubes, but the extreme discoloration made it impossible to follow the individual tubes except at the extreme limit of coloration. Tests were made with a variety of stains, but with no result, the coagulation invariably separating from the stain. When the color can be carried along with the coagulation, it will visually show what may be regarded as absolutely true, that the coagulant is carried in the dentinal tubes as effectually as in those exhibited.

In the specimens prepared for the microscope, the evidence is positive to the trained eye that every tube is filled with coagulated organic matter; and this has been so frequently repeated, and with precisely the same results, that I have no hesitation in accepting it as a fact. I failed, however, to observe any change in the cementum, and I am, therefore, led to doubt the possibility of any coagulating effect in that tissue by any of the agents used—*Dental Cosmos.*

Reviews.

DESCRIPTIVE ANATOMY OF THE HUMAN TEETH. By G. V. BLACK, M.D., D.D.S., Sc.D. *Third Edition.* Published by the Wilmington Dental Manufacturing Company, Philadelphia.

A book which calls for a third edition must needs be a good book; and this is a good book. The author describes the teeth from the standpoint of the dental practitioner and, therefore, uses a terminology which applies chiefly to human teeth. The principal point of this edition is the completion of this system of nomenclature. It would obviously be convenient if all writers adopted a uniform

system of names for the parts of teeth, but it would be well to avoid, as far as possible, the use of adverbial forms such as "occluso-gingivally" (page 4, line 10), which are rather freely used in this work. Would it not sound better to say, from the occulusal to the gingival margins, or some similar phrase, even though it be at the expense of brevity? In an imperfect form this phrase occurs in many places, *ex. gr.* page 25, line 10, "grooves crossing from labial to lingual," but why the noun is omitted puzzles us; surely the sentence leaves the mind troubled with a sense of incompleteness. Of errors we notice on page 160, line 7, "Frenum labium" for "Frenum labii," and on page 98, line 3, "proximate with" for "proximate to." But these are minor criticisms. The book is of undoubted value and should be carefully read not only for the descriptions of the outward forms of teeth but for an account of the pulp-cavities. For, as we are quaintly told, "It is often necessary for the dentist to enter the pulp chambers of the teeth of his patients, and there perform delicate operations with a precision which demands the most accurate knowledge of these cavities." The author's meaning is obvious, but the literal meaning of the sentence reminds us of Gulliver's experiences in Brobdingnag Land. There is a welcome freedom from "padding" in this book, and the illustrations, type and paper are excellent.

Die Extraction der Zähne. By Dr. Julius Scheff, Jun. Published by Alfred Hölder, Vienna.

We may congratulate the author of this book not only on the extremely interesting and valuable matter which he presents to us, but also on the excellent way in which he handles the subject. The opening chapter deals with historical mention of the subject, and in a brief, but satisfactory manner, takes the narrative from the earliest times down to what is rightly spoken of as the "epoch-making discovery of the forceps by Tomes." In the following chapter an account is given of the various instruments that have been used, the description of which is much simplified by the excellent wood-cuts. These will vividly call back to the mind of the present-day student the dental armamentarium of a foregone period. In connection with forceps we notice a description of some made by Reiner, of Vienna, with a joint modelled after one used by Collin, of Paris, for surgical instruments. The special feature of the joint is that when the

blades are at right angles they may be separated. No screw is needed as the two blades, except in the one mentioned position, cannot be separated. A chapter on the "indications for extracting" may be on the whole commended, but we should scarcely be able, from the paragraph dealing with malpositions of the upper canine, to learn what is the correct treatment. The various lines of action are mentioned but the reader is not sufficiently enlightened on the indications. Nor do we agree with the author that we should immediately extract teeth in which a nerve drill has broken and cannot be removed, at least we might wait and see if trouble follows, which fortunately is not always the case. And again in cases in which secondary dentine formations in the pulp cavity cause intense neuralgia, we fancy most dentists would scarcely be inclined to follow the author's advice and extract "whole rows of teeth"—such a proceeding *may* be called for, but surely having diagnosed the presence of secondary dentine (perhaps by the extraction of one) we might at least attempt the preservation of the others by extirpation of the pulp under an anæsthetic. Then, again, indication 15, if followed literally, would cast a black slur on our work as conservative dentists. Extraction is indicated, says par. 15, "for teeth, the crowns of which are so decayed that the food, which collects in such cavities, fouls the breath by its decomposition." It is but fair to add that the author expressly states in his preface, that "the educated dental surgeon is but seldom compelled to extract teeth," still we think it scarcely right, even when speaking to general practitioners, and still less to dental students, to be quite so eager to advocate the extraction of teeth. The concluding chapters of this work are devoted to a description of the methods of extracting the different teeth. The author while mentioning other methods of procedure, of course, advocates his own. His descriptions are clear and well written and we are not disposed to do more than criticise one of his suggestions, it is that, for certain teeth, it is better to change over from the right to the left side of the chair ; this we cannot agree to. It is a rule in surgery that a man, when operating, takes his position and keeps it throughout, and this applies to dentistry. The effect of a man, say during a gas case, running round his patient to get at a tooth in the other side, can be better imagined than described. Most of us would at any rate, have to re-arrange our fixtures.

TRAITÉ TECHNIQUE DES PRÉPARATIONS MICROSCOPIQUES À L'USAGE DU DENTISTE, par J. CHOQUET, Preparateur à l'Ecole Dentaire de Paris. Paris: Société d'Editiores Scientifique 4, Rue Antoine-Dubois, 1895.

We take up with pleasure this hand book on microscopical technique which has recently been specially written "à l'usage du Dentiste." Its production serves to emphasize the fact—apparent to all who take an interest in these matters—that great advancing strides are being taken in all directions in every branch of dental science, and that the excellent work in practical dental microscopy of Tomes, Mummery, Underwood, and Charters White is still being followed up and sustained by earnest enquirers both here and on the Continent.

The contents of the book are well divided into twelve chapters and comprise the history of the art, descriptions of the necessary apparatus and management of the microscope, methods of preparing the hard and soft tissues, with and without decalcification, and the processes of imbedding, staining, and mounting specimens, together with a short and rather incomplete account of photo-micrography. Chapter IV. is devoted to a description of the chemical composition and histology of the teeth, an important subject, but one which we think is scarcely included under the title of the book. These pages should be either very much amplified and illustrated or omitted altogether. To make sections of the hard tissues, M. Choquet advises the use of a sharp rough file (*lime à metal*) for grinding down the tooth after it has been cut into slices with a fine saw. The section is imbedded in or stuck on the surface of a block of hard gutta-percha, and held in position (at first) with the fingers of the left hand, a tedious process, and one much more quickly accomplished by using a corundum or carborundum wheel on the lathe. Sections are finally reduced to the desired thinness and polished by means of powdered pumice between the surfaces of two roughened plates of glass. The author suggests for this purpose, the employment of the print trimmers so much used by photographers. In our opinion, it produces less fatigue, and more uniformity of thinness of the section, if larger sheets of glass than those he recommends (10 centimetres) are used. In the chapter on the preparation of sections, shewing the retention *in situ* of the hard or soft parts of a tooth, he does not sufficiently fully describe Koch's and Weil's impregnation methods. A valuable

addition to this part of the book would be the summary of the latter process, which was given by Mr. Mummery in the "Transactions of the Odontological Society," vol. xxii., page 222. An index to the contents of the book would be welcomed.

The author, however, has done his work well, his style is lucid, but perhaps a little more suggestive than descriptive. The gain of more detail throughout the book would greatly enhance its utility, still it should be of value to those interested in Dental Microscopy.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

To the Editor of the "DENTAL RECORD."

CONTINUOUS GUM WORK.

SIR,—On reading Mr. Gartrell's paper on "Continuous Gum Work," I was surprised to find the statement, that the process is still regarded as impracticable, this I think rather misleading, and I am sure that anyone who has seen Mr. Rose's method will agree that the process is far from impracticable, in fact it presents no more difficulty than any ordinary metal or vulcanite denture.

Speaking from my own experience, having recently constructed a good many cases, I might say that I have never seen any discoloration of the teeth or warping of the plate, neither is it at all necessary to solder the teeth to the plate except in cases of very close bite.

With the new method of fusing (with the petroleum blast), "gassing" is an impossibility, it having been proved by Mr. Rose at one of the meetings of the Metropolitan branch of the B.D.A that the vapour of petroleum had no effect on the gum enamel, although purposely placed in direct contact with it.

In conclusion, I would like to say that Mr. Rose is always willing to assist anyone over any difficulties that may occur to them.

Yours truly,

CHAS. BARRETT, L.D.S. Eng.

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Original Communications.

NEURALGIA.*

By HENRY BLANDY, L.D.S.EDIN.,

Dental Surgeon to the Nottingham General Hospital and the Eye Infirmary.

AT the close of one of the meetings of the Midland Branch of the British Dental Association held at Derby, a physician from Leeds said he would be very much obliged if the dentists present would give him a few hints on neuralgia, and how to treat it. There was naturally a repressed smile running round the room, as every one felt the impossibility of answering the question on the spur of the moment.

When a dentist speaks of neuralgia, he means a nerve pain of a more extended character than odontalgia, or toothache. When a patient complains of pain of a shooting character in the head, the ear or arm, we say he has neuralgia ; and we examine his teeth carefully, and we generally find a decayed tooth, or teeth, or stumps, which indicate the locality of the nerve lesion which gives rise to the pain. We remove the decayed tooth and we generally cure the patient.

Some little time ago I had a lady patient who had suffered severely from neuralgia in the head ; she had been under treatment by a physician for many months ; she had been to Smedley's Hydro. for nine months to get up her general health and tone ; she had had a course of massage, I suppose on the same principle that muscular rheumatism would be treated, and which is treated effectually in that way—but with no improvement. The racking sleep-destroying pain still continued. She did not believe it could be her teeth, but came to have them examined as a forlorn hope.

There was an upper wisdom tooth decayed, but I diagnosed the lower wisdom as the offender, which was apparently quite sound.

* Read before the Notts and Derbyshire Dental Society, January 18th, 1895.

This tooth was very sensitive to hot air applied by the hot air syringe, and to cold water. But she declined to allow me to extract it, and decided to have the upper tooth out. It was decayed, and of no great value, so against my advice I took it out. In a week or two she returned : there had been no improvement. Had the upper wisdom tooth been a sound and useful tooth, or been capable of being made into one by stopping, I should, of course, have refused to extract it. I look upon the dentist as the arbitrator between the patient and his impatience. The one is a professional and the other an amateur. The proverb " Every man knows where his own shoe pinches " does not hold good with regard to teeth. On this second visit I was able to get my way and extracted the lower wisdom. On performing post-mortem examination on it and splitting it I found the nerve cavity full of pus. We all know how painful a simple gathering on the finger may be when the finger swells, and there is heat and great congestion. The tooth cannot swell, and we get the congestion in the confined pulp chamber, consequently there is compression of the delicate nerve filaments, and we get extreme pain. But the pain may not be localised to the tooth and we get what we call reflex neuralgia. Neuralgia might also be caused by the deposition of secondary dentine in the pulp chamber.

There are many cases of neuralgia which may be relieved by dressing the cavity in some tooth—destroying the pulp, clearing it out and stopping it. I remember a case where a young lady came with intense neuralgia, saying she thought she should go mad. She paced up and down the surgery, and demanded almost instant extraction of an upper lateral tooth. This was the only decayed tooth she had, and would have left an unsightly gap, and she would have had to be bothered by a plate for one tooth. I injected morphia into her arm and dressed the cavity—destroyed the nerve and eventually filled the tooth with gold, saving it for appearance and mastication. Another case, a gentleman brought his doctor to give him an anæsthetic to have an upper molar out, which I stoutly refused to extract although under threat that he would go elsewhere, and find a dentist more amenable to reason. But he gave way and I saved that tooth.

Another obscure cause of neuralgia is the malposition of teeth. I remember two cases. One a medical man of 50 years old, who complained of great pain all over his head. He dare not have

chloroform or even gas to have a stump out, which I took to be the upper right canine, under which was a large swelling. I injected cocaine and went for the stump, but the instrument slipped off and I failed to get it. I went deeper and failed again. Then with my saw edge forceps I trephined until I had got a very firm hold and it took a long and strong pull, but when it came I found I had a large canine which had never been erupted. It was lying nearly horizontally in the alveolus. The other case was nearly similar in a patient of 45, whose canine was under sound bicuspid teeth.

A third and very interesting case of malposition causing great neuralgic pain was that of the wife of a coachman, aged about 45. She had no bad teeth and apparently a healthy mouth. On examination all her teeth were present except the left upper wisdom. The second molar was decayed in the crown. I carefully tapped this—she winced. On extraction I found the palatal root broken off nearly to the neck. The fracture was not flat and even across, but slightly cupped, evidently not fractured but absorbed, as the roots of temporary teeth are generally absorbed by the action of the rising permanent ones. To prove this I immediately extracted the wisdom tooth which was underlying, and it fitted exactly the second molar palatal root. (Specimen exhibited.) The same thing sometimes occurs with lower wisdoms, which will burrow under the gum and eat their way into the pulp chamber of the lower second molar. I have the following notes in my hospital case book for last year. Mrs. R, 34, neuralgia 11 years, use of arm gone for 3 or 4 years, for 3 or 4 days at a time, had not been able to do her hair for 5 years. Extractions xx. chloroform. Three weeks afterwards she reported was better and had regained the use of her arm.

Salter gives a case where the right arm was seriously affected—became nearly powerless and was constantly in a state of aching pain—the patient could hardly grasp or hold anything in her right hand. Facial palsy occurred with dimness of the right eye. A week later she had complete facial paralysis, deafness, and her right arm as above. Upper right wisdom tooth removed. Before patient left the house pain of arm and powerlessness had vanished. Patient quite cured in a fortnight.

Teething is recognised by Romberg and Henoch as a frequent cause of paralysis in children, without any apparent cause. According

to Fliess paralysis of this sort occurs more commonly during the period of the second dentition. The onset is sudden, feverishness, restless sleep, in morning arm, more rarely leg, paralysed, followed by difficulty of breathing, asthma, palpitation, distortion of face, and squint, ending in coma and death.

Fliess records one case, boy five years, apparently healthy, paralysed arm in morning, arm red, no pain. Boy fell from a waggon same day on his head and died. Post-mortem: Congestion of spinal cord, great congestion and turgescence of veins from shoulder to neck up to face, which was very striking in sub-maxillary region. So that these arm paralysis cases are not always hysterical as might be suggested.

I show you a tooth extracted for a woman of 55, whose eye had become affected by the irritation and neuralgia caused by it, until it went quite blind. The cavity or cavities, for there are two, as you will see, are on the posterior side of this second upper molar. The upper one shows signs of former caries, the lower one does not, but both were sufficiently deep to allow thermal changes to reach the pulp cavity. The tooth, to all external appearance, as you will observe, when in the mouth looked perfectly sound and healthy, and it was only on the most careful examination that these cavities were discovered.

We find a great difference in our patients in their capacity for bearing pain. I have taken out teeth which have been very difficult indeed to dislodge, and the patient, to my surprise, has remarked it did not hurt him much. On the other hand I have taken out perfectly loose stumps for a patient who has appeared to suffer great pain.

Cowper's line "A beetle feels a pang as great as when a giant dies"—meaning that the animal creation suffers equal pain—is untrue, and no one knows better than a dentist that there are conditions affecting the constitution and conductivity of nerves, apart from any hysteria or natural cowardice, which we must recognise and treat with the greatest respect.

A few years ago a gentleman came to have a tooth stopped, he had been paymaster on board Atlantic liners for years, had been at sea all his life, and was accustomed to brave the dangers of the deep. He was and is now a robust healthy man of 40. It was in the winter. He took his coat off before sitting down, I said "You will be cold," he said "Cold? look here," and he stretched out his

hand, which fairly smoked with the steam rising from it, as also did the top of his head. But he was a courageous man, he sat down and had his tooth stopped. His will conquered his nervous dislike to the operation. His vaso-motor centre was greatly affected by fear. We have a vulgar saying when a man is greatly alarmed, "Oh! it put him in an awful sweat." The state of health as well as that of the mind greatly affects the conductivity of the nerves.

We should expect to find anæmic girls suffer from neuralgia, and we do. I had an anæmic girl only this week whom her mistress said had been a martyr to neuralgia for months, she could not sleep at nights, was partially deaf, particularly quiet and silent, and sometimes had been nearly mad with neuralgia. She could not locate it to any particular tooth—I took out six.

There are cases of neuralgia in persons who have lost all their teeth, or in portions of the alveolar process from which teeth have been extracted for years. These are due to previous nerve impressions left by some aching tooth, or, it may be, the compression of the trunk of the branch when it passes through some foramen in its course.

In illustration of the first, I had an old aunt of 70 who frequently had violent attacks of neuralgia in her toothless gums, she would never have submitted to any operation, and I don't think any cure was found for her. Professor Gross explained the pathology of this in this way:—The minute nerves distributed through the wasted alveolar border have undergone compression from the deposition of osseous matter in the canals, and after other remedies had failed he resorted to excision of the affected portion of the alveolus. A case which was under the care of my colleague at the General Hospital, Mr. Chicken, in '91 and '93 may be interesting. J. F., 31, Lace Maker, strong physique and well nourished, intermittent attacks of neuralgia for last four years, good health, cannot ascribe first attack to any cause, no illness, worry, or anxiety. Attack begins with pain commencing on inner side of lower jaw, right side, behind wisdom tooth, shoots forward along inner side of jaw, and outer border of right side of tongue, terminating about the middle line.

Pain of a burning character—patient says every attack seems to get worse—number of these gradually increases. At the present time he has as many as 20 a day. Duration variable—from one second to two hours.

Movements of jaw in talking and eating often bring on an attack ; also movements of tongue.

There is a marked tenderness along right border of tongue, and all over parts in which pain is felt, but there is an especially tender spot far back in the mouth close to ramus of jaw. Right side of cheek slightly swollen.

Patient had previously had all teeth drawn which in any way could be suspected of causing irritation. Has taken as much as 40 grains of quinine three times a day, also croton chloral.

No history of rheumatism, fever, scarlet fever, &c.

Habits regular—no history of alcoholism. Family history good.

On December 18th, 1891, chloroform was administered and Mr. Chicken operated. The details of the operation would not interest you as dentists ; I presume you would not care to undertake an operation of this severity. But a piece of the lingual nerve and a piece of the inferior dental nerve were removed - and he was discharged on December 28th, with no recurrence of pain.

On October 11th, 1893, patient was readmitted with recurrence of pain, although not nearly so bad as two years ago, now merely momentary, and only a few per week.

A second case of Mr. Chicken's, H. W., 56, March 23rd, 1892.

Patient had been under medical treatment some time. Had exalgin and antipyrin without effect. Pain about parts supplied by second division of fifth nerve.

Parts laid open, this nerve seized—ligatured, and a large piece of it taken away. Patient discharged cured on April 28th.

Then you may have neuralgia arising from periostitis with suppuration and ulceration of the roots of teeth. There are also mechanical reasons for it. Sometimes a tooth will have a spike of tooth bone on the extremity of its root, which, as it were, pricks the trunk of the branch in its passage to the apical foramen. Then we have many cases of exostosis due to irritation of the periosteum and thickening of the cementum. I show you a number of teeth extracted from a Swiss governesss who was a martyr to neuralgia. In fact you may lay it down that anything which interferes with the normal condition of the smallest twig of a nerve will be resented by the whole body, whose nerves are all in complete telegraphic and telephonic communication with it, through the branch offices, the ganglia, and through the great central office, the brain.

PRESIDENTIAL ADDRESS.*

By Mr. F. J. Bennett, M.R.C.S., L.D.S.

Gentlemen,

There is a philosophy which asserts that everything in nature is dual, and we may at least go with it so far as to assert it as true of the Students' Society, in that we may consider it from a two-fold aspect; first, as it is of interest to others from without, and again, as it appears to ourselves from within. From the former we may expect the very natural enquiries, by those who are no longer Students in the strict sense of the word, as to how the beginners are bearing themselves towards the great task which is before them, and as to the nature and concerns of that body which must ere long enrol its members in those permanent assemblies of the dental world, the Odontological Society and the British Dental Association; for as from the germ one may gather the parent growth, so from the student of to-day may one deduce the practitioner of the future, and the direction in which the current of his professional thought now sets may indicate the course of the strong stream of opinion hereafter: therefore, we see that nothing lives for itself alone. Viewed from within, it appears a fixed, yet ever moving body, steadfast, yet ever aspiring. From its traditions I think we may see its first aim, its first desire, is certainly towards the forming of a high professional character, and by that I mean the bearing of ourselves in thought and action according to the best traditions that exist. So much does this belong to the province of the Students' Society, so important is it to our attaining success in the future—both in the eyes of our professional brethren and in the eyes of the public—that it will be our constant object here, and in the present, to cultivate these habits, to make them part of ourselves, and to impart them to each other, till they become a condition of our existence. At that period of life when example is so contagious, when for good or bad everything is possible and nothing impossible, must be laid the great foundation of professional character.

Its next aim would appear to be towards the establishing of a taste for the best kinds of work, and the seeking out for the most approved methods of overcoming the difficulties and requirements

* Delivered before the Students' Society of the Dental Hospital of London.

of our daily practice, and of freely diffusing whatever we ourselves know to be good, and either by the describing of processes, the shewing of specimens, or the reading of papers to impart that capacity for new ideas which tends to eradicate those prejudices and errors which are the common property of us all. Further, there is the learning to express clearly whatever we wish to say without the debating society spirit of opposition, and merely for the elimination of truth, and finally there is the promoting of good feeling and fellowship. These were, I believe, the aims of the Dental Students' Society at its foundation thirty-three years ago, and these are their aspirations to-day.

But, though we recognise in these objects the life of the Students' Society, yet with life there is growth, and with growth development; we note it, not merely in the addition to our members, and in the increasing interest displayed by them, but we see it also in that new feature of our meetings, the supplementing of a demonstration, often elaborate, to the mere written description which sufficed in the earlier days of the Society, and further, we recognise it in the character and excellence of the papers themselves, some of which, for originality of thought, sound grasp of subject, and masterly treatment of details, are deserving of a permanent place in the literature of our profession.

Thus we see that the Dental Students' Society is building up for itself a character and an individuality of its own, and by which it may claim an important share in the progress of our profession. May it be our aim and delight to consolidate this structure, and to adorn all those who pass from our midst with such stamp of professional thought and efficiency as will reflect a glory on the Students' Society.

But again, with life there is also change, and whilst preserving the good institutions we must absorb whatever will further conduce to our prosperity. We may seek it in many directions, I will suggest only one, that which brings us into closer familiarity with those methods, which, in the medical profession, have yielded so abundantly.

If the value of microscopy in dental science were ever doubted, it must surely have disappeared with the discovery of micro-organisms in the teeth, for in bringing dental caries within the domain of bacteriology, it claimed for it at once a similar method

of investigation. Therefore microscopy, as the first path by which we reach this field of enquiry, should claim our individual attention. With those facilities which our general hospitals afford, and with the help we can give each other, we should be able to establish microscopy as a regular branch of our work, and the far deeper insight into the subject which is to be obtained by the preparation of even a few simple specimens should induce us all to trust to our own efforts in this direction rather than to the labours of others; indeed, a great many of the difficulties of bacteriology itself are removed by a ready familiarity with the methods of preparing microscopical specimens. The extraordinary extent to which bacteriology has influenced, not merely the theory, but the practice of medicine, is well known to you, and lately this subject has been pushing its way more and more into, what we may call, our own sphere of influence, and the question as to the probabilities of general infection of the system, by organisms which find lodgment in the teeth, is receiving considerable attention. The observers are too well accredited, and the issues are too vital for us to regard the matter as trifling, and, though it may be difficult to define the place where dental science ends and medical practice begins, it will be clear to ourselves that anything and everything, which, in the teeth, is associated with disease, must belong to the province of dental surgery.

This participation in disease by the tissues outside the teeth brings me to draw your attention to the, I think, unique collection of specimens of dental disease in animals which is to be found in the Museum of the Odontological Society. Fortunately for our patients it is not often we see even ordinary diseases pushed to their fullest extent; here they are to be found in every degree of severity, and in some the amount of destruction to the jaw alone is such as to make us wonder if we have ever before fully realized what an alveolar abscess may become. The mention of specimens reminds me of the teaching museum. The magnificent case of comparative dental anatomy, the generous gift of the Dean, is sufficient testimony to the importance of this subject, and, although the teeth were, I believe, the very first structures to be studied by the aid of comparative specimens, both recent and extinct, yet there remains still much to be learnt, whether we consider them as a whole, or in their component parts.

I have directed you to one or two subjects for thought in the future, and though the future must always suggest what is nebulous and obscure, yet, as time goes by, this at least to me gathers force and clearness. First, that our profession possesses surpassing interests for those who seek them, as elevating and absorbing as any to be found in the whole range of medical science.

Interests of a kind also which the study of nature always yields, even to those who follow her merely for the sake of increasing knowledge, interests that tend wonderfully to root out professional jealousies, and to help us to lift ourselves above the worries and cares of our daily life. Second, that the many-sidedness of our dental training goes very far to equip us for the pursuit of these tastes in whatever direction we please to follow them, whether in biology, pathology, mechanics, or metallurgy.

Lastly, that now, in such a Society as this, and whilst we are students, is the time to cultivate such interests and tastes, to root out those weeds which are the growth of small and limited ideals, and to sow only of that seed which later will yield the finest fruit.

TUMOURS OF THE JAW.*

By Mr. A. C. Strand, M.R.C.S., L.R.C.P.

Mr. President and Gentlemen,

I can only offer as an excuse for my position here to-night the difficulty encountered in getting any one to read a paper for this date, and thus in a moment of unfortunate and since repented weakness I consented to fill up the gap. The inexperience of the beginner and tradition must of necessity prevent students from producing anything of startling originality. We are compelled to turn to current text books and copy down for the most part the information we require, and this paper is no exception to the rule.

Aware of my incapacity of dealing with any matter connected with the mechanical side of dentistry, I have chosen a subject which is nevertheless of considerable importance. It has been my endeavour to make it as practical as possible by eliminating matter which does not come within the sphere of the dental surgeon, such as the treatment of some of the tumours, while retaining such points

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

as the differential diagnosis of the various tumours. Although it is not the duty of the dental surgeon to treat a large number of the tumours of the jaw, he may often be the first to direct his patients' attention to a growth of which, up to that time, they were quite unaware, and the early and certain diagnosis of which may be of no small moment to the patient, or on the other hand he may be consulted and asked for his opinion on such a tumour.

Tumours of the Jaw may be divided into—

A Fluid, and
B Solid ;

the solid being divided into—

1 Malignant, and
2 Non-Malignant.

Whilst of fluid or cystic tumours of the jaw there are three varieties—

1 Dental,
2 Dentigerous, and
3 Multilocular Cysts.

1. Dental Cysts—*Theories*—(*a*) By Tomes and Magitot their starting point is considered to be an inflammation of the alveolo-dental periosteum, which develops into a cyst instead of an abscess. (*b*) Others believe them to be due to a hypertrophy of the remains of the enamel organ. They are commonest in the upper jaw, and generally arise in connection with an incisor or canine tooth, but sometimes have apparently no immediate connection with them. They usually occur in adult life, and are generally of small size. Their contents vary from a clear to a brownish or purulent fluid with cholesterin crystals. They are of slow growth and painless. When they grow to a large size they expand the bone, giving rise to pain by their pressure.

2. Dentigerous Cysts—Are commonest in the mandible, and generally arise in connection with a permanent lower molar tooth.

Theories.—(*a*) Broca ascribes them to a disappearance under morbid influences of the enamel organ. The small space thus left between the follicle and papilla becoming filled with fluid. (*b*), Tomes, to the increased collection of fluid between the enamel organ and investing tissues, a result of delayed dentition.

These cysts contain one or more teeth in their interior. The teeth may be well formed or quite rudimentary. As a rule the

cysts are single, but occasionally consist of two compartments. Their contents are ordinarily clear fluid, sometimes gelatinous, and rarely sebaceous. The tooth may be free in the cavity, or, as is more usual, be implanted in the wall of the cyst with the crown projecting inwards. They are of slow growth and at first painless. Dentigerous cysts, like other cysts, may undergo alteration not only of the contents but of the cyst wall.

Diagnosis.—This depends chiefly on the absence of a permanent tooth in the situation of the tumour. Dental cysts are commonest in the upper jaw, and generally in connection with an incisor or canine tooth, whereas dentigerous cysts are most frequent in the lower jaw and in connection with a molar tooth. Also the presence of decayed teeth with no absence of permanent teeth would point to a dental cyst. They form smooth-rounded tense tumours. After all, the important part lies in distinguishing between a solid and fluid tumours, and should there be any doubt it can easily be settled by making an exploratory puncture.

Treat.—It is now considered necessary to excise the whole of the cyst wall, as occasionally after merely incising and draining they have been noticed to recur. Where this is impossible, as much of the cyst wall should be excised as possible, and the cavity swabbed out with chloride of zinc, 40 grs. to ℥j, or the cyst wall may be cauterised. Any teeth or rudiments of teeth in connection with the tumour should be removed. The cyst should always be reached by an incision within the mouth.

3. Multilocular Cysts—May occur at any age, but are most frequent about the 20th year. They are commonest in the mandible, are of slow growth with but little tendency to implicate surrounding structures They rarely recur if completely removed.

Theories.—(*a*) Magitot considers them formed by fusion of several dentigerous cysts or by a single dentigerous cyst becoming subdivided. (*b*) Eve, by an ingrowth of the epithelium of the jaw. (*c*) Others to a similar mode of origin as dentigerous and dental cysts.

Diagnosis.—The fact that they usually occur in the mandible, are generally of larger size, and the absence of signs that would indicate dental or dentigerous cysts.

Treatment.—The merely palliative treatment consists in puncturing the cysts. The radical treatment of complete removal hardly comes within the province of dental surgery.

We will now turn to the SOLID TUMOURS.

They may be divided into :

A Non-malignant, and

B Malignant.

The (A) Non-malignant tumours of the jaw are—

1 Fibroma.

2 Enchondroma.

3 Osteoma.

It is not my intention to go into the anatomical structure of these tumours.

1. FIBROMA.—This closely resembles the fibrous tumours found in other parts of the body. It usually springs from one of two situations, *viz.*, either (*a*) The interior of the antrum ; or (*b*) Some portion of the alveolus. In both cases it is intimately connected with the periosteum, thus resembling epulis. It is of slow growth and painless at first, and may attain to a large size. It involves the surrounding tissues, but does not suppurate. It occasionally recurs, and is apt to undergo calcareous degeneration. When growing from the antrum and left untreated it will expand the walls of that cavity, producing considerable deformity. In many cases they have followed on a blow, but are more often due to the irritation of decayed teeth.

2. ENCHONDROMA of the jaw is rare, but the jaw may become involved in cartilaginous tumours springing from other bones of the face. It is generally observed early in life springing either from the surface of the bone or from the antrum. They are as a rule of slow growth and painless. They form hard, nodulated tumours. They produce absorption of the bone of the maxilla in their progress and protrude beneath the skin, which, however, they rarely, if ever, involve. They may undergo ossification and are apt to recur.

3. OSTEOMA.—The commonest form is a simple hypertrophy of a part or the whole of the bony tissue of the jaw. The tumour shews the ordinary structure of healthy bone. It is of slow growth and painless, and generally occurs in young adult life. Pedunculated growths have been met with springing from the outer surface of the bone, and still more rarely, ivory-like tumours have been found in the same situation.

Mr. Bland Sutton in his interesting book on "Evolution and Disease" refers to the occurrence in certain West African negroes of bony growths situated on the nasal processes of the superior maxillæ.

This has given rise to the somewhat romantic idea of their being a species of horns, and they are consequently known as the "Horned Men."

(B) The Malignant Tumours of the jaw are divided into—

1 The Sarcomatous, and

2 Carcinomatous.

1 SARCOMA.—By this is meant a tumour composed of embryonic connective tissue. It is the only malignant growth which commences in the jaw itself.

The other malignant tumours originate in some neighbouring epithelial tissue and only secondarily infect the bone.

Sarcoma is commoner than carcinoma in the upper jaw.

Sarcomata may be divided into

a. Central and

b. Periosteal

according as they start in the bone itself or spring from the periosteum.

a. *Central Sarcoma* in the great majority of cases, presents the structure of myeloid or giant-celled variety, but may show round-celled formation. It generally occurs before the age of twenty-five, is of fairly rapid growth, and painless at first and is the least malignant of the sarcomata. The submaxillary glands may or may not become infected. As it grows it encroaches upon the structures in the vicinity of the antrum. Thus it pushes down the palate, causing a swelling in the roof of the mouth and displaces the alveolar process and teeth. It may encroach upon the orbit, causing displacement of the eyeball. It may obstruct the nasal cavity and by extending backwards into the pharynx interfere with respiration and deglutition. Myeloid sarcoma when situated in the alveolar part of the jaw is known as myeloid epulis.

b. PERIOSTEAL SARCOMA is generally either of the round-celled or spindle-celled type.

The spindle-celled variety is of frequent occurrence in the upper jaw. It shows a marked tendency to ulcerate and may undergo ossification, being then known as osteo-sarcoma.

The round-celled sarcoma is very vascular, of rapid growth and softer in consistence than the other sarcomata, with a tendency to fungate. It is very liable to recur, and is the most malignant of the sarcomata.

2.—Carcinoma.—The variety of cancer that occurs in the jaw is always epithelioma, which may be of two kinds :

a. The Squamous, and the

b. Columnar.

a. The *Squamous Epithelioma* probably always begins in the gum or palate and only secondarily implicates the bone.

b. *Columnar Epithelioma* always begins in the antrum. It may spread to the palate and the outer wall of the antrum, and protrude on the face. It may also spread into the nasal cavity.

Carcinoma usually commences after the age of forty, is insidious in its onset, forms a soft, rapidly growing tumour, gives rise to pain and discomfort, infiltrates surrounding structures, involves the skin, infects the submaxillary lymphatic glands, causing enlargement, bleeds readily, and breaks down easily under the finger, produces an emaciated, sallow condition of the patient, known as cancerous cachexia. Nearly always recurs, and inevitably proves fatal.

Diagnosis of tumours of the jaw is often by no means a simple or easy matter. Even to distinguish between fluid and solid tumours is not always easy. And it is often impossible to determine without microscopic examination the malignancy or non-malignancy of a tumour. In examining a case of tumour of the jaw—in fact in examining any case—it is always better to go about it methodically. Never start by putting your fingers in the patient's mouth, it is a somewhat too rapid introduction, and the patient will probably have some difficulty in answering your questions articulately with your fingers in the mouth. While the patient is pouring out his troubles you may conveniently take stock of him, noticing whether he is young or old, healthy or weakly, hysterical and nervous or robust, etc. Also whether there is any swelling of the face. Then, when the patient has exhausted himself, we may proceed to ask our questions with a view to finding out when the tumour first commenced, how it commenced, and where it commenced. Whether it has grown rapidly and caused much pain. Enquire also into the family history. Also find out the age of the patient. Never put leading questions. If you put leading questions your patient's information will be much less satisfactory and reliable, as you may place your suspicions in his mouth. And never attempt "lightning diagnoses." Nine times out of ten you are wrong, and the success of the one does not compensate

for the foolishness of the nine. Having gathered all the information you can by inspection and question, then proceed to examine the mouth gently and carefully. Examine the alveolus, soft and hard palates, the teeth and the sulcus between the cheek and the gum. Inspect also the nares and pharynx.

The first definite point to be decided is whether the tumour is fluid or solid. We have already gone into the various points and diagnosis of fluid tumours. Supposing we have made it out to be solid, then, we have to decide whether it is malignant or innocent. If the patient is young and the tumour hard, of slow growth, painless, and fairly well defined. If the patient seems in fairly good health. If surrounding structures are not involved except by mechanical interference, and there is no enlargement of sub-maxillary lymphatic glands. Then it is probably non-malignant and either a fibroma, enchondroma, or osteoma. The differential diagnosis of these is not of much importance.

Fibroma is the commonest and least hard ;

Osteoma is very hard ; whereas

Enchondroma is rare ;

Sarcoma is more rapid in its growth and softer than any of those just mentioned. It occasionally ulcerates but does not fungate. Is at first fairly well defined, but later on more diffuse. There may be odema of the skin. The sub-maxillary lymphatic glands may or may not be enlarged.

The *Epitheliomata* are very rapid in their growth, occur late in life. Infiltrate surrounding structures early. Are soft and show tendency to fungate. Give rise to much pain and discomfort. Implicate the skin, and cause enlargement of the submaxillary lymphatic glands, and produce a cachetic condition of the patient.

Treat.—I stated in the beginning of my paper my reasons for not going into the treatment of solid tumours of the jaw.

Gentlemen, I trust that I have not wearied you with facts with which perhaps most of you are as well acquainted with as I am. Had I had longer notice I would have endeavoured to have brought something before you which had less of second hand about it ; but if any part of this paper has been of any interest to any one of you, I shall feel that my feeble efforts have not been wholly in vain.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ORDINARY MONTHLY MEETING was held on the 4th ult., the President (Mr. Frederick Canton) in the Chair.

The minutes of the previous meeting were read and confirmed, and the following gentlemen were nominated for membership :—

Messrs. F. M. Farmer, L.D.S.Eng., London ; W. H. S. Prideaux, L.D.S Eng., W. ; F. G. Frankland Rooke, L.D.S.Eng., W., (resident) ; J. M. Nicol, L.R.C.P., M.R.C.S., L.D.S.Eng., Leeds ; G. A. Peake, L.R.C.P., M.R.C.S., L.D.S., Cheltenham ; F. C. Porter, L.R.C.P., M.R.C.S., L.D.S., Nottingham ; G. N. Skipp, L.D.S.Eng., Sale, Cheshire, (non-resident).

The following gentlemen were balloted for and duly elected members :—Messrs. E. H. A. Mackley, L.D.S.Eng., Norwich ; T. L. Nash, L.D.S.Edin., Inverness ; W. Sims, L.D.S.Ire., Manchester (non-resident).

The PRESIDENT announced that the Council in conformity with its powers had nominated Mr. James Stocken for honorary membership. He then referred in felicitous terms to Mr. Stocken's long connection with the profession and the Society. The nomination was confirmed by acclammation.

The LIBRARIAN (Mr. W. A. Maggs) having acknowledged the receipt of the usual exchanges, the Curator (Mr. Storer Bennett) reported the following additions to the Museum :—A supernumerary tooth, conical in shape, situated by the left upper incisor, taken from a boy aged eight. A lower lateral incisor removed from a lad of the age of fourteen, the pulp cavity was largely exposed, and the boy had been in the habit of clearing out food with a pointed match. The match broke in the tooth, and its thin end worked down the root canal, ultimately appearing through the apex and producing alveolar abscess. The broken match could be seen projecting through the extracted tooth about one-eighth of an inch. A very valuable specimen had been presented by a gentleman not connected with the profession, but who took a great interest in the Society and its Museum. He referred to Mr. Larkin, of Melbourne, who had previously presented the skull of a female dugong ; he had now presented that of a male dugong, with the tusks perfect. Mr. Charters

White had presented a model showing the apex of a canine errupting in the palate. It was taken from a lady aged fifty-five who had for a long time worn a plate with comfort, but ultimately a pimple formed in the palate, and later the apex of the canine came through. Mr. Charters White had kindly made a section through the root, and had also presented micro-photographs showing a very large amount of cementum and a very small pulp canal.

Mr. W. E. Harding (Shrewsbury) referred to the treatment of root canals. A large number of those met with in practice were small, indistinct, and difficult of access, so that they could not be thoroughly cleared. For a number of years he had used a ten per cent. solution of bi-chloride of mercury in absolute alcohol, applied to the pulp chamber on cotton wool or other fibre, with great success. But since Dr. Miller's paper, read at the Chicago Congress in 1893, advocating the use of a pellet formed of one-tenth of a grain each of bi-chloride of mercury and thymol, he (Mr. Harding), had adopted this method in some two hundred cases, but using pellets of only one-fifteenth of a grain, and by far the larger number of cases were very successful. He did not advocate this treatment for cases where the canal could be got at, as he was strongly in favour of filling all root canals where possible, but in almost inaccessible positions the plan he had suggested would be found valuable.

Mr. Betts said that he had recently been rather disillusionized with regard to the solution of bi-chloride of mercury in alcohol. An eminent chemist had informed him that after heating for a short time the bi-chloride became mono-chloride, therefore, when the bi-chloride in a solution of alcohol was put into the root of a tooth the bi-chloride became a mono-chloride.

Mr. Gartley presented a molar tooth with a twisted fang.

Dr. J. E. Grevers (Amsterdam) made a very lucid and highly interesting casual communication of some length on the subject of "Erosion." Having reminded the Society of Dr. Magitot's contribution to the subject in a paper read before the International Medical Congress of 1881, he gave a *resumé* of the opinions of Fochard, Wedl, and others, and then discussed the suitability of the term "Erosion." He preferred the term Hypoplastic-Teeth (teeth of defective enamel), and had adapted the following classification, (1) Hypoplasia cupuliformis ; (2) Hypoplasia cuspidiformis ; (3) Hypoplasia sulciformis ; (4) Hypoplasia semilunaris. By

means of numerous micro-photographs Dr. Grevers demonstrated that in each of the first three classes a distinct line running from the outer surface of the defective enamel to the periphery of the dentine might be observed, the course being identical or parallel to the brown striæ of Retzius.

Mr. F. J. Bennett said that if he had followed the point of Dr. Grevers' remarks it was that in these defective teeth the irregularities followed the line of development of growth. Dr. Grevers appeared to claim an originality in his explanation of this, but he (Mr. Bennett) would point out that they found in "Salter's Surgery" a full description and drawings of this process, showing that Salter had arrived at the same conclusion many years ago. Salter called them the "incremental lines," and he not only described them in the dentine, but also in the enamel, showing most distinctly what Dr. Grevers had pointed out, viz., that the irregularities followed strictly the line in which the formation and the development of the teeth took place. He would commend Salter's work to Dr. Grevers' notice, because they must claim an English origin for this idea.

Dr. George Cunningham protested against the statement of the last speaker, and would undertake to say that neither Dr. Grevers nor Dr. Sigmondy would have put before a scientific society as original something that had already been written by Salter. He believed that these gentlemen were equally with Mr. Bennett well acquainted with the "incremental lines" of Salter, and he defied anyone to show from Salter what had been shown on the screen that evening. It was quite true that these pathological lines did coincide with the so-called incremental lines of Salter, but they could understand and differentiate between them. The work brought before them by Dr. Grevers was, he would say advisedly, a work of augmentation, and work that had never been shown before the Society previously.

Mr. H. Baldwin said the Society was very much obliged to Dr. Grevers for introducing this classification, which he took to be certainly original. Did he understand Dr. Grevers to apply the term "Erosion" to the defects which he had described? Here it had always been usual to restrict the term not to congenital defects, but to defects acquired in perfectly well-formed teeth, defects of a peculiar character, simulating a fine cut, generally at the neck of the

tooth, but also appearing at other points upon the tooth's surface, in which loss of substance could not be explained to the ordinary effects of friction.

Mr. HOWARD MUMMERY thought Mr. Bennett was confusing the lines of incremental growth as shown in Salter's book, with the lines of defective development. The lines shown by Dr. Grevers were not lines of ordinary incremental growth, they were lines of arrested development and re-formation.

Mr. F. J. BENNETT explained that what he intended to say was that the defects strictly followed or reverted to the lines in which growth would have taken place.

Mr. MANSBRIDGE asked how the slides were mounted? They were really very beautiful specimens, being so very transparent.

Mr. GREVERS, in reply, said what he would have wished to say in answer to Mr. Bennett had been exactly expressed by Dr. Cunningham and Mr. Mummery. Salter's book was not unknown to him, and if Mr. Bennett referred to it he would find a picture of the development, but he would not find the lines he (Dr. Grevers) had shown in his specimens. In reply to Mr. Mansbridge the preparations were mounted in Canada Balsam. He hoped at some future time to bring forward a further communication on this subject.

The PRESIDENT remarked that the Society would be very happy to give Dr. Grevers an evening for the purpose.

Mr. HOWARD MUMMERY read a paper on "Photomicrography." Photomicrography was a science of quite recent development, but had already been of immense value in many departments of scientific study. There could be no doubt of its educational value, and no course of lectures was now considered complete that was not illustrated by lantern slides. Photographs were of great value as a check upon observation; they kept drawings within bounds, and did not admit of quite such a play of the imagination as was frequently seen before the days when the camera was called in to assist the microscope. While, however, fully recognising the value of the photograph in demonstrating the minute structures, he did not think it was able to entirely replace the coloured drawing, but, as a check upon it, it was invaluable, and it was highly desirable that all papers on histological research should be illustrated by both photographs and drawings. There was one point in this connection on which he would lay great stress, and that was that the photograph

should not be touched up in any way, either upon the negative or the print. As soon as this was done a suspicion was thrown upon its accuracy, and its value as a check upon observation was completely done away with. Many collateral branches of knowledge bore upon the subject being discussed to-night, the great and rapid advances in the science of bacteriology made during ths last ten years have greatly stimulated photomicrography, as the minute organisms with which this new science was concerned were represented by photography with an accuracy and clearness not otherwise obtainable. Another important discovery, that of isochromatic or orthochromatic plates, had been an excellent aid to the photomicrographer. These plates gave the correct colour relations of the object in light and shade, and a moment's reflection would enable anyone to see the great value of this in photographing stained preparations. For instance, while formerly a yellow, from its weak effect upon the photographic film, came out black, or nearly so, a properly prepared orthocromatic plate (with the addition of a coloured light screen) renders it light in the resulting print, *i.e.*, in its proper shade relations to the other colours of the spectrum. Blue, again, which to the eye appears to be a dark colour, is rendered as white upon the photographic plate (blue containing a very large proportion of the chemical rays of the spectrum) ; a colour-corrected plate reproduces the blue parts of the objects as dark in the resulting print. Another very important factor in the present recent advances in the art was the introduction of the new lenses ; first, the water and oil immersion lenses, and more recently the apochromatic lenses of Zeiss ; both these improvements greatly increase the light admitted to the object. As he had described elsewhere, and perhaps might be permitted to repeat here, "the greatest stride in microscopic optics dates from 1886, when the firm of Zeiss, of Jena, introduced the so-called apochromatic lenses. Before the introduction of these lenses, a sharp image in any optical system could only be obtained with one portion of the spectrum, the other portions giving images not absolutely clear, but all more or less blurred. The apochromatic lenses gave an image almost equally sharp with all the colours of the spectrum. In the old achromatic objective the colour correction was only made for one portion of the area of the lens, so that towards the margins, and also at the centre, it was imperfect, but in

the apochromatic lenses the colour correction is made equal for all portions of the area of the lens. Again, whereas in the older objectives only two colours of the spectrum were brought to one point, in the apochromatic system all these colours are brought to one point. A special kind of glass in combination with fluorspar is employed in these lenses. The effect of these corrections was practically to abolish colour in the microscopic image; we obtain an increased concentration of light and a greater range of magnifying power with the same objective, as every high eyepiece can be used with them without detriment to the image. Special eyepieces are used with those lenses called compensating oculars, and their use is rendered necessary by the fact that all lenses of high aperture, owing to their hemispherial fronts, magnify the blue more than the red; an eyepiece is accordingly used in which the opposite error is introduced, the red being magnified more than the blue, and consequently with these eyepieces the image is free from colour up to the margin of the field." There are many excellent workers in this art, both in this country and abroad, among the most prominent of the pioneers in this field are Dr. R. L. Maddox, to whom they were indebted for the invaluable suggestion of gelatine as a base for the photographic film; Dr. Woodward, in America, who produced beautiful results before the introduction of the new lenses; Dr. Neuhauss, in Germany, whose photographs of flagellated organisms are well known, and in this country Mr. Andrew Pringle, whose beautiful work with high powers was familiar to all: his photographs of dental caries they had all admired on this screen. The work in this department of their friend and former President, Mr. Charters White, was also well known to them, as also his excellent photographs of dental and other tissues. In taking photographs with low powers of the microscope, no great difficulty came in, provided the specimens chosen were suitable for the purpose; but the photography of objects such as bacteria, with high powers, was a matter requiring great patience and perseverance, and it was in obtaining good results with a magnifying power of one-thousand and over that the utmost refinements of the art were called into play. An expensive and elaborate apparatus was not necessary in order to obtain good results. There was no doubt, however, that a special apparatus had many advantages; such a one as he had there to-night, although not nearly so elaborate as

many that were now made, enabled one to do the work with a minimum of fatigue, and ensured rigidity, which was a very important point. The first desideratum was of course a very firm and solid base-board, not supported on legs attached to it, but on a very firm and solid table, and for high power work, wherever possible, on a cemented basement floor, for vibration was the great bugbear of the photographer. The bellows should be capable of considerable extension, and blackened cardboard diaphragms inserted at intervals to cut off all reflected rays ; a small amount of reflection from the interior of the bellows or of the microscope tube would give rise to ghosts in the negative—an unpleasant kind of phantom, which generally managed to blurr the one important part of the negative. To prevent these ghostly reflections, a careful examination of the interior of the camera should be made every now and then, and the slightest reflecting surface should be touched with a dead black paint. The microscope tube should be lined with black velvet. Any microscope would serve the purpose that was rigid in the horizontal position, and nose pieces should not be used to carry the lenses, but they should be screwed directly into the microscope body to ensure accurate centreing. A good sub-stage condenser was a very important part of the apparatus, and the high angle achromatic Abbé condenser of Zeiss was one of the best to employ, as it transmitted a very large cone of achromatic light, it should be furnished with an iris diaphragm. If an oil lamp was used as the radiant, a bull's-eye or similar condenser should be placed immediately in front of the flame, so arranged as to convey parallel rays to the back of the sub-stage condenser. He preferred a large flat wick lamp, with the edge of the flame towards the object, not having had much success with the round wick employed by Dr. Neuhauss. A means of using the fine adjustment while focussing at a distance was of course requisite. In the apparatus shown, this was obtained by a brass rod covered at one part with india-rubber ; this bore upon a friction wheel, and by means of cord and pulleys worked the fine adjustment. There were, of course, many modifications of this focussing apparatus. The portion of the apparatus on which the microscope and lamp were placed was pivoted, so that it could be rotated and the adjustments made while the operator was in a sitting position, before it was returned to its place in front of the camera. For use with the orthochromatic plates coloured glass screens were

required—yellow glass of different shades being the most generally useful ; a colour called " signal green " was valuable in photographing certain shades of red. Many preferred to use fluid light filters instead of glass. A solution of picric acid formed an excellent pale yellow filter, and different strengths of a solution of bichromate of potash were useful when darker tints were required. If sunlight or the lime or electric lights were employed, Zetnow's light filter was most valuable. It consisted of dry nitrate of copper two and-a-half ounces, dry chromic acid two drachms, water four and-a-half ounces. If the limelight was employed, of course the exposure time was very much shortened, but the eyes must be protected in focussing with dark spectacles or a deep coloured glass placed below the stage. He thought perhaps their purpose would now be better served if he described the steps to be taken in making the adjustments and exposure for photographing an ordinary object—first assuming they were using a low power, such as an inch or half-inch ; and secondly, with a high power, such as a one-twelfth oil immersion, at such an extension as to give a magnifying power of 1,000 diameters. Suppose a good thin and even section of dentine or enamel, unstained, had been chosen. The first thing to do was to sit down to the turn-table, and, having placed the eyepiece in the tube of the microscope, accurately adjust the centre of the flame ; then place the object on the stage and carefully choose the best part of it, seeing that the light was fairly even. Removing the eyepiece return the turn-table to its place, allowing the tube of the microscope to pass within the brass flange on the camera without touching it. A focussing screen carrying a piece of white cardboard should now be placed in the camera, the little door at the side being opened, and again sitting down by the microscope, the projected image is focussed with the coarse adjustment on the cardboard. We now judge if the field on the paper is evenly lighted, and probably find it advisable to adjust the bull's-eye condenser near the flame so as to diffuse the light evenly over the object and its projected range. This method of preliminary rough focussing saves a great deal of unnecessary fatigue in focussing through the screen at the back of the camera, but once having obtained the focus on the card, we close the side door, and put a plate-glass screen in its place ; a very little adjustment with the focussing rod and fine adjustment with a focussing lens will give the true focus

of the object. Removing the screen we substitute the filled dark slide, and after closing the shutter of the camera, pull out the slide and all is ready for exposure. Being sure that the apparatus is free from vibration we open the shutter and give the exposure, such an object as this with a good light would require perhaps from ten to fifteen seconds. If, however, we wish to photograph a slide of bacteria, and magnify it a thousand times, we shall have to take further precautions, and as such a preparation will have been stained with an aniline dye, colour difficulties will have to be met. To obtain a negative magnified to this extent a one-twelfth oil immersion lens—preferably an apochromatic lens of high angle—should be used in combination with a special projection eyepiece, although of course, by greater extension of the camera, an eyepiece can be dispensed with. Place the substage condenser in position, and with a half-inch lens focus down upon the condenser until the little hole in the centre of the cap is exactly in the middle of the field of the lens, then carefully centre the aerial image of the edge of the flame, which is projected by the lenses of the condenser. Replace the half-inch by the one-twelfth and again see that condenser and flame are properly centred, as, although it is much easier to make these adjustments with the lower power, the optical centre of the immersion lens may not quite correspond with it. In photographing a coloured preparation, such as this, almost the full aperture of the condenser should be used, that is, the iris diaphragm should be nearly open to its full extent. Another point is that the angle of aperture of the condenser should be equal to that of the objective if we wish to take full advantage of the latter. The condenser and light being now centred, place the object upon the stage and focus down upon it. This being a coloured object we shall have to employ a coloured screen, and if the stain is methyl violet or gentian violet a pale yellow screen will suit it best. The turn-table is now adjusted, the paper screen placed in position and viewed through the door, a rough readjustment of the focus with the coarse adjustment will be found necessary, and it must be seen that the edges of the disc are quite sharp ; if not, the screw collar on the eyepiece must be shifted and an increased and even illumination obtained by means of the bull's-eye as before. In focussing with the fine adjustment, the glass screen may now be dispensed with, and the focussing glass, which may be either a Ramsden

eyepiece or a spectacle lens of eight-inch focus as recommended by Mr. Bousfield, used upon the aerial image in the camera. With a long extension of the camera the rays which form the image being nearly parallel, there is a considerable range in which the focus is quite sharp, and consequently we can dispense with the glass screen. This is often very convenient, as one's eye is not disturbed by any markings upon the surface of the glass. When using a short extension it is necessary to use the glass screen in order to insure that the sharpest focus of the object shall be exactly in the plane of the sensitive plate, because, the rays being more divergent, the region of sharp focus is much more limited in extent. The shutter should now be closed, examine again to make sure the focus has not altered, and very carefully insert the loaded back, then open the shutter and expose. In this instance, the exposure would be about six minutes, but the time must of course depend upon the nature of the slide and the depth of tint and the coloured screen. High power work involves much disappointment, many negatives turning out failures, and only now and then is a negative secured the qualities of which are thoroughly excellent in every respect. Developing a plate with high power requires considerable experience and judgment. He found he got the best results with pyrogallic acid and soda, and more control of the development. Fresh soda should be added by degrees as the image appeared, always using a small quantity of a ten per cent. solution of bromide in the developer. It often happens that the negative would be clear but undeveloped, in that case it might be intensified. He obtained excellent results with the ordinary mercury and ammonia intensifier. Great care should be used to remove all traces of hyposulphate before placing in the sublimate solution and washing very thoroughly before applying the ammonia. Should the negative be a little veiled it would be better not to try to intensify, but one could very often procure a very satisfactory lantern slide from such a negative by a contact print with a weak light. Many excellent makes of lantern plates were to be had, but he had recently been using the special Ilford and the Imperial plates, developing with hydrokinone, to which should be added a few drops of bromide. To obtain a perfectly clear black ground, which greatly added to the beauty of the slide, he poured on and off two or three times a solution of hydrochloric acid in water, about one part to eight, and then thoroughly washed. He

preferred the gelatino-chloride papers on account of the excellent detail they gave, glazing the surface by squeezing on to highly polished ferrotype plates.

The PRESIDENT asked if Mr. Mummery had seen the apparatus exhibited at the Royal Institute similar to the one now described, but with a tube at the side reflecting the image. The object was that for instantaneous work or any specimens of a moving description they could watch, bulb in hand, for the instant when the image was in the middle of the screen.

Mr. CHARTERS WHITE said he would be very presumptuous indeed if he attempted to improve upon the excellent paper Mr. Mummery had placed before them. It was so lucid and full of truth that he would recommend everyone of his colleagues interested in microscopy to study it. Many of the statements he could endorse from his own practical experience. It was often the practice to flood an object with so much light that nothing could be seen but a glare, this he thought a mistake. If the light was softened the details would come out better. A pale yellow screen was useful to get contrasts, but he had not been so successful with the signal green, which lengthened the exposure without any apparent benefit. The scientific value of the coloured screen was yet in its infancy. He had never worked up to a 1,000 diameters as the vibration from Pickford's vans and similar vehicles in his neighbourhood was not favourable to it.

Dr. J. W. PARE asked Mr. Mummery how he used the screen? also if he could say something as to the length of exposure of isochromatic plates?

Mr. ROUGHTON said, speaking from experience, the practice of micrography was rather an expensive business. One might begin with a very simple apparatus, consisting of a box into which the end of the microscope was fixed, and think one was going to do wonders, but gradually it would be found that something better must be got, and accordingly another apparatus would be made, perhaps another microscope bought. Then they would think ordinary lenses would not do, and apochromatic lenses would be substituted. By that time there would not be much left of £100. He would recommend gentlemen going in for photomicrography to make up their minds as to whether they could afford it, or else let it alone. The value of apochromatic lenses he believed was rather over estimated. Most

work he thought could be done as well with the ordinary achromatic lens. For an illuminant he always used limelight, the exposure required being much shorter than that with an oil lamp. He agreed with Mr. White as to cutting down the light with the condenser.

Mr. W. Hern asked whether Mr. Mummery had been able to get coloured micro-photographs? At the Harveian Society last year he had seen some very lovely specimens of coloured photographs, fruits and flowers, which appeared perfectly natural. It struck him whether, using similar methods for photomicrography, the actua staining could be brought out.

Mr. Beadnell Gill wished to endorse Mr. Mummery's remarks a to development. He thought it was frequently not realized how great an improvement might be made by a careful study of development. He would ask Mr. Mummery if he had found any particular advantage from first immersing the plate for a reasonable time in "pyro" before using the accelerator or the developer? From his own small experience he found that in many cases he had a great deal more control over the development by this plan.

Mr. Mummery having replied at length, the usual votes of thanks concluded the meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

Ordinary General Meeting, held Monday, February 11th, the President F. J. Bennett, Esq., in the chair.

The minutes of the previous Meeting were read and confirmed, on casual communications being called for :—

Mr. Nowell drew attention to a case of mercurial salivation that had come under his notice at a general hospital. The patient was a woman, aged thirty-eight, who was suffering from gastric ulcer. During the subsequent course of treatment she was given calomel in pills to the total amount of grs. xiii. in small doses extended over seven days. On the eighth day marked salivation was noticed, and the drug stopped. The case, he thought, was interesting as an example of the peculiar susceptibility of certain persons to the action of certain drugs ; also it reminded us not to be too prone to ascribe salivation to the careless administration of the exciting drug.

Mr. Dodd mentioned a case of supposed epithelioma of the tongue that came under his notice whilst he was a dresser at a general hospital. The case was seen by more than one surgeon, and the patient, aged sixty-seven, was admitted into a special ward. The glands were much swollen, and the disease considered too advanced to justify an operation. The patient remained in the ward two weeks, but not wishing to die in hospital, he was removed to his home. Mr. Dodd was much surprised some eight weeks later to see this same individual in the out-patient department, and on examining the tongue he found almost all trace of the supposed malignant disease had disappeared. The patient on leaving hospital had been kept in bed and fed on a "slop" diet. The case he thought was one of ulceration due to the presence of decayed and sharp edged teeth.

The President remarked on the interesting nature of both the casual communications, and advised dental students whilst attending a general hospital to keep a sharp look out for cases of dental interest. He advised those who were not working for a double diploma to be sure to spend some of their time in the opthalmic and out-patient departments.

The President then read his introductory address :—
(see page 101.)

The President then called upon Mr. A. C. Strand for his paper on "Tumours of the Jaw." (see page 104.)

In the discussion that followed :—

Mr. Seymour congratulated the reader on the care and trouble taken in the preparation of the paper. He wondered why Mr. Strand had not mentioned epulis and similar tumours. He had had a dental cyst of large size under his care recently, it was not situated over the incisors or canine, but over a bicuspid.

Mr. Dodd said that Mr. Strand's paper was an extremely valuable one, drawing attention as it did to so important a subject. Few subjects were so valuable to a dentist as a thorough knowledge of the tumours of the jaw. He had been struck by the way in which the tongue adapted itself to very adverse conditions, it was frequently exposed for years to the constant irritation of neglected teeth, yet such a patient often remained ignorant of this state of things till his attention was drawn to it by a dentist. Mr. Dodd said that he had often noticed that students were very fond of

going out of their way to see some very rare case or operation, but they did not pay sufficient attention to the study of the commoner ones. He said that fractures of the jaw, empyema, and dental cysts came well within the province of dentistry, and that such and similar cases should be treated by a dentist. As regards diagnosis, the enquiry into the duration of the symptoms often enabled one to form a speedy idea as to the nature of the disease *e.g.*—

Is it a matter of days? Probably inflammation.

Is it a matter of weeks or months? Probably malignant.

Is it a matter of years? Probably a slow growing innocent tumour.

THE PRESIDENT remarked on the difficulty of classifying the various tumours of the jaw. He noticed that Mr. Strand had not included odontomes, and thereby had omitted a very interesting subject. Ostioid pedunculated growths, as he understood them, were not rare, especially in persons of a gouty diathesis. He thought that it rested with the public to choose whether in cases of fractures of the jaws, etc., they would be treated by a dentist or a surgeon. In his opinion a dentist should be very careful not to undertake any operation not distinctly within his province.

Mr. STRAND briefly replied.

A vote of thanks was then accorded to Mr. Strand for his paper, and to those gentlemen who had brought forward casual communications, and it was announced that the next meeting would be on March, 11th.

The Proceedings then terminated.

A TRANSPARENT mirror glass, says *Invention*, introduced by Herr Alfred Rost, of Halbstadt, reflects light on one side, from which it is practically opaque, while from the other side it is transparent. It is proposed to use this type of glass for glazing windows in the streets of a town; for, while it will not cut off light or vision from the interior, it will prevent outsiders from seeing into a room. It is probable that none will welcome this discovery more than a dental surgeon whose consulting room happens to be in the front of the house.

THE DENTAL RECORD, LONDON: MAR. 1, 1895.

ON THE DENTAL CURRICULUM AND EXAMINATIONS.

At the last meeting of the Representative Board of the British Dental Association a discussion on the advisability of establishing an examination in mechanical dentistry, before the commencement of the students' hospital surgical, practice ended in that convenient, but most illogical way—postponement *sine die*. It seems to us that the passing of an almost identical resolution at the Newcastle Meeting forestalled and rendered needless any action on the part of the Board, for surely the voice of the whole Association should include and over-ride that of the Board, which is elected to represent the Association in the interim of the Annual Meetings. Nor does the practical bearing of this resolution lose its force because it seems the mover was, for the nonce, living in another plane, thinking the whole thing (perhaps even life itself) an abstract phenomenon. The voters certainly realized they dwelt on mother earth and that the evils complained of were not abstract but very real, needing for their cure, not a platonic soliloquy but an earnest struggle. We may take it, therefore, that the majority of the members of the Association *are* of opinion that an examination should be established. To bring this about two ways are open, firstly to get the Medical Council to take action, and, secondly, a direct appeal to the different examining bodies. Taking into account the cost and the uncertainty of the deliberations of the Council, surely the second method would be by far the more preferable. As far as the English college is concerned we feel perfectly sure that any representation made to the Council by the dental section of the Court of Examiners would receive every consideration, and doubtless the attitude of the other Colleges would be equally courteous. It would, however, be

a great mistake to make so radical a change, as is involved in the scheme alluded to, without taking into consideration the examination as a whole, and the curriculum of study required of the candidate. It is asserted that the examination, as it now stands, embraces so many subjects that it is too great a tax on the powers of the candidate. It is urged that the hospital attendances should be extended to three years and that the examination should be divided into two parts, somewhat after the method that is in force at Dublin, Edinburgh and Glasgow. This suggestion, although by no means new, has been the subject of some correspondence in the columns of the *Lancet*. We cannot agree that these letters help us very much towards a solution of the problem, for the arguments adduced are somewhat irrelevant and the statements scarcely accurate. Thus, in the initial letter Mr. Newland-Pedley's description of the difficulties of the curriculum and examination might be justly drawn from a perusal of the syllabus, but it would require considerable qualification to represent the actual conditions of the case. We confidently assert that, with the examination at its present standard, if a candidate needs "severe cramming" it is either his own fault or that of his teachers, especially in general subjects. The reason that a man needs "cramming" is because he neglected his theoretical work during the earlier portion of his training, and because there is at the general hospital apparently no supervision of his studies. The truth of our remark receives some confirmation from the fact that many men show absolute ignorance of the simplest things when they begin their "severe cramming," and yet the percentage of rejections is not high, as Mr. Newland-Pedley states, but as may be seen from tables we reprinted from *Lancet* in our December issue, was in 1894 *absolutely lower* than that of any other examination held at the College of Surgeons *except* those held in elementary anatomy and physiology and in materia medica and practical pharmacy. The fact is, that the period of dental students' study calls for the addition to it of another year, and the examination needs

dividing not to ease the student's work, nor to run in competition with American colleges, as Mr. Gaddes suggests, nor to prevent discredit to their hospital, as Mr. Storer Bennett hints (poor thing, it can well take care of itself), but to secure a higher standard, a real knowledge instead of the present smattering, and to ensure the student working during each part of his career. The addition of another year will probably not come into force for some time, but the division of the examinations is a suggestion which could be more easily adopted. The examples of Dublin, Glasgow, and Edinburgh should not be too closely followed, for though here are two examinations nominally, and these may be taken separately, yet they can be taken, we believe, in immediate sequence, one one week and the other the next. We should like to see the examinations divided somewhat as follows: The candidate at the end of his pupilage to pass an examination in dental mechanics. During the pupilage, or during the first hospital year, to pass the examinations in biology, chemistry, materia medica, and practical pharmacy, now obligatory to medical students; any pupil living in a large town, where elementary science is now so well taught, and of average ability, should be able to pass in these subjects during his pupilage, thus leaving his two years at the hospital free for other subjects. At the end of his first winter session he should then pass the examinations in elementary anatomy and physiology now required of medical students. This examination is by no means difficult, and it would ensure the student working during his first winter. Two years after passing in mechanical dentistry, and at least one year after passing all the other examinations, the candidate should then present himself for the third or final examination for the diploma, and this should include the anatomy of the head and neck, and the surgery thereof, together with general pathology; and also dental surgery and anatomy, and operative dentistry. It is evident, therefore, that the final examination would be lightened by excluding physiology and dental

mechanics, and by limiting the anatomy to the soft parts of the head and neck. Till the curriculum be extended to three years it would be difficult to exclude anatomy from this final examination. Should, however, the period of hospital study be lengthened to three years, then the dental student's work and examinations should be identical with that of a medical student up to the end of the second winter session, after which he would attend his medicine and surgery lectures, and should hold a three months' appointment as a dresser to an out-patient surgeon. This would, of course, involve an increased mental effort on the part of the student, but we believe it would actually give the student more time for purely dental work than he now has, for the last year or eighteen months would be quite free from that possible waste of time, attendance on lectures.

News and Notes.

Messrs. J. McCarthy and Edmund Owen have been elected members of the Court of Examiners section of the Board of Examiners in Dental Surgery, of the Royal College of Surgeons of England.

Mr. E. G. Betts has been elected Treasurer of the British Dental Association, v. Mr. W. Woodruff, resigned.

Mr. Frederic Canton has been elected President elect of the Metropolitan branch of the British Dental Association, and Messrs. J. H. Badcock, C. G. Betts, J. H. Mummery, and Mr. Robert H. Woodruff, have been elected to vacant seats on the Council.

Mr. Geo. N. Willis, L.D.S.Eng., has been appointed Dental Surgeon to the East Dulwich Provident Dispensary.

The papers on Dental Microscopy, by Mr. Hopewell Smith, which have appeared in our recent numbers, will shortly be published in book form.

Our readers will, we are sure, join us in sympathy with the kindly and energetic secretary of the Dental Hospital of London —Mr. Pink—in his bereavement. We regret to say Mrs. Pink, for long an invalid, died a few days ago.

The Annual General Meeting of the Dental Hospital of London will be held at the Hospital on Wednesday, March 13th, at 6.15 p.m., Henry Harben, Esq., J.P., in the Chair.

The death of Mr. John Whitaker Hulke, F.R.S., during his term of office as President of the Royal College of Surgeons, makes it an event of public though sad importance. As Surgeon to Middlesex Hospital, many dental students were brought in contact with Mr. Hulke, and on all hands we hear expressions of regret and esteem. His gifts were varied and his position assured by labours in many fields. Elected F.R.S., for his work in Geology, his eminence as a surgeon was recognised by his choice as President of the College. He lost his life through going to the hospital late at night to attend an urgent case, for he caught a chill, which caused bronchitis, followed by pneumonia, by which he died.

Through the courtesy of the Registrar, Mr. W. J. C. Miller, we have received copies of the Medical and Dentists' Registers for 1895, which have just been published. From the tables therein given we find that the dentists registered but having no qualification have decreased in number from 3,700, the number five years ago, to 3,479 ; they now represent 70·98 per cent. of the total number, as against 76·80 in 1890. There are now 4,901 dentists on the register, of whom 663 have the L.D.S., Eng. ; 133 the L.D.S., Edin. ; 113 L.D.S., Glas. ; and 454 L.D.S., Ire. ; 32 have surgical qualifications, and 27 foreign diplomas. Continuing a comparison with 1890, we find that in the five years there is an increase of 189 in the English diplomas registered, 47 in the Edinburgh, 31 in the Glasgow, and 17 in the Irish. The number of those having British or Irish diplomas has increased from 1,079 to 1,363, thus there are 83 more dentists registered now than there were in 1890. This increase is noteworthy, since it shows that the number of those entering the profession through the portals of the Colleges now more than balances the number of those who go over to join the

great majority. It is also satisfactory to find that the balance of the Dental fund has increased £254 3s. 6d. during the same period. From 1890-91 the fund actually decreased.

From the "Medical Register" we learn that the number of names entered has increased during 1894 by nearly 1,000. During the year 1,426 names were registered, and 504 were removed ; of these 458 were removed on evidence of death. The Council sat for 15 days in 1894, which is in excess of the average. Since the Council was established in 1858 this length of Session has only been exceeded three times, but has been equalled two other times.

Wanted ! an investigation of the teeth of the children of the rich. Andressing a meeting at Warwick last month, the Hon. and Rev. E. Lyttelton, Head Master of Haileybury College, said " he was becoming profoundly convinced that the best educators were those who constantly bore in mind certain familiar truths. Speaking from experience as a schoolmaster, he was bound to say that there were vast numbers of parents of the upper classes who did not seem to know even the most elementary things connected with the training of the body. It was remarkable what little care some parents seemed to take in urging upon their children the necessity of giving their teeth close attention. Recently he had a dentist down at Haileybury, and the result was perfectly ghastly. There were 1,800 teeth requiring immediate attention out of 500 mouths."

Mr. O'Duffy recently read an important and interesting paper before the Insurance Institute of Ireland on " The teeth as an index of the constitutional state of candidates for Insurance," in which he urged that it would be well, especially in relation to children, to have their teeth periodically examined by persons competent to pronounce an opinion upon them. He brought forward evidence to show the importance and value of dentistry to insurance companies, to induce those gentlemen connected with Dublin offices to take steps in the interests of the shareholders by considering the question. As illustrating the financial value of teeth, he gave two cogent examples. First that of a weight carrying hunter, otherwise a horse capable of bearing a man fifteen or sixteen stone weight over the hunting field. Such animals usually sell for 300 guineas

and upwards. Now, suppose one of these animals met with an accident to a tooth, owing to a pebble in his food coming into contact with a tooth when chewing, a matter that has often happened, thus causing the horse to bolt his oats. The result of this, Mr. O'Duffy stated, would be that if he were a 300 guinea hunter before the accident to his tooth, he would afterwards be only worth thirty guineas. And why, it may be asked, should the owner of such an animal suffer a loss of 270 guineas by the accident of a pebble getting between the teeth? Because the animal with a sore tooth could no longer chew his oats and hay, and consequently could not get the necessary nourishment out of his food. It is precisely the same in respect to man as to the horse; both from the same causes are liable to the same physical effects. As the second illustration of the value and importance of proper mastication, he stated that in the slave market which used to exist to a large extent in many countries, and still exists in some places, the victims of that barbarous traffic were subjected to a large examination of their teeth, such as at present prevails in regard to horses; in both cases those of sound teeth brought the highest price.

THE Board of Trade enquiry into the explosions in St. Pancras, due to ignition of the coal gas by the electric lighting wires, has led to the astonishing discovery that pure metallic sodium forms in the junction boxes as the result of electrolytic action. This, of course, ignites immediately when in contact with water, and it is evident it would do so immediately the water leaked in through the junction box.

A SIMPLE method of restoring the porcelain facing broken away from a piece of bridge-work is recorded by CharlesW. Jenkins, D.D.S., of Zurich, Switzerland, in the *Cosmos*. Take, for illustration, a central incisor. Make a perpendicular slot in the backing, of a width slightly exceeding the distance between the outer edges of the pins in the selected tooth. The depth must be proportioned to the thickness of the gold at this point, care being taken not to endanger the strength of the piece. Undercut on both sides. Fit accurately to this slot a bevelled side of hard 18-carat gold backing. It should be exactly flush, no more. After grinding the tooth to gum, adjust to the backing and try in. When all is satisfactory, solder. The holes

for the pins should be widely reamed (not enlarged), and but little solder used. File away surplus, and you will have a tooth which will slide exactly into position, leaving the lingual surface of the piece unaltered. A little thin phosphate will secure it. It will be more solid than a Tam many boss.

Misfortunes come not singly, but in whole battalions. The proverbial mutability of worldly things must surely sometimes make even the most prosperous pause and wonder what he would do did disaster overtake him. Probably he would be the first to ask assistance of the very fund, which now, when he could, he apparently forgets to help. The members of the British Dental Association number 817, yet of these only a paltry 242 are subscribers to the Benevolent Fund. Possibly many more may contribute to the after-dinner collections, which form not a small part of the Fund's income. We appeal from Philip drunk to Philip sober, and ask if it would not be far better to give a regular annual subscription? And those who, even in their most generous moments, do not give, we must gently remind that the Secretary's address is 40, Leicester Square, and that having joined the Association in order to support professional views of matters political and a high standard of ethics, so of their brotherly kindness they should help those of their craft who cannot help themselves. A penurious professional pharisee is certainly of all objects the most despicable.

The Fourth Meeting of this session of the Edinburgh Dental Students' Society, was held on the evening of February 4th, Mr. Sewill Simmons, L.D.S., the President, in the Chair. Mr. S. W. N. Swales read a paper on "Methods of Treating and Filling Roots," which led to a good discussion among the members. It is intended to hold the Eleventh Annual Dinner on March 8th, when Dr. Macdonald Brown, F.R.C.S., Lecturer on Anatomy at Surgeons' Hall, the Honorary President elect, will occupy the Chair, and the menu card as in the past will be of a humorous nature.

Lincoln's-in-Fields, though no longer a haunt of terror to the student, now that the examinations have migrated to the Hall by the River, is still of interest as the site of the College. Probably

few dental surgeons have been inside the gardens, but as they are now public property, curiosity may attract a good many. The Inn was established in the early part of the fourteenth century, and was called after Harry Lucy, Earl of Lincoln. It seems we have to thank Oliver Cromwell for having any open space left, for a building mania threatened at that time to cover it over with houses, till checked by the peremptory order of the Protector. At one time the square was the fashionable part of the town, and the haunt of foot-pads and house-breakers. Before the Inn was established it formed part of a sylvan expanse called Ficket's Field and the civic huntsman followed the Corporation hounds across the space on his way westward.

THE Annual General Meeting of Governors and Subscribers of the Brighton, Hove, and Preston Dental Hospital was held on January 30th, in the Board Room, 116, Queen's Road, Brighton, under the Chairmanship of Alderman Dr. Ewart, J.P. The Report expressed regret that the financial position was not more satisfactory, and that new subscribers are not more readily gained. Notwithstanding their claims to support, and in spite of the handsome donations from the Committees of the Hospital Saturday and Hospital Sunday funds, the debt upon the Institution had been doubled, the deficiency of £8 14s. 10d. having risen to £16 19s. 10d., and that notwithstanding the greatest economy and care had been practised. The total expenditure had been but £140, and of that amount £70, or one-half, was absorbed by rent, rates and taxes; over £25 being expended in the necessary work of the Institution, such as in the purchase of anæsthetics, repairs, firing, printing, &c. During the past year the admissions had been 2,993, viz., 1,312 males and 1,681 females, including over 1,100 children under fourteen years of age; and anæsthetics were found necessary in 324 cases, being a large increase over any previous year. No fewer than 837 extractions were performed under this influence. In all, there were 3,304 useless teeth and roots removed, and 171 decayed teeth rendered serviceable by stopping; whilst there were 371 cases of a miscellaneous character attended to, including several of regulating in the young. It was with great regret that the Committee had received the resignations of Mr. E. M. Tod, one of the consulting

dental surgeons, to whom they expressed the warmest thanks for the interest he had taken in the Institution ; and of Mr. D. E. Caush and Mr. S. P. Johnson, who had been associated with the Hospital from its foundation, and who, in retiring from the more active duties connected with it, would still give it their welcome support and encouragement.

Dr. LEFFMANN publishes a paper in the *International* giving his tests on the amount of oxygen contained in specimens of hydrogen peroxide. From this we take the following:—

	Volumes.
One-ounce bottle, S. S. White Dental Company, first sample, November 10	5.04
One-ounce bottle, S. S. White Dental Company, second sample, October 30	5.3
One-ounce bottle, H. D. Justi, first sample, November 10	.56
One-ounce bottle, H. D. Justi, second sample, November 10	.56
Sample of Marchand's purchased at G. Sibley's, October 30	12.04
Samples of McKesson & Robbin's hydrozone, at least six months old, kept in photographic dark room, and opened to-day, November 10, no internal pressure, contains	9.1
Samples of McKesson & Robbin's pyrozone that has been standing in laboratory for at least six months, opened occasionally, showed	9.1
Pyrozone, when fresh, contains almost exactly	10.

these may be compared with his description of good hydrogen peroxide. He says : "Hydrogen dioxide solution should be a clear fluid, containing a sufficient amount of the dioxide to give ten volumes of oxygen when completely decomposed. Fifty cubic centimetres if it should not require more than about five cubic centimetres of decinormal sodium hydroxide to neutralize the acid present. It should keep well in a moderately cool atmosphere. On opening a fresh sample no distinct explosion should occur, and when poured into a beaker very little effervescence should be noted."

Mr. THOMAS FLETCHER, of Warrington, writes to us as follows :— "I have had the pleasure of making a representative collection for the London Dental School of specimens of casting in iron, brass, bronze,

tin alloys, and type metal, showing the various methods of coring undercuts, two to five part moulding, casting in metal moulds, and hammered work from the flat, with graver and punch work. Some of the examples are unique, and have been taken from my own private collection, much to the annoyance of the "powers that be" at home, who object to it being reduced. Those members of the British Dental Association who were at the meeting at Warrington will no doubt remember seeing this, and it has been suggested that a similar collection would be valuable in every dental educational centre. I shall be pleased to supply a similar set, with the full description of the methods by which the results are obtained, to any English or Foreign Dental Schools which are prepared to provide a suitable case for their exhibition and examination. The case for the London set was made by Messrs. Garnett & Sons of Warrington, who fully understand this class of work, but of course as regards schools abroad it will cheaper to obtain these on the spot. To those who wish for this collection it must be remembered that it is a work of time, suitable examples are not to be obtained at a day's notice, and the London collection required over four months to complete, not allowing for my own specimens, which could only be obtained by accident. To those who who can see the London collection I may call special attention to one minute casting in iron by Devaranne, of Berlin, showing the method of casting the finest filagree work. Like Michael Angelo, Devaranne is dead, and has not left his 'business' to anyone, his work is unique and 'uncommercial'; so far as I am aware they are not to be purchased at any price, except when odd examples come into the market by accident."

Abstracts and Selections.

SULPHURIC ACID AND PEROXIDE OF SODIUM IN THE TREATMENT OF PULPLESS TEETH.

By F. T. Van Woert, M.D.S., Brooklyn, N.Y.

The object of this short paper is to explain somewhat the details necessary for the accomplishment of results such as I have attributed to the above named drugs; and in the beginning be it understood that there is nothing to follow which is original with me.

The credit, if any, is due to the gentlemen whose names appear in this paper as having introduced these remedies to the profession. Since the introduction of sodium peroxide by Dr. E. C. Kirk, three years ago, I have met with very great success in its use, as well as in making the solution. I seem to have been more fortunate than many others, as I am constantly in receipt of communications stating that the writers have failed utterly in their efforts to accomplish results like those claimed for the remedy. The sulphuric acid which was recommended by Dr. Callahan, at Ashbury Park, last August, I have found so valuable in bringing to light nerve-canals that would never be found were it not for its use, that I embrace this opportunity to spread the glad tidings, with the hope that others may be profited by it as I have. It is generally conceded that one of the most difficult and uncertain operations which we are called upon to perform is that of opening and sterilizing roots, and in a great many cases it is utterly impossible to accomplish that end, and the result is the loss of many valuable teeth. Dr. Shields, of New York, claims that this is due to a lack of professional education and manipulation, and makes the absurd statement that he always opens to the end and fills all roots, which you know as well as I do is a mechanical impossibility. It is eighteen hundred and ninety-four years since any one man has claimed such perfection, and I predict it will be as many more before another member of our profession will have the audacity to proclaim himself absolutely perfect, and the rest of us diabolical quacks. My excuse for these utterances will be found on pages 12 to 15 in the *Transactions* of the New Jersey State Dental Society, 1893.

Dr. Callahan recommends a forty to fifty per cent. aqueous solution, as follows: "Let us suppose we have an inferior molar tooth in which the pulp has been destroyed; we adjust the rubber dam, open the pulp-chamber thoroughly, take an old discarded broach, twist a little cotton on the end, bend the broach to a right angle so it will reach well down into the cavity, place the broach into a suitable handle, and by means of the broach and cotton place directly upon and above the dead pulp a drop or two of a forty to fifty per cent. aqueous solution of sulphuric acid. The solution, by a process of dehydration, will cause the pulp to shrink and toughen so that it can with comparative ease be removed. Now, by means

of the broach and cotton, place a drop of the solution over the entrance of each canal. Sometimes it will be necessary to sink a little well or depression at the mouth of the canal to get the acid to stay where it is wanted, being careful to use only round or bud-drills for this purpose.

"Take a No. 5 Donaldson nerve-canal cleaner, bend it to a suitable angle, cut the shank short with nippers so the broach will fit up close to the handle and be rigid and strong; then with a pumping motion begin to enter the canal slowly and carefully. The acid will precede or follow closely the fine broach and destroy all septic matter it comes in contact with. Proceed until the patient notifies you of a sensation which is similar to that felt when chlora-percha goes through the foramen; treat all the canals in the same manner. I say all, because sometimes you will find what appears to be four distinct canals.

"Usually three canals will be found. The posterior root will have one broad canal; the anterior root will nearly always show what seems to be two canals.

"By this time the solution will be so charged with disintegrated tooth and pulp-substance that it will hide the canals from view. Now, by means of a Dunn syringe, fill the cavity with a saturated solution of bicarbonate of soda; this, when brought in contact with the acid solution, liberates carbonic acid gas in such quantities that the effervescence will carry all the broken up tooth and pulp-substance out of the canal, out of the tooth on to the rubber dam, leaving a deposit of bicarbonate of soda lining the whole tooth. This can be removed, if desired, by a little sterilized water, alcohol, or peroxide, either of which will leave the canals white and clean.

"If we desire to make the canals larger, place more acid in them and use a larger broach until the canal is as large as wanted; then cleanse again with bicarbonate of soda; dry the canals thoroughly by means of paper points, alcohol, hot air, etc., and you have the cavity and all the canals thoroughly opened, thoroughly clean, thoroughly aseptic, and you can proceed to treat or fill, as you may choose."

I have been using this preparation as described in the above quotation, and find the claims made by Dr. Callahan for it precisely as he has stated, to wit—

1. The operation is perfectly safe, because the action of the acid is self-limiting on dentine.

2. It is a pronounced germicide.

3. The acid acts upon diseased tissue with far greater vigour than healthy.

4. The destroying of the diseased tissue in this way leaves a fresh aseptic surface.

5. An aseptic wound will heal itself in any part of the body if properly closed.

6. Dr. Callahan claims that the acid softens the dentine a very short distance.

In the use of a bicarbonate of soda solution the acid is neutralized, in doing which conbonic acid gas is generated in sufficient quantities to carry off the *débris* from the root canals.

Now, do not understand either Dr. Callahan or myself as claiming the use of sulphuric acid and soda bicarbonate solutions to make it possible to open all root canals, but credit us with the conviction that by its use many hopeless cases are mastered, and hundreds of teeth saved which would otherwise be lost.

When you are not successful in your attempts to thoroughly cleanse the canals, place in the pulp-chamber a saturated solution of sodium peroxide and seal the crown from twenty-four to forty-eight hours; then remove and wash with warm water, after which fill in the usual manner, with the assurance that the majority of cases will not give you further trouble. But to obtain these results it is absolutely necessary that every detail is followed in the making of the solution.

First, the peroxide must be powdered in a mortar, as it is not fine enough as purchased to add to the water without a chance of spoiling the solution before its completion.

Dr. Kirk explains the cause of this on page 499 of the *Dental Cosmos*, June, 1894, as follows: "If the solution be made hurriedly by the addition of considerable quantities of the powder to the water at one time, the evolution of heat due to the energy which attends the combination produces a rapid elevation of the temperature of the solution.

"This causes a decomposition of the peroxide, a loss of its loosely combined extra atom of oxygen occurs, and the resulting solution

is little more than a solution of sodium hydrate, or ordinary caustic soda, which is practically inert as far as bleaching power is concerned

"To obviate the rise of temperature and consequent decomposition of the peroxide, the solution must be made slowly."

To make this solution, take a common tumbler about half-full of distilled water, place it in the centre of a good-sized pudding-dish, and pour all the cold water around it possible without floating the glass. Add the sodium peroxide in very small portions, about what could be taken upon the point of the large blade of a pocket-knife, dusting it in the water slowly to cause as little agitation as possible, and this amount should not be added oftener than once in a half-hour, being careful to have the sodium peroxide finely powdered; this to be continued until the preparation begins to look opaque as powder is added. Let it stand over night, and it is then ready for use. This takes several days to make, but it will more than pay for the time consumed in its prompt action as a bleacher and sterilizer.

The general impression is that sodium peroxide is for bleaching only, while it is the most valuable preparation I have ever found for the treatment of dead teeth, if used as described before.

The question has been raised as to whether this solution does not disintegrate tooth-substance. I feel safe in saying that it does not, having used it very extensively the last three years without once giving trouble. The preparation can be kept in a glass-stoppered bottle for a long time. It is just as well to keep it in a cool place.

To preserve the powder, screw the top of the can down tight, and run between it and the outer rim a little base wax melted so that it will barely pour. You can remove the top at any time by simply passing the point of a knife through the wax, close to and around the same.

I sincerely hope I have made myself plain in this matter, and that those who read this article will try for the results claimed, as I am sure they will find the addition to their medicament cases very valuable. I am just in receipt of a communication which reports very successful results in the use of peroxide of sodium by a student in the Philadelphia College, after the following method: Apply the dam, cleanse and prepare the cavity, place in the pulp

chamber a small portion of the powdered peroxide, then flood the cavity with water, allowing it to remain until the agitation from the combination ceases, after which it is washed out and treated as before described. This would seem to me a very practical and sure way of obtaining a solution that would be effectual.—*International.*

A CASE OF RAPIDLY FATAL FACIO-CERVICAL CELLULITIS FOLLOWING TOOTHACHE.

By James Elias, M.R.C.S. Eng., D. P. H. Camb., &c.

On Thursday morning, April 12th, 1894, a young man twenty years of age complained of toothache and was unable to go to his work as weigher of bluestone at a copper works. The pain was rather severe, the seat of mischief being the last right molar of the lower jaw. On the following day a slight swelling appeared on the right side of the face, the pain disappearing at the same time. By Saturday, the 14th, the swelling had increased, and in the afternoon I first saw him. On examination I found the face swollen over the right side of the lower jaw, the swelling extending under the chin and slightly down the neck. The inside of the mouth was in a state of general congestion, extending to the back of the throat, and the floor of the mouth was raised, and beneath the tongue the mucous membrane was so œdematous that it partially protruded when the mouth was open, suggesting the appearance of a second (smaller) tongue. The tooth complained of was much decayed, and sharp pain was elicited on percussing it. The temperature was 103·5°F., and the pulse 130. There had been no rigor. The offending tooth was extracted, pus welling out of the cavity. An aperient was perscribed, also an antiseptic mouth-wash. On Sunday morning (the 15th) I again saw him. The swelling in the face and neck had now considerably increased, and I felt convinced that it was a case of rapidly spreading cellulitis. I sent for Mr. Lewis of Neath to see the case with me. He came in the evening. During this short interval the disease had made rapid progress; the face appeared to be double its usual size, the right eye being almost closed. The swelling had increased all over the front of the neck, the œdema extending over the chest to the level of the nipple. The patient was at this time perfectly conscious,

but he was unable to lie down, the dyspnœa, however, not being urgent. Rigor and pain were absent. Speech was difficult. The temperature was 103° and the pulse 140. We decided to operate at once. No chloroform was administered. A deep incision was made in the middle line, extending from the symphysis menti down to about the middle of the neck. A probe was now carefully passed deeply amongst the structures below and parallel with the lower jaw on the right side and brought to the surface opposite the angle where the point was cut down upon. A sinus forceps was then passed along the probe, and after the latter had been extracted the forceps were opened to an extent which allowed a medium-size drainage-tube to be inserted. No pus was reached, although we probed carefully for it. The operation, which was borne well by the patient, was performed under strictly antiseptic precautions, the final dressing consisting of boracic lint (in the form of a hot fomentation) covered over with cotton wool. He passed a rather restless night, complaining of mucous at the back of the throat, which was difficult to clear away. There was no delirium, and he took nourishment fairly well. At 7 a.m. on Monday (the fourth morning after the swelling first appeared) the nurse stated that the patient had a "fit," which only lasted a few minutes, and then he died.

That this case should have ended fatally is not to be wondered at, for there were three dangers threatening the patient's life—viz., œdema glottidis, extension of phlebitis (along communicating venous branches) to the brain, and œdema of the lungs; he undoubtedly died from the first of these. The disease was evidently septic in nature and resulted from an ordinary dental abscess, so common at the roots of decaying teeth. It seems surprising that such cases as the one recorded above are not more common, and this must be attributed to the fact that the mouth, like the rest of the alimentary tract, is remarkably free from those pathogenic organisms which are the cause of septic inflammation. Such germs must, however, continually find their way into the mouth, but it is more than probable that they meet with an early death through the action of the secretions unless they find a suitable nidus, due to an abrasion of surface or faulty secretion, which would enable them to flourish. There are numbers of germs, on the other hand, mostly of a parasitic nature, which flourish well

in so favourable an incubator as the oral cavity, thus proving that the oral secretions exercise a "protective influence" and exert a bactericidal action over those pathogenic microbes only which are fatal to the human organism. The exact way in which the various secretions of the human body behave towards certain bacteria offers a wide and important field for research to the practical bacteriologist; but the result of such discoveries can only tend to emphasise the importance of keeping the secretions in as healthy a state as possible and of assisting their germicidal action in all surgical operations involving mucous membrane by the constant use of antiseptics.—*The Lancet.*

Review.

HELPS IN SICKNESS AND TO HEALTH. By HENRY C. BURDETT. Published by the Scientific Press, Limited.

This book, of some 470 pages, is divided into three parts. I. Helps to Health. II. The Treatment and Nursing of Emergencies and Simple Ailments. III. Particulars of all Institutions in England and Wales for the Relief of Sickness or Bodily Infirmity. Of these three sections Part III. seems to us by far the most valuable, for here the author is dealing with matters on which he is an authority. Turning to the account of dental hospitals we find no mention of those at Exeter and Plymouth, Guy's Dental Hospital being a department of a General Hospital is, we suppose, omitted on that ground. The other sections seem to us spoilt for want of room. Concerning teeth we find it stated that accumulation of tartar about the necks of teeth is one of the two chief causes of decay. This will be news to most dentists. We would gladly have seen stress laid on the need of having the teeth periodically inspected, especially during childhood's days. The directions for the cure of toothache are crude in the extreme, and we do not think the patient will benefit much from following them. The criticism of the other parts of the book scarcely falls within the province of a dental journal, but seeing the extent of ground this book seeks to cover we would suggest that a great deal of space, that could have been more profitably employed, is wasted on self-evident commonplaces.

THE DENTAL RECORD.

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Original Communications.

THE TOOTH ISOLATOR.

By WILLIAM VAJNA, M.D.

Lecturer on Dentistry at the Faculty of Medicine, Budapest, Hungary.

THE introduction of the rubber-dam marks an epoch in the annals of odontology, and its great inventor, Dr. S. C. Barnum, the celebrated American dentist, whose name ought to be inscribed in golden letters in the history of odontology, deserves not only the gratitude of the present but also that of future generations, for his remarkable invention has alleviated the suffering of hundreds of thousands of patients, and has at the same time materially reduced the difficulties which surgeon-dentists have to overcome during their operations—especially gold fillings.

However, although one cannot praise the advantages of the rubber-dam enough, yet it is also certain that it would be exaggeration to make use of it for all plastic fillings, as numerous cases may present themselves where the omission of the rubber-dam is not only justified, but where its use would be unreasonable. Besides, without taking into consideration the loss of time and the more or less considerable technical difficulties, not to mention the expense, the rubber-dam is often unpleasant to the patient, and, what is worse, the steel clamps which grip the neck of the tooth, often for more than a quarter of an hour, cause, especially in cases of sensible dentine, extremely acute, almost unbearable pain. That this is

so, and that the rubber-dam is not so often used in private practice as many assume, is well known. This is also clearly proved by the circumstance that since the introduction of the rubber-dam (1864) the most celebrated surgeon-dentists continually recommend innumerable accessory instruments—such as tongue-depressors, cotton wool roll, napkin holders, wadding roller clamps, bibulous paper, saliva ejectors, etc.—to replace and avoid the use of the rubber-dam.

That these instruments, notwithstanding some of them are of practical usefulness, have not fully answered the expectations held concerning them is sufficiently proved by the circumstance that none have come into general use.

Having myself felt this general want for a long time, I have quite recently succeeded, during my different experiments, in constructing an instrument by the aid of which, without having perhaps finally solved the question, I have still made sensible advance. My instrument, to which, in view of its purpose, I give the name of "the tooth isolator," is described in what follows.

The isolator is used for the insertion of plastic fillings (amalgam, cement, gutta percha) in lower and central teeth, and in approximal cavities of the molars and bicuspids, as well as in the preparation of root canals, when for one reason or for another, to serve the patients or when pressed for time, one wishes to avoid the use of the rubber-dam. The isolator is especially serviceable at the very places—that is to say at the back inferior teeth—where, on account of the tongue, and the saliva which collects at the bottom of the mouth, we encounter relatively the greatest difficulties.

By the aid of the "isolator," by using a small piece of tulle, we obtain the three advantages indicated below and so can execute fillings more easily, and with greater precision.

1st. The tongue as well as the side of the mouth can be kept securely aside.

2nd. The polished surfaces of the "isolator" throw light on the very spot of the operation, that is to say, light up the cavity of the tooth to be filled.

3rd. By preventing the saliva running in we can keep the cavity of the tooth quite dry.

When using the "isolator" we do not occasion—as is the case with the use of the rubber-dam, tongue-depressors and clamps—the slightest pain to the patient, nor even the least inconvenience.

The "isolator" (Fig. 1) is made of a single piece of shining polished metal, neither soldered nor riveted. Thus the instrument can be well and easily cleaned, and is very durable.

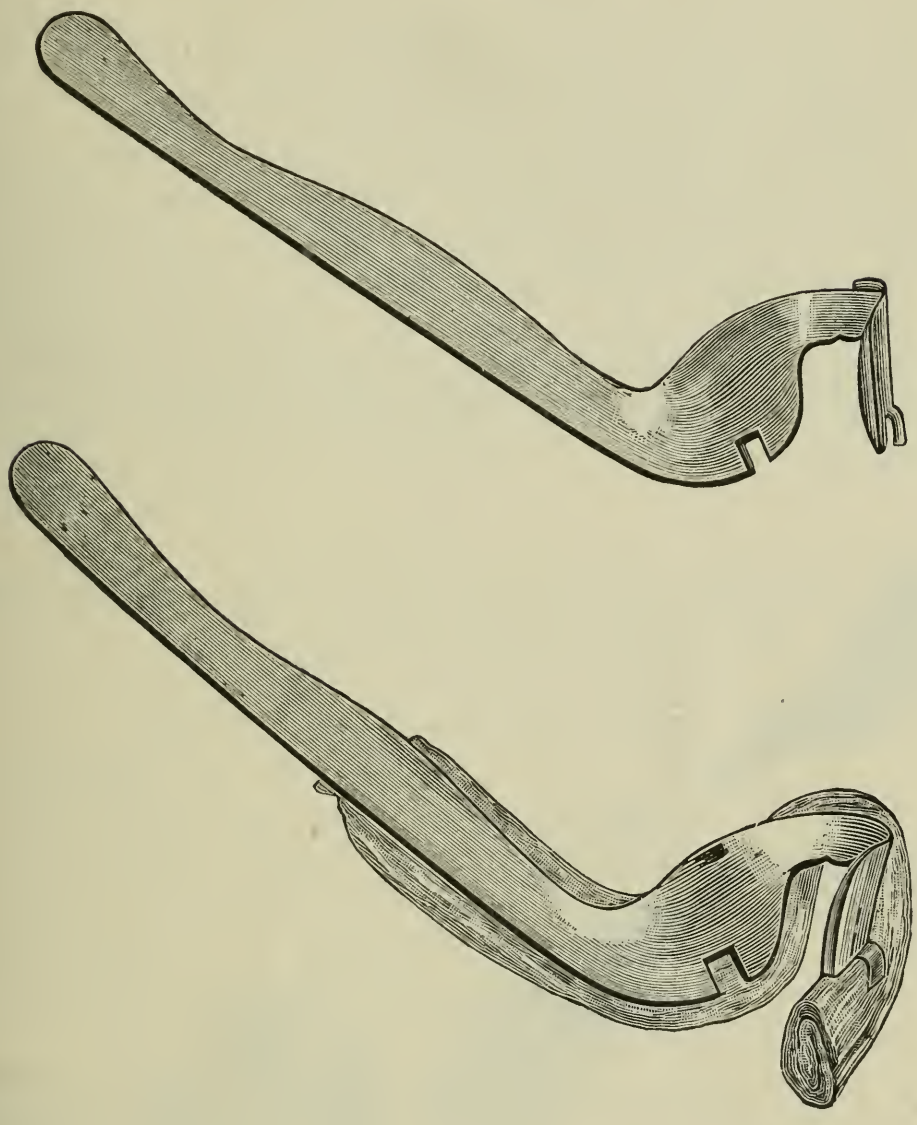

FIG. 1.

The "isolator" consists of two converse shell-like parts, whose surfaces face each other and are solidly joined together in the middle by a narrow piece; the handle of the instrument is in continuation with one of these pieces, and is bent a little sideways. Upon each inferior side of the plates and upon the cross-piece there is a clamp, three in all.

The "isolator is employed in the following manner :—

After having duly prepared the cavity of the tooth to be filled and set in order all the instruments and the necessary materials for filling, take a square piece of linen, the sides of which are about fifteen centimétres in length. Fold this eight or ten times so as to get a role of two centimétres in width, fifteen centimétres in length upon half a finger in thickness. (One can get these pieces of linen in packets of 100, as mouth napkins of all dental depôts.)

Then draw this ribbon under the clamp of the "isolator," having the junction of middle and end third under the central clamp, the direction of which is upwards; then place the shorter end of the ribbon under the clamp on one shell, and the longer end of the ribbon under the clamp on the plates continuous with the handle, while the remainder of the ribbon should be placed along the handle and retained there by the fingers whilst using the instrument (fig. 2).

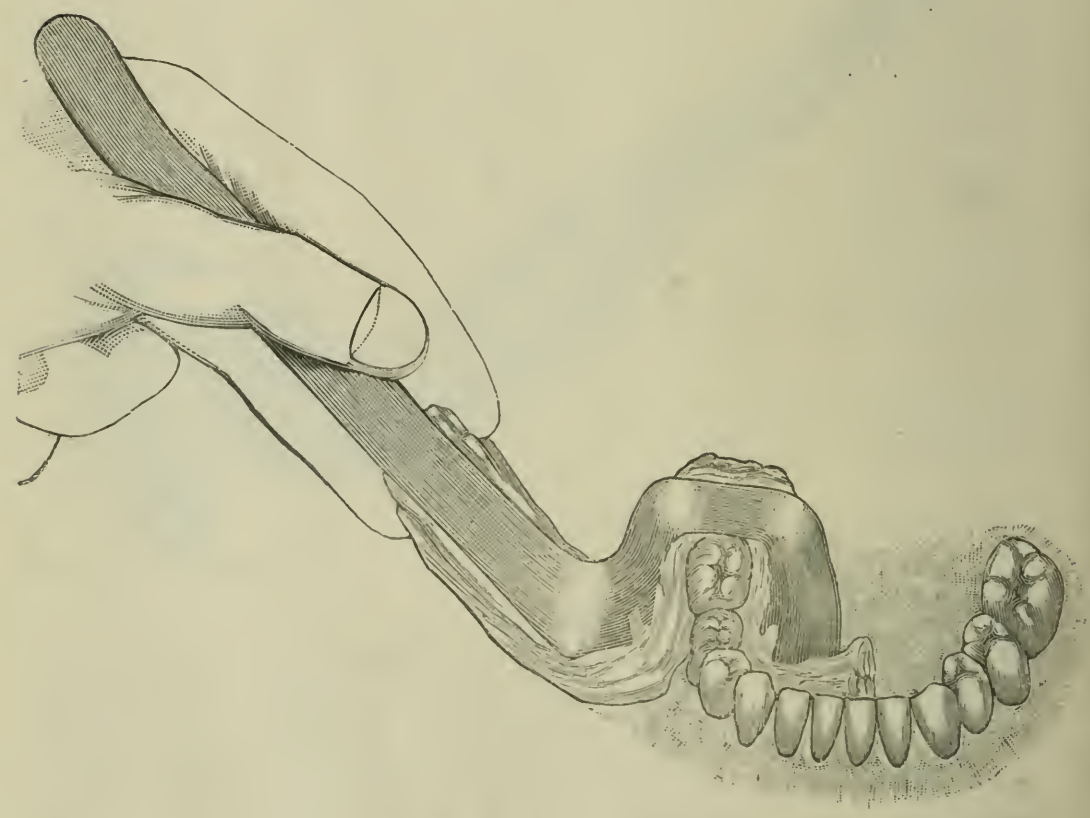

FIG. 2

When required for use, the "isolator," fitted with its napkin, is placed over the tooth to be filled, so that the plates are against the buccal and lingual alveoli, these holding the napkin tightly against the gums, then with the help of tweezers arrange the cloth round the tooth.

The "isolator" is so shaped that it can as well be used on the right side as on the left side. Its handle must always be placed in the right corner of the patient's mouth. It is best to hold it in its place oneself with the left hand and not request the patient to hold it It is very advisable, whenever the instrument is being used, to take an entirely new piece of tulle, the more so as it comes cheaper than the washing of a napkin.

I venture to recommend my isolator to the attention of my honorable colleagues, convinced that its use not only benefits the patient, but that it facilitates work, and, if applied as described, will produce good results.

SOME OF THE AIMS OF OUR STUDENTS' SOCIETY, AND HOW BEST TO FULFIL THEM.*

By Mr. F. Lawson-Dodd, L.D.S.Eng.

Mr. President and Gentlemen,

It was with great hesitation that I finally decided to read a paper to you on the above subject. It is contrary to precedent, and we are by instinct conservative. It is introspective, and although this is sometimes good, yet we all have a rooted aversion to it. However, these objections, mighty as they appear, did not swerve me from my purpose. For some years it has been my lot to belong to two societies such as ours, and at both, it is time to say, that there has not been shown that amount of interest and enthusiasm which alone can ensure the fullest success. It seemed that this was a point that might well be considered by all of us, and, thinking that this gap, which the secretary was most anxious to fill, might be occupied in a far less useful manner than in discussing a subject so personal to us as a society, I ventured to undertake the task.

The meetings, although fairly well attended as a rule, are almost only taken part in by those for whom the Society does not primarily

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

exist. Now to take part in anything is to take an interest in it, and in this lies the solution of the whole question of fulfilling its aims. When attending meetings it has often seemed that this lack of success was largely due to the fact that the majority of those present had not only not read the rules, but had an entire misconception of the reasons of this Society's existence.

Feeling this to be the case, I somewhat rashly resolved, some day, when opportunity offered, by way of experiment, to open a discussion on the whole subject ; a discussion in which for the moment we could forget our ultimate professional end and look to the machinery, so to speak, which, in this Society, is to further that end, and find out in what way we could attain most progress with the least dead-weight of silent and functionless members.

No doubt before you feel that relief which the final words of my paper will bring you, you will be convinced that there is by no means a wide gulf of difference fixed between myself and that worthy Welsh divine who is reported to have urged his words rather than his example on his hearers. Whether that be the case or not there is no doubt that one advantage of this subject is that nearly all can say a few words upon it, as all are interested in it, and so my words may attain a sort of reflected value by having directed your minds to think over the position and work of the Society, and perhaps hit upon ideas, which, when carried into practice, will arouse new energy. This is an age of societies. The old belief that two heads are better than one is now replaced by a new one, viz., that two hundred heads are better than two. It was on this experience that all such societies as ours were founded. We are beginning to see the truth of the words "we are members one of another," that our interests are inseparably bound together, that a man's good work affects the reputation of the whole profession, that a man's careless and slovenly work brings discredit, not only on himself, but on all his brother practitioners. So we see that these societies, formed for mutual benefit in our professional youth, are valuable, if for no other reason, yet in this, that they create among us a unity of interest which is obviously most beneficial. I will mention a few ways in which we by means of this society try to bring about this mutual help, and if, as no doubt will be the case, some of the more important remain unnamed, it will rest with you to fill in the blanks afterwards.

The objects and aims of the Students' Society here may be classified into three groups (1), those strictly *Professional* (2), those more widely *Educational*, and (3) the *Social.*

We will consider those objects, which may be called the purely professional, first, not because they are more important than the others, but rather on account of the fact that the subjects treated of under this head are more serviceable for examination purposes, and most here will feel that they are consequently in a sense the most useful. It does not seem to me that they are in the long run so valuable as the others, and I will give you my reasons. Our Professional Education proper is so well looked after by the large teaching staff of our hospitals that the best that we can get here can only be supplementary and secondary to that, whereas the advantages classified under the two latter heads are attainable by no other means, that I know of, than by our Society.

This first object is fulfilled by the many papers and discussions on those subjects dealt with in the text books, next, and better, by casual communications and their useful hints, by which means we can give one another the benefit of our personal experience in the operating room or at the bench, and these cannot as a rule be found in books.

Then, too, there is another class of subjects of even greater value than those just named, I mean those which deal with the treatment of our patients, I was almost saying private patients, but I will not, for it seems to me that *all* those who are under our care should be treated as private patients, and that any man who is worth his salt will use the same gentleness and courtesy to anyone in his hands, whether rich or poor. I was told that when one left the hospital it was well to commence in a private practice to learn how to get rid of the roughness acquired at that institution, all I can say is that it ought never to have been, and that we ought so to treat our patients here so that no change would be needed. No, what I mean is the papers dealing with those minor points, which, if considered, give great extra comfort to our patients. A great man has said that success in operative surgery depends entirely on paying attention to minute details, this is true of dental surgery equally. I remember having some carbolic acid applied to an aching tooth once by a gentleman, he dipped a pledget of wool in the tip of conveying forceps into a deep and narrow necked bottle, and then applied the

drug to my tooth, but he had not noticed that the handles for several inches were smeared with the acid, and that they subsequently were rubbed on my lips. Then again the limits of our work as dental surgeons and the difficulties which should lead us to call in the general surgeon or physician and our attitude towards those professions, all are subjects which could be dealt with beneficially. These and other kindred papers, whose titles will doubtless crowd into your minds if you do not contemplate reading one shortly, appear much preferable to the mere text book subject, because they are not to be found in print, yet are of inestimable importance to all of us.

Then, too, the discussion of those general diseases which are manifested by special oral symptoms form a most interesting and useful field for the future. They also are good because the reader of the paper can condense and render them more suitable for us dentists than can the writers of the ordinary works on Medicine or Surgery. The vast importance of a thorough knowledge of the general condition produced by poison, such as lead or mercury, or by diseases such as syphylis or malignant disease, has already been impressed on us. I will, by way of illustration, however, mention in a few words a rather curious case that came under my notice while taking a "locum" in the country. A female patient, aged about forty-five, consulted me one day about indefinite neuralgic pains, which she said commenced in her face but went all over her; she at the same time, with that confidential manner characteristic of elderly persons of her sex, stated that she suffered from very severe indigestion, accompanied by great abdominal pain. She looked quite broken down in health, and her hands were in a state of tremor. The whole history pointed to the fact that the teeth played quite a secondary part in her troubles. Immediately on examining her mouth, I saw, somewhat to my surprise, a well-marked "blue-line" on the gums. The usual enquiries showed that she did not clean her teeth with charcoal (the only possible cause of such an appearance). She had been near some painting, but had not touched anything of the kind. The water supply was good. Things were getting quite perplexing when the woman herself cleared up the matter by saying that she had been for some time sniffing up her nose a powder she called "lithrage," for some complaint which she did not name. Needless to say the "lithrage" was

really litharge, or the oxide of lead, and her disease lead-poisoning. Now she was being treated by a local medical man for "indigestion," and my duty was somewhat puzzling. However, I told the patient her disease, its cause, and advised the immediate withdrawal of the powder. She did perfectly well and is now quite strong again, and she required nothing with regard to dental work proper.

Then again the last of the professional objects is fulfilled by each of us demonstrating the use of, and showing those instruments and materials which we have found serviceable to us, and which when used by a fellow student may mark a new epoch in his operating.

These I think comprise most of the subjects by whose discussion or study the professional objects of this Society are carried out. We will now consider the second group, viz., the Educational.

The tendency of special study for examinations offers a great temptation to neglect all things that do not directly aid the great end in view, and for this reason there is not so great an eagerness on the part of our members to read papers on subjects more widely educational. Yet such information as we get in this way, although not being in the main thoroughfare of our daily work, renders that work more enlightened and ourselves more cultured and useful members of our profession as well as of that great outside world for whom we exist. These subjects have been dealt with under such titles as that so admirably adapted by Mr. Nicol, viz., "Pain," then again the History of the Dental Profession and its growth out of a state of barbarism, the evolution of dental instruments, and in short, all that knowledge which may be called the ornament of our professional lives.

There is a very prevalent error which is rampant amongst us even now, it is the idea that our three or four years at the hospital is to be nothing more than the continual routine of scientific study unrelieved by reading of any other sort. This is a most injurious mistake, for even our special reading will be done with more zest and thought if we occasionally brighten it by the admission of general literature or good novels. I heard one of the most able London surgeons say (and he is a man whose name is familiar to all of you) that he always read a novel a week. Well this is perhaps too much, but it shows that a profound special knowledge is quite compatible or even more likely with very wide general reading.

There is a most important educational object of our Society which we will think of for a short time, and so important do I deem it that it shall be mentioned here somewhat separately from its fellows. It is the opportunity afforded at all our meetings of cultivating our powers of public speaking. It is impossible to exaggerate its importance to all of us. Everyone is agreed that a most essential and yet most neglected part of our training is that of learning how to express, before a more or less numerous audience, with clearness, accuracy, and precision, our knowledge upon any scientific fact, and mind, if we can do it concerning a scientific fact we can do it about any other. Now it is at these meetings, and at these meetings *only*, that we have the opportunity of doing this. But you may say "of what use is it to us?" Well, just this, that sooner or later, we shall nearly all of us become members of such Scientific Societies as the British Dental Association, or the Odontological Society, and at their meetings we shall be expected to contribute something to the discussion, at least if our aspirations range so high as to lead us to hope for a place of distinction on their rolls. Now who would like to make his maiden speech on things dental before such an audience, and who would not then wish he had first spoken here, where all criticism is gentle and all mistakes soon forgotten. There is another reason why I urge this point. There are many men who lose their heads when they get up to speak, and fear the sound of their own voices, and the occurrence of these unfortunate facts holds good even in the *viva-voce* examination at the college, and there is no doubt that a little practice in elocution here would certainly help them then. Then if any of our members ever become demonstrators or lecturers they would still more value their practice here. Here we may all speak our opinion freely and with confidence of a sympathetic and patient hearing. Gentlemen, let me dispel from your minds, if it still exists, a most absurd rumour which had sprung up when I was a second year's man, and which had some influence upon us then, viz., that it would be considered cheek for a first or early second year's student to speak at the Society's meetings. Needless to say it is not only not cheek, but a sign of courage, and also that one of our main objects is being carried out.

The social objects of our Society are fulfilled by the opportunity for mutual intercourse which these meetings afford, not only before

their commencement but also afterwards, under perhaps more pleasant circumstances, and unfortunately sometimes during their progress. This is perhaps a point which present students do not appreciate so fully as those who only come here for the meetings. We who have no direct connection other than that of past studentship with the Dental Hospital, feel the greatest pleasure in meeting here, not only some of our own old fellow-students, but those who are following on the path we have trodden. Here we are brought face to face with one another as friends and not merely as fellow-students. We have left behind all the formalities and ranks of the hospital. This Society knows no demonstrators, or house surgeons, or second year's men, but only its President and Council and members. The new men who come here have an opportunity of forming new friendships and of making themselves more a part of the Society by taking an active part in its work. Many a man has been able to say that his first taste for original investigations or his first additions to the literature of his profession were made at our meetings. The social value of all the clubs in connection with the hospitals are so fully understood that it seems needless to enlarge upon them, suffice it to say, that anyone who has not taken some part, however small, in their working, knows nothing of some of the pleasantest periods of student life.

In giving you what it seems to me are the three classes of aims such societies as ours have in view, I have given illustrations under each division, partly because it appeared well to show by that means that these objects had, even by past papers, been fulfilled, and partly too, to make my points clearer. I should now like to say a few words on the ways in which we can make our work more effective.

Perhaps the most important of these is the absolute necessity of each member doing his best to ensure success by coming regularly to all the meetings, and then by taking some active part when he is here. This Society was not formed for the purpose of asking you to come and listen to scientific lectures by the highly qualified members of our staff, you have that elsewhere, it was not intended as a means for extra demonstration by the junior staff, but rather that you who have not the magic letters L.D.S. to rejoice in might have the opportunity of giving papers by the writing of which you would learn, and by whose criticism you would benefit also. Everyone can do something, it is his duty, and if he bears this in

mind he will go about with an eye ever watchful for something of interest to bring as a casual communication, and so he will in trying to benefit the Society have a double reward.

There are, however, many who on account of nervousness are unable to do either of the above, well they may at least break the ice of silence by asking questions, and thus draw forth information which many are glad of. I would even suggest that the first five or ten minutes after the reading of a paper be devoted to the asking of questions, and that after this the discussion be proceeded with. This plan is adopted by one society I know of with great success. There is another way of helping the Society, and that is by showing microscopical specimens at the commencement of the meeting, and I had the pleasure last time of seeing those which our Secretary had arranged for us, they were exceedingly good and the only pity was that many members did not come early enough to give them sufficient study. We give a prize for the best paper read during the year, and it seems that it is equally important to encourage the mounting and exhibition of specimens, either microscopical or otherwise, in the same way. Of course some should be given to the Society, at least those gaining a prize, and in this way we should considerably add to our museum, and again, these could be lent to those who had an early intention of meeting the examimers. If I may make one more suggestion I would urge men to bring the regulation cases they have in hand before us, so that we might discuss the means of correcting the errors and learn the result of the treatment employed. The regulation of teeth is one of the most difficult questions which we have to deal with, and we cannot see too many cases, and while the work of the day is going on we can only see our own, or a few others at most ; here, however, many might be demonstrated, and so our knowledge would be increased.

The dental profession was viewed not so very long ago by the public, as one whose members were little better than mechanics, and certainly as being in a position far beneath that of surgery. The stigma was very likely true at one time but, thanks to those who have by great efforts applied for many years insisted that a broader and more scientific education was necessary for us, and who first by their own example taught this, we can now say that dentistry is a calling which not only contains within its ranks, but is daily adding to them, numbers of the most cultured and refined men. This

Society has in view the same broad object, and the tone of all our meetings impresses upon us the fact that we are about to enter a profession for success in which culture, refinement and wide education are as essential as they are in any other calling we know of.

Gentlemen, I will not keep you longer, but will end by saying that some days ago, asking the advice of an old friend with regard to the subject of my paper, he, in the sense of *Punch's* advice to those about to be married, said "choose a new subject and rewrite the paper." His reason being that the objects and aims of our Society were so well known to all of us. It may be so, but should there be one fact which is new to any one here, or that may call forth some interesting remark from one of my hearers, I shall feel that at least to that extent my purpose is fulfilled.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting was held at 40, Leicester Square on the 4th ult., Mr. R. H. Woodhouse, Vice-President, in the Chair.

The minutes of the previous Meeting were read and confirmed.

Messrs. L. M. Stocken, L.R.C.P., M.R.C.S., L.D.S. Eng., Ealing, and F. R. Flintan, L.D.S., Eng., Weybridge, were nominated for Membership. Messrs. R. Herschell, L.D.S., Eng., Eastbourne; P. F. Henry, L.D.S., Eng., and A. E. Baker, L.R.C.P., M.R.C.S., L.D.S., Eng., London, W., were balloted for and duly elected members. Messrs. W. Simms, Manchester, and T. L. Nash, Inverness, were duly admitted to Membership.

Mr. E. Lloyd Williams being unavoidably absent through illness, his paper was postponed, and the evening was entirely devoted to casual communications.

Mr. Harry Rose gave a demonstration of various methods of taking impressions of the mouth. He said that some sort of apology

seemed necessary for introducing so elementary a subject to the notice of the Society. He did not propose to describe the ordinary daily routine of taking impressions, either in gutta percha, wax, plaster, or composition; but he would endeavour to illustrate methods of taking impressions when the situation of the teeth made it difficult, if not almost impossible, to take an impression in the ordinary manner. The success of the first operation depended on the shape of the Impression Tray. It need hardly be said that the Impression Tray should approximate in size and shape to the model for which it was intended, it should, however, be slightly larger, yet still following the same outlines, so that there might be a sufficiency, but not an excess, of the modelling composition. It was a common error to suppose that it was necessary to take the impression of both the labial and lingual aspects of the case. Let them take a typical case, say eight front teeth *in situ* long and straggling, due to the recession of the gum or other causes; it would be observed they had an appearance of a series of cones, the broad ends represented by the points of the teeth. Now, with an ordinary tray, either the teeth would be drawn out of the mouth, or else the composition would be pulled out of shape; but if in place of the ordinary tray they employed one with the front portion cut away, it would be seen at once that it could be more readily removed from the mouth, while, at the same time, it would allow of the composition being kept in the mouth until the danger of dragging had ceased. With respect to the difficulty as to the length of time the composition took to harden, this was formerly one of their great troubles, but it had been overcome by using what was known as the irrigated tray, a tray so constructed that a volume of cold water could circulate through it, the effect being that the composition would harden in one or one and a quarter minutes. With the front portion of the tray cut away it could be readily removed, and a beautiful and accurate impression was obtained. In taking models were undercuts existed it was well first to lubricate the fingers with a little vaseline, and secondly to use *soft* composition for moulding into the spaces. These pieces could, if necessary, be removed from the mouth and trimmed up. When re-inserted the impression was taken in the ordinary manner, and the pieces could be re-inserted into the impression tray after its removal. Where there was an extra undercut it could be taken in two pieces, using pieces of German silver just roughly bent up into

shape, so as to support the composition in the mouth. In the first place, the impression of the lingual aspect and half the cavity was taken by one portion, a piece of plate supporting it in position. The guide was made in the centre of the piece of composition, and another piece of plate was taken, forming the little tray upon which some composition was moulded. That was then taken, and after the first piece had been removed and just a little vaseline rubbed upon it, a second piece was pressed on the first. If it was then found there was not sufficient guide to hold the two pieces firmly together another small piece of composition could be placed over the two pieces, forming a little lock and fastening them. This method answered admirably for cases where from absorption of the gum in front of the mouth it was necessary to take an accurate representation of the gum where any extensive recession had taken place. A small piece of German silver was bent to shape, a little composition moulded on it and pressed into the plate. It could be moulded accurately into position and smoothed up so as to bevel it upwards towards the point. This method depended for its success, first on using an impression compound perfectly free from elasticity, secondly on lubricating the fingers with vaseline while rubbing up, and thirdly on employing the smallest amount of composition and supporting the position properly during the process of hardening. He did not claim to have said anything new, and his only excuse was that he considered taking impressions of the mouth one of the most important operations in dental procedure.

The CHAIRMAN remarked that no apology was needed from Mr. Rose for bringing forward a subject which, appealed to them perhaps more than any other, in their daily work.

Mr. WALTER COFFIN thought it would be of interest if Mr. Rose could state his views as to the desirability of making special cups and trays for cases as they presented themselves. They had often to ask themselves whether rough impressions should always be taken from which special trays should be made, or whether they should be satisfied with a large range of ordinary cups which could be adapted to special cases. It would also be useful if Mr. Rose could state whether he had any useful and simple method of making special cups to meet emergencies.

Mr. W. R. HUMBY felt some diffidence in speaking of the double tray, which he had used for many years, because it seemed to be a

thing that had been invented by he did not know how many hundred dentists at different times. Without receiving any previous information from anyone he had himself used it independently, and introduced it to his classes, and it was not until that had been done that he heard it had been introduced in other ways. This tray went into the mouth without any extra resistance, and certainly the wax maintained its shape during dislodgment. It was necessary to be careful not to take club-shaped teeth with it, or it would set so hard that it could not be removed, except by substituting warm for cold water in the circulating arrangement. He had adopted the plan of putting a little lubricant over any teeth which presented unusual difficulties, and found that a little ordinary soap was even preferable to vaseline. Though it was necessary to have rather a large range of trays, which were an expense, the results must be admitted to be superior to those obtained by any other method. He should be very happy to furnish a description of the process of making the trays, so that members might be able to start really where he was leaving off, and perhaps improve on his methods.

Mr. W. Hern said that in cases where the teeth were long and straggling, with large triangular cone-shaped spaces between them, in using a special tray with no front the composition was liable to drive in between the spaces. In such circumstances, he was in the habit of filling the spaces with a little pellet of cotton wool or amadou, or anything which would prevent the gutta percha running in between the teeth. The difficulty of the undercut he had nearly always got over by taking a piece of Gilbert's G.P., which seemed to take the spaces very accurately, and was not difficult to remove.

Mr. G. Cunningham said the communication and the discussion seemed to have gone upon the idea that modelling composition was the only material to be used in taking an impression. Mr. Rose had laid down as a kind of axiom that if it was desired to take a good impression the closer the impression tray corresponded to the particular case the more likely were they to get a good result. His (Dr. Cunningham's) plan was first to take a rough model, have a special tray made to that, then take the impression with gutta percha. With regard to undercuts he would ask, supposing a great deal of trouble were taken to get the undercuts, a model being taken as it were in two parts, as he had done several times, thus getting a very perfect model with the base of the triangle at the margin of the

gum and face, then make a plate to fit that, what were they going to do then? In all these questions of taking impressions, the personal equation was no doubt very important, but he thought it somewhat strange that no one had risen to speak on the question of a plaster impression. He did not forget their obligation to Mr. Coffin for having introduced gutta percha, and teaching them the proper use of it; they also owed something to him with regard to modelling composition. Whenever he had an edentulous case he invariably used renovating compound in combination with modelling composition.

Mr. W. A. MAGGS remarked that when he was secretary of the Society some four or five years ago he brought forward an irrigated tray on behalf of Mr. Farmer, of Manchester. He did not know whether Mr. Farmer originated it, but as far as he was aware that was the first time the irrigation tray was brought before the Society.

Mr. W. R. HUMBY said he had been using them for several years when that was introduced. The Dental Manufacturing Co. had made the trays for the last ten or twelve years. Practitioners in different parts of the country had originated the same idea, and although there was originality in each case, it could scarcely be said where the priority began.

Mr. J. H. REINHARDT said his trouble was that he always got a tremendous drag in taking both inside and outside impressions, especially the lower, where all the teeth were standing. He had never used irrigated trays, but had used a saliva ejector and the ordinary bulb syringe with cold water. He would like to know what method Mr. Rose employed when the impressions became so very hard.

Mr. H. BALDWIN felt the reason many members had not risen was that while using plaster they were glad to hear of other processes offering good results. Personally, he used more plaster than any other material, but it had the disadvantage that it was often very difficult to put together, and took a good deal of time. It would not do to let an impression drag at all, or if it was allowed to drag it must be after it had got almost hard, and all but absolutely cold, otherwise the drag would extend; personally, he always had a special tray made for each case. It was made to a rough model, and cast in tin without a handle, the handle being soldered on afterwards. This was easily done, the whole casting process not occupying more

than ten minutes. With regard to priority of invention, he had seen an irrigation tray eleven years ago. He did not know who invented it, but he found it knocking about in one of the rooms of the house. He would like to ask whether the process of swabbing an ordinary tray with cold water and using a saliva ejector would not answer the same purpose as the irrigation tray.

Mr. J. H. Badcock thought that with gutta percha and plaster anything could be done that was required. A special tray was of very great advantage, and the material he used for making it was gilding metal, brought to his notice by Mr. Morton Smale. It was a softish metal, easily struck up, neat and clean in appearance, and did not involve any labour in polishing. Gutta percha had the advantage o not only taking undercuts with extreme faithfulness, but of remaining soft to the end. In the case of loose teeth there was the great advantage that a perfect undercut could be got, and there was no drag. He had practically abandoned the use of composition in favour of gutta percha and plaster. He used plaster almost exclusively in plain cases with no teeth, or only one or two, standing. Where an undercut was required he could always depend upon gutta percha, and the result was very good. The only objection to it was that it had to be kept in the mouth for some time longer than when composition was used.

The Chairman asked Mr. Badcock if temperature was not somewhat an objection.

Mr. Badcock said that although water had to be used very hot for melting gutta percha, nevertheless, owing to some peculiar property in gutta percha, it did not burn the patient nearly so often as composition.

Mr. Storer Bennett said they were indebted to Mr. Rose for an extremely interesting discussion, more especially as it had brought out some two or three opinions on the subject. Like Mr. Cunningham, he felt inclined to question Mr. Rose's statement that the only method of taking undercuts was the one he had suggested. Undoubtedly gutta percha could be used for some purposes, but his own favourite method of doing it was by using plaster of Paris. He had never seen any undercuts that could not be taken by that means, and it had the advantage in the case of loose teeth that by careful watching the time of breaking the plaster of Paris the mould could be removed piece by piece, and thus an impression of the loosest

tooth could be taken. Whilst agreeing with Mr. Cunningham as to the merits of different kinds of composition, he could not agree that when this admirable impression of the undercut had been obtained it was of no value. In his judgment they could not have too perfect a model. He believed that every undercut could be as a rule utilised ; two or three years ago he brought before the Society a simple method of inserting plates, not by pushing them down between the teeth, but inserting them from the lingual side and pushing them out towards the buccal side. By this plan the undercuts were utilised to a very large extent, making them of great advantage, because by the fact of the cavity being V-shaped with the base towards the gum the plate was held in position, and could not properly rise.

Mr. Cornelius Robbins had been waiting to hear if one other plan would be mentioned, viz., that of combining two very opposite materials, plaster and composition, in taking one and the same impression. In many cases of undercut the difficulty could be got out of tolerably easy in that way. Plaster could be built around a tooth with considerable undercut. It would set quickly, and then one could take a composition impression on that, and when it was removed from the mouth by easing away the undercut plaster cone and putting in place a fairly good model could be got with less difficulty than by a plaster impression. He did not regard special trays as a necessity. With a decent assortment of trays one could, with a little manipulation, get a fairly good adaptation, at any rate, for the first model. He did not even think it necessary to have a tray with the front cut out for the long incisors standing in the lower jaw ; the way to get over the difficulty was by not putting composition where it was not wanted, but roughly to mould the composition with the thumb and finger over the teeth that were standing. In that way they did not invite failure, and for men in busy practice it was an advantage not to have to make a special tray. There were, however, cases where success could only be obtained by special trays. He thought the point mentioned by Mr. Hern very important, viz., with respect to the plaster getting between the front teeth, for, however nicely they might make the model, there was always a danger of dragging, which was avoided by Mr. Hern's method. With reference to the irrigation tray, he thought a very good result could be got without it by just flashing the ordinary tray over a spirit lamp and then draining a little cold water upon the back of it.

Mr. Rose, in reply, said that for any cases presenting difficulty he usually made a special tray ; this did not entail the least amount of discomfort to the patient. As a rule he used bees' wax to take a temporary impression of the mouth, and to that impression he made a special tray. He agreed with Mr. Hern as to the great advantage of packing the spaces in front of the teeth, so as to exclude the composition where it was not required. With respect to Dr. Cunningham's remarks, he wished to say he was not referring to the use of gutta percha, plaster of Paris, or any other material, but simply confined himself to the merits of taking the impression in composition. He used composition because it took the least possible amount of time to mould into shape, and enabled him to produce undercuts or duplicate his impression so quickly that two or three could be taken as against one in plaster. He was aware that Mr. Coffin had a special liking for gutta percha and an admirable way of working it. With regard to the spaces between the teeth, it was most important to get the gum perfect and free from distortions, so that the plate might rest upon it without injury, and the patient be able to masticate fairly. With regard to what Mr. Badcock had said as to gutta percha, he used composition purely for the reason that it took considerably less time to harden and gave better results. The same would apply to plaster of Paris ; in order to obtain a good result it must remain in the mouth nearly five minutes, and if impressions were to be taken in sections it must be remembered that there was always a slight expansion of the plaster. He agreed with Mr. Robbins that ordinary trays could be used as successfully as special trays except in cases of exceptional difficulty. Mr. Cunningham had made him say that he used a tray that should accurately, or nearly accurately, fit the mouth. He did not say that at all. What he did say was that it should be large enough to admit of a sufficient amount of composition, but not an overflow.

Mr. Hopson brought forward a case (a model and photograph of which he presented) of a lower canine erupting from the lip. The patient, a girl aged two and a-half, was admitted to Guy's in January, 1878. The cheek was eaten away by phagadænic ulceration, the part affected extending from the left corner of the mouth, describing an arch about the size of a five shilling piece. The free borders of the upper and lower lips (more particularly the lower) were included. The alveolar process was laid bare, and there was a very fœtid smell.

After treatment with nitric acid and nitrate of silver the child seemed much better, and went out on February 1st with the wound granulating up well. Four months later she returned with further ulceration in the old place, which was again treated as before, and some loose teeth were extracted. A few pieces of necrosed alveolar process came away, but the wound granulated up well, and the patient went out on June 14th with the place practically healed. Subsequently the tissues of the teeth, cheeks, and lips became firmly adherent to the maxilla, greatly limiting the movement of the jaws in mastication. At the age of thirteen she erupted a left lower canine, which pierced the lip and caused great disfigurement. Having apparently tolerated this condition for six years, she came up to the hospital last January, and the tooth was removed. There was very little movement, and she could only separate her teeth for about a quarter of an inch, though still able to speak and masticate fairly well.

Mr. A. R. Colyer showed a defective first permanent molar, removed from a patient aged thirty, who complained of a great deal of swelling on the side, which had continued for three weeks. On examination the left first permanent molar was found impacted, the grinding surface of the crown being on a level with the necks of the other teeth. A putrid discharge round the teeth had been noticed for nine months ; the other teeth were in place and in order. He removed the first permanent molar one day, and found the temporary molar loose in the socket on the second day. He thought it was a case of unerupted temporary molar preventing a full eruption of the six-year old molar. He believed the temporary molar was placed between the anterior buccal root and the palatine root.

Mr. Ackery mentioned that two years ago he brought forward a similar case, and was then in hopes that some explanation might be offered as to how these six-year old molars could be impacted. In the case referred to the bicuspids were present, and the second molars in position. It occurred in a lad about twelve years old, and he was quite at a loss to explain why the six-year old molar should have been prevented from getting up to its normal length. He should be glad to hear any suggestions as to the cause.

Mr. Humby said it was rather rare to find a first permanent molar retarded in eruption, and still more so to find more than one tooth retarded. They sometimes found a permanent molar down on the

level of the gum, as in Mr. Ackery's case, and also other temporary teeth not rising to their right level. But in the case mentioned by Mr. Colyer it seemed as if the permanent tooth had come into position, and had been succeeded by a temporary tooth—in other words, the temporary tooth had attempted to erupt and had done so between the roots of the first permanent tooth.

The CHAIRMAN said it sometimes happened that a tooth had got caught in that way. It seemed to be a case in which the temporary molar was caught in between the permanent molar and the bicuspid, and was held back in some way in the socket in which the permanent tooth was removed.

Mr. HUMBY remarked with regard to depressed molars it was sometimes very difficult to decide whether a tooth such as the first permanent molar really had even been of full length and has always receded in the socket, or whether the tooth had risen up to a certain distance and refused to rise any higher. He had a very curious case where great pain was referred to a depressed lower molar ; the tooth was subsequently extracted, but though it had been the seat of the pain, it was apparently perfectly free from caries.

Mr. STORER BENNETT desired to draw attention to a case of prolonged and intense pain after the extraction of a tooth due to an irritated nerve exposed at the apex of the socket which resisted all treatment until it was incised. In November last he was consulted by a lady aged twenty-three who was suffering from severe periostitis in her left upper wisdom tooth. A few days previously she had undergone an operation on the right side of her mouth, which was immediately followed by pain in the left upper wisdom, with inability to insert a plate which she had worn up to that time. The operation had been performed under an anæsthetic, and the mouth kept open by a Wood's gag, which had been so unfortunately used as to dislocate the wisdom tooth, on which it rested. He wished to venture on a word of warning in the use of this powerful instrument, which he had known to cause serious pain in many instances—credited to the dentist rather than to the anæsthetist, who had been the real offender. The tooth had to be removed, but the socket was intensely painful, and remained so for twelve days, no application affording any relief. In the meanwhile the socket granulated healthily, except at its apex, where a spot was discovered about the size of a pin's head, which looked white in colour, in marked contrast to the red of

its surroundings, and caused the greatest agony on being touched, no matter how lightly. Bearing in mind that John Hilton in his lectures described instances of ulcers and wounds which were very painful in consequence of the exposure of ends of nerves in the wounds—cases in which the pain was stopped by the division of the nerve just below the surface of the wound—it occurred to him that this was a case of a similar nature. He therefore passed the blade of a Paget's knife into the socket for about a quarter of an inch and cut across the nerve, with the happiest result, for the pain instantly ceased, never to return.

The usual votes of thanks having been passed, the meeting terminated.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

Ordinary General Meeting of the Students' Society of the Dental Hospital of London, held March 11th, 1895.

The minutes of the previous General Meeting were read and confirmed.

On casual communications being called for—

Mr. Carter showed a model of the lower jaw of a patient, aged 16. The temporary incisors, canines, and second molars were retained; whilst the permanent canines were within the arch and occupied a position behind the laterals on each side, the permanent central was twisted and lay between the two permanent canines. He also showed a model of the upper jaw of a patient, aged 25. In this case the permanent upper lateral on each side had not erupted, the permanent canines occupying their place. The temporary canines were retained, and occupied a position between the permanent canine and bicuspid on each side.

Mr. Douglas showed a right upper wisdom tooth with four roots, an enamel nodule was present on the anterior surface between the buccal and palatine roots. The crown was multicuspid.

Mr. Bonnalie showed a second lower molar with the anterior root normal, and the posterior root divided.

Mr. W. F. Forsyth (Junior) presented a model of a right upper central, showing what he considered an abnormally developed

cingulum. The President said the case was very interesting, and suggested that the projection might be a supernumerary tooth that had become attached to the permanent central.

Mr. Mountford exhibited a model showing a supernumerary upper tooth situated between and behind the right lateral and canine, from a woman aged 35. The patient stated that her brother had a similar tooth in a similar situation.

Mr. Nowell showed a right upper second molar with the anterior buccal and the palatine roots united throughout their entire length by a thin broad plate of dentine and cementum.

The President then called upon Mr. F. L. Dodd for his paper on "Some of the Aims of our Students' Society, and how best to fufill them," (See p. 147.)

In the discussion which followed :—

Mr. Douglas said that, although only a first year's student, he had already gained much information from attending the meetings of the Society. He remarked that although the dental profession had made great progress of late years, yet there was plenty of room for further advancement ; he thought this would be best effected by present students paying more attention to the study of medicine and surgery.

Mr. Bonnalie said that he thought students always treated their patients with kindness and gentleness, and begged to differ from Mr. Dodd's statement to the contrary.

Mr. Torpey stated that accounts of the harsh treatment accorded to patients in hospitals that occasionally appeared in papers and journals were almost invariably gross exagerations or actual misstatements. He advised all students to keep models of all curious cases that came under their notice at hospital, and so form a little museum for themselves.

Mr. Workman thought that everything depended on the cultivation of a delicate touch and kindly bearing towards one's patients whilst at hospital. He thought that a man who was inconsiderate to hospital patients would retain the same reputation in private practice.

Mr. Turner advised all members to attend the Society's Meetings regularly, and to look out for cases suitable to bring forward as casual communications, and to take every opportunity of joining in discussions. He had noticed that at Student Society Meetings at

the General Hospital casual communications were usually brought forward by the staff, whereas it was much better that the students themselves should collect and state the cases.

Mr. W. F. Forsyth (Junior) said that many cases of great interest occurring in the hospital were left unrecorded, and urged all students to bring forward all matters of interest.

Mr. W. S. Nowell said that he was sure that a considerable proportion of what dental knowledge he knew had been acquired at these meetings. He thought students ought to be more ready to record their failures and accidents as well as their successes. He stated it as his opinion that when a dentist discovered an error in diagnosis made by the patient's medical attendant it was the duty of the dentist to communicate the fact privately to the doctor, and not to take the wind out of the doctor's sails by telling the patient. Doctors, surgeons and dentists should play into each others hands, and not create strife by narrow minded motives.

The President then called on Mr. Dodd to reply.

The President stated that Mr. Clayton Woodhouse's prize for the best casual communication had been divided between Mr. H. W. Turner and Mr. Padget. Also that the Students' Society's prize for the best paper read during the past year had been awarded to Mr. N. J. Bennett.

The President stated his intention of offering a prize, to be competed for during the present year, for the best account in writing of any case or series of cases bearing upon any specimen in the Odontological Society's Museum.

The usual vote of thanks was accorded to Mr. Dodd, and to those gentlemen bringing forward casual communications.

The next meeting would take place on May 13th, when Mr. Parrôt would read a paper on "Regulation Cases."

The proceedings then terminated.

Mr. Henry Harben, J.P., has, in addition to £500 already contributed by him, generously promised a further munificent donation of £1,000 towards the amount required for building the new Dental Hospital in Leicester Square conditionally upon a sum of £13,000 being contributed by the public within reasonable time, and which will enable the Committee to commence the building.

THE DENTAL RECORD, LONDON: APR. 1, 1895.

THE TEETH OF PAUPER LUNATICS.

THIS is not a political Journal. Even dental politics are outside our immediate sphere of action, still less do we dabble in matters imperial or municipal. Individually dentals may be "bigoted tories" or "rabid rads," enthusiastic progressives or hesitating moderates, but assembled in professional parley they know none of these things, and are friendly with each and all of those who help to carry on the work of dental progress and reform. There is, however, one matter perhaps verging on politics, though we think not, which even we feel called upon to discuss; it is the need of supplying efficient dental services to the poorer employées of the Government, our soldiers and our sailors, to the poor children in our board, municipal, reformatory and other schools, and to the aged poor in our workhouses, and the sick in our infirmaries and asylums. What a list this seems! An index of pauperdom, and, for the most part, in urgent need, yet absolutely without dental advice and aid. Take for instance the lunatic asylums in the County of London, of which there are five, at Burstead, Cane Hill, Colney Hatch, Hanwell and Claybury, all full to overflowing and containing within them somewhere about ten thousand lunatics, besides nurses and attendants. The population of a fair sized town, drawn from a class who, partly from force of circumstances and partly from ignorance, never do and never have taken even elementary care of their teeth. The fancy of an imaginative mind can scarcely picture the amount of trouble and disease, both of the teeth and caused by the teeth, of these unfortunates. The days are happily gone and gone for ever when the madman was regarded and treated even worse than a criminal. He is a sick man,

and we try to cure him. He is provided with a healthy home, such comforts as we can, as many amusements as possible, and skilled medical aid. Nay, it is even suggested that the community shall appoint and pay an eminent scientist, who, by devoting himself to that particular branch of scientific research, may advance our knowledge of the causes of mental disease, and so, perhaps, help us to an improved curative and preventative treatment. But if it be our duty, as indeed it is, to do these things, surely we must attend to those organs of the body, which, situated in its main entrance, will, when diseased, not only prevent food being taken at all, but be a source of much local trouble and a sort of poison generator for the whole system. It is late in the day to argue the need of attention to teeth and the uses of these. Educated people know their value and the advantage their possessor derives from any attention he may devote to them, and if this be so in a healthy man, how much more in one that is diseased. In one form of madness, and a fairly common one, the melancholic refuses food, and we have it on good authority that many of these have such bad teeth that as our informant, a medical officer in an asylum, put it "There is no wonder they don't want to eat." So how do we treat them?—Well, we give them flowers to look upon, green fields to play in, fine houses to live in, pianos to listen to and games to play at; offer food they cannot possibly chew, expensive drugs to cure diseases one obvious cause of which we refuse to remove, and finally propose to provide an eminent pathologist to examine the unfortunate's brain when dead. An overdrawn picture this—perhaps! But there is method even in our madness, for we would draw attention to the very urgent need of dentists being appointed by the County Council to attend each of its asylums. The expense, compared with the cost of the asylums, would be but infinitesimal and the benefit great. It might be urged that the medical attendants should undertake these duties, but this is absurd—Firstly, they have no time; Secondly,

they have not had the necessary training to undertake the care of teeth in an efficient and proper way. We have reason for saying, that, next to the patients, none would more warmly welcome these appointments than the medical officers of the asylums.

News and Notes.

Mr. Christopher Heath has been elected President of the College of Surgeons in succession to the late Mr. Hulke.

The Second Annual Meeting of the Notts and Derbyshire Dental Association was held on January 18th, 1895, in King John Chambers, Nottingham, when the following Officers for the ensuing year were elected: *President*—Mr. E. Renshaw, L.D.S.I., Mansfield; *Vice-President*—Mr. D. S. Hepburn, L.D.S.Eng., Nottingham; *Hon. Treasurer*—Mr. H. N. Salmon; *Hon. Secretary*—Mr. F. C. Porter. Mr. H. Ernest Goddard was elected a Member of the Committee *vice* Mr. Chalcroft, resigned. At an Ordinary Meeting, held on February 13th, the President read his inaugural address, the various points of which were subsequently discussed. The funds of the Society being in a satisfactory condition, it was decided to devote a sum to the purchase of some standard text books as the nucleus of a library.

At a meeting of the Glasgow Dental Students' Society, held on the 20th February, Mr. Rees Price gave a Lantern Exhibition of "Microscopical Sections." A few on "Odontomes," by Mr. John J. Andrew, of Belfast, were also shown. On the 28th, Mr. William Dall gave a Lantern Demonstration on "Porcelain Inlays, Ancient and Modern." On the 6th March, Mr. John Angus read a paper on "Vulcanite Work," which was followed by an interesting discussion. Before the paper was read, Mr. Grant, Secretary, announced that there was a surplus of £9 10s. 6d. from the Dental Students' Concert, which was held in the St. Andrew's Hall, on Friday, 25th January. It was agreed that part of the money be spent in purchasing books for the library.

THE 11th Annual Dinner of the Edinburgh Dental Students' Society was held on Friday, the 8th of March, at the Imperial Hotel, Edinburgh. About 70 gentlemen were present, the Dean of the Hospital, Mr. W. Bowman Macleod, L.D.S., F.R.S.E., being in the Chair, in the unavoidable absence of Dr. Macdonald Brown, F.R.C.S., the Honorary President of the Society. The menu card was, as usual, of a humorous and artistic nature, designed by Mr. F. Page, L.D.S., in which, as a motive, he cleverly satirises the craze of the day, the "New Woman," only she is also a dental woman. After an excellent dinner, including "haggis," with bag-pipe accompaniment, the toast list was proceeded with. The usual loyal toasts having been honoured, "The Edinburgh Dental Students' Society" was given by the Chairman, and responded to by Mr. J. Malcolm, L.D.S., the President of the Society for the ensuing year. Mr. Oswald Fergus, L.D.S., from Glasgow, proposed "The Incorporated Edinburgh Dental Hospital and School," the Dean and Mr. Watson, L.D.S., Lecturer on Dental Surgery and Pathology, responded; "The Edinburgh Medical Schools" was given by Mr. J. S. Amoore, L.D.S.; "The Guests" by Mr. S. R. D. Walkinshaw, and "The Chairman" by Mr. C. Wood. The rest of the evening was occupied by songs, recitations, music, etc.

THE 37th Annual Meeting of the Dental Hospital of London was held on March 13th, at the Hospital, Leicester Square. Mr. Henry Harben, J.P., a Vice-President of the Hospital, occupied the chair. In the Report, which was unanimously adopted, regrets were expressed at the resignation of Dr. C. J. Hare, the former chairman of the Managing Committee, and at the deaths of Colonel Charles Harding, of Mr. Montague Durlacher, and of Mr. Henry Whiting, all formerly members of the Committee. During the year Messrs. Woodhouse Braine, Cornelius Robbins, J. Maine Nicol, have, to the regret of their colleagues, resigned their positions on the staff of the Hospital; the vacancies so created having been filled by the election of Messrs. Bridger, Comerford, George Hern and Percy Smith. The Demonstratorship, vacant by the resignation of Mr. Briault, has been filled by the election of Mr. A. B. Densham.

With regard to the work of the Hospital, the Report draws a comparison between that done in 1894 and that done twenty years ago, when the Hospital removed to its present quarters. From this table it can be seen that the work done now is about three times what was done then, the most remarkable increase is in the number of extractions under gas. These are now over six times as numerous as they were in 1874, and now actually in excess of the number extracted from adults without gas, the numbers being 15,833 and 15,815. Altogether some 36,261 teeth have been extracted in the year, and 14,751 teeth have been filled, besides other work, which bring the total number of operations up to 58,449. This, taking the working year as 300 days, gives a daily average of about 175 operations, meaning probably not far short of a hundred patients each day.

As regards the financial position of the Hospital, it is pleasing to note an increase in the annual subscriptions, though the total received is less than in the previous year. This is quite in harmony with the experience of our other metropolitan charities. The fund for the new building still grows, though slowly. During the year some £4,126 has been received, from which must, however, be deducted about £1,000, being the interest of loans, rates, taxes, expenses of appeal, &c. It is hoped that the remaining £13,000 required may soon be contributed, not only to allow the new buildings to be commenced, but to enable the Hospital to benefit by the generous offer of Mr. Henry Harben, to which we refer in another paragraph.

The Annual Dinner of the "Students' Club" of the Dental Hospital of London was held at the Holborn Restaurant on March 5th, Mr. David Hepburn in the Chair. The toast of the evening, "The Students' Club," was given by the Chairman, who spoke in praise of athletics and of the need of each following at least one of its various branches. Mr. W. F. Forsyth, Junr., responded, and gave some account of the sports in which the Club indulged. Mr. Humphreys proposed "The Visitors," Surgeon-General Don returning thanks. Mr. Morton Smale proposed "The Chairman," who briefly replied. An excellent programme of music, recitations, &c., formed a feature of the evening's entertainment.

In a supplement of the *Guy's Hospital Gazette* containing a report of the meeting of the Dental Society of that Hospital, we note a paper by Mr. Frederic Constant on "Dentistry and Public Elementary Schools," from which we quote the following:—One morning, during my work as house-surgeon, I was curious enough to record the answers of 53 patients to my query, "Do you use a tooth-brush?" No less than 48 said "No." Pressed why they did not, some said that they could not afford one, some that they had tried one, and it made their gums bleed or teeth ache, some thought it "rotted" the teeth or otherwise injured them, some didn't know why, and one—a girl about 20 years of age—had never heard of such a thing. The remaining five answered the query in the affirmative, but of four of these I had my doubts, especially when one assured me that she brushed her teeth "every Saturday night," and another "when she thought of it." In only one case did the teeth look as if they were brushed.

The annual dinner of the Odonto-Chirurgical Society of Scotland was held on the 15th inst., in the Balmoral Hotel, Edinburgh. Mr. Rees Price presided. About forty gentlemen were present. After the usual loyal and patriotic toasts, the Chairman proposed "The Dental Diploma," granted, he said, thirty-five years ago. Dr. P. A. Young, who gave "The Odonto-Chirurgical and Sister Societies," said it was matter for congratulation that those societies were building up a speciality upon the firm foundation of science. The good work which those societies were doing was meeting with the gratitude of the public and the goodwill of the medical profession. The hospital in Edinburgh had recently altered its position, so that it would have more air and light, and they sincerely trusted that the work which had begun there would go on and prosper. He should like to speak out with great force on the abuse of medical charities. He was sure that that was a subject which must be enquired into and dealt with at once. There was no question that the Infirmary and other special hospitals were very much abused by those who should not be there. Mr. Durward, president of the Odonto-Chirurgical Society, and Mr. Broomfield Paterson, secretary of the British Dental Association, replied, the latter of whom said that the Legislature should stamp out the practice of quacks. At an interval Mr. Andrew Wilson was presented with a handsome timepiece and

an album, and, for his wife, an opera-glass. In making the presentation, Mr. Bowman Macleod said that those who knew Mr. Wilson loved and respected him. Mr. Wilson briefly replied.

S. E. GILBERT, in "Items of Interest," gives the following method for filling deciduous teeth when moisture cannot be excluded :—Dissolve Gilbert's white stopping in chloroform. Make a thin mix of zinc phosphate, and thicken to a putty-like mass with the chloro stopping ; dry the cavity as well as possible, and pack with the above, finishing with burnishers ; may also be used "under water."

THE *Dental Weekly* states that there is a probability that before long the old churchyard of St. James's, Pentonville Road, will be laid out as an open space. It is here that the remains of the famous clown, Grimaldi, lie. It is not generally known that Grimaldi clowned at night and followed the occupation of a dentist by day.

DENTAL HOSPITAL OF LONDON.

THE Thirty-seventh Annual General Meeting of the governors o this institution was held on the 13th ultimo at the hospital, Leicester Square, Mr. Henry Harben, J.P., presiding. Among those present were Dr. Joseph Walker, Mr. Morton Smale, Mr. Storer Bennett, Mr. Alfred Marsh, Mr. Allen Stoneham, Mr. R. H. Woodhouse, Mr. James Smith Turner, Mr. E. C. J. Hall, Mr. F. J. Bennett, Mr. W. F. Forsyth, Mr. H. Baldwin, Mr. W. Hills, Mr. W. C. Smale, Mr. Hepburn, Mr. J. F. Pink, the secretary, and others.

The CHAIRMAN, in moving the adoption of the report, said : It is now my duty to move that the report submitted be adopted, printed, and circulated among the governors and subscribers of the hospital. I am sorry a larger number of our subscribers are not present this evening, but we may look upon their absence as showing the complete confidence they have in the committee and in the general management of the hospital. There is one thing I should like to say with reference to this report and the work of the hospital, and it is this. I have been over the building and seen the work it is doing, and I only wish that every scientific society would do for its students what this institution is doing—I mean, to give them opportunities

of practical demonstration, so that when they leave the institution they may have not merely a theoretical knowledge of dentistry, but also a practical knowledge of its application. It is one of the greatest mistakes in the profession that students are not taught the practical application of what they learn by study. Here in this hospital I am glad to see one of the grandest of its features is the thoroughly practical as well as theoretical instruction which it gives its students. The hospital gives its students opportunities for gaining practical knowledge, and before they leave the hospital they must show that they are able to put their knowledge into practical work and I say all honour to the Dental Hospital for having established such a system. The only other point I wish to draw attention to is the fact that we want money. I understand there is a feeling abroad—and I am bound to say that I have shared in it, that with such a fine building as the hospital apparently possesses, there is no need for a new one. But the fact is, imposing as the building may appear from the street, it is simply a mark—there is nothing behind it. It has no depth. It is impossible to pass through the building without going through the operating rooms, and we are so cramped for space that we cannot give our students or lecturers proper appliances. The truth is that the hospital has a front with nothing behind it, and it is a shame that this fact is not better impressed upon the public. I have read the appeal for funds in the report, but I can tell you that if I had written that appeal I should have made it stronger still, for we are really in misery for want of room. In this great and wealthy London an institution that does such important work ought not to be in such a position. There are plenty of persons with ample means who only want to be told how best to apply their money, and I cannot help thinking that the disease from which the hospital suffers may be speedily remedied if you only let the public know what it is you want. In my opinion the profession have come forward in a noble manner. They have promised £6,000 towards the new building. The public have promised or given £5,000; the present site is worth £15,000, so that we only require another £14,000 to make up £40,000 required for our new hospital. Surely all who have the best interests of the charity at heart will try and do the very best they can to get this money, and so enable the committee to have a building where the staff can do its work without the hindrances or inconveniences that beset them at the present time. It is absolutely impossible for

the staff to pursue their practice properly in the present cramped space at their disposal. I never make promises, but if you can get together the bulk of the money needed I will give a substantial sum to complete the balance—I will, in fact, double the sum I previously gave so soon as you get nearly all you require to complete the new building. I will not give any more until I see other persons coming forward and demonstrating their practical interest in an institution which ought fo be supported, not only by the profession but by the public at large. Many persons fancy that if anything is wrong with their teeth they have only to go to the dentists to have it put right, they are apt to forget that if it were not for the Dental Hospital the dentists would not have any place where they could gain practical experience in their study for the profession. For this reason the public should be personally interested in the proper education of the future dentists, and this can only be given when the hospital has plenty of room in which the students may pursue their studies.

Mr. Storer Bennett seconded the adoption of the report and accounts, and in doing so said that the committee and governors were very grateful to Mr. Harben for the kind speech and his very generous promise of assistance.

The report was adopted.

Dr. Walker proposed the re-election of the retiring members of the committee of management :—Lieut.-Col. George Lambert, Messrs. W. H. Ash, G. H. Bailey, F. Canton, Ashley Gibbings, Cuthbert Peek, H. Pullman, and A. Willett.

Mr. Hepburn having seconded the resolution, it was carried unanimously.

Mr. Smith Turner said that they liked to get new blood in the committee, and he had therefore much pleasure in proposing the election of the following gentlemen to the committee :—Dr. Dudley Buxton, Messrs. James M. Andrew, Storer Bennett, J. Elliott Taylor and Richard Winch.

Mr. Morton Smale seconded the resolution, which was carried unanimously.

Mr. W. C. Smale then proposed the re-election of Dr. Walker as treasurer. He said they all know how much Dr. Walker had done for the hospital, and what a lot of valuable time he gave to its affairs as a member of the finance committee. He was more than energetic, and he (Mr. Smale) pitied the man who followed him.

Mr. Forsyth seconded the resolution, which was carried unanimously.

Mr. Morton Smale then proposed a vote of thanks to the treasurer, the chairman, the committee of management, the finance committee and the medical staff; and Mr. Baldwin having seconded the resolution, it was carried unanimously.

Mr. Stoneham proposed a vote of thanks to the Chairman for presiding. He said: Gentlemen, I think Mr. Harben's remarks respecting the hospital, coming as they do from a gentleman who is the pivot of one of the largest institutions in the kingdom, and which is a marvel of organisation, will doubtless have much weight with the outside public, and I hope his more than princely benevolence to the institution will act as a stimulus to the benevolent public, and induce them to come forward with substantial assistance towards the new building. The sight which Mr. Harben and I saw this morning, when we went over the hospital, was enough to stimulate anyone to help a charity which was doing so much for the relief of the suffering poor. In Mr. Harben we have one of the busiest men in the city, and it is a remarkable thing that he should find time to come down to our hospital and take such an interest in its work, but it is an illustration of the truth of the old adage that he who has most to do finds the most time in which to do it.

Dr. Walker, who seconded the resolution, said it was not generally known that it was due to Mr. Harben that they had such an able chairman of committee. They had asked Mr. Harben to be that chairman, but he replied that he had not the time, but would give them a better chairman, and suggested Mr. Stoneham, who was able to act. They were much indebted to Mr. Harben for taking the chair that evening, and for his liberality towards their building fund. By his visit to the hospital at an earlier hour in order to see its working, he showed his keen and critical interest in its welfare and his appreciation of the valuable work it was doing amongst the poor.

The Chairman in replying to the vote of thanks, said that in his experience it was the busiest men who found most time to work for others. The busy man was obliged to point out his time in order not to waste any, and it often happened that there were occasions in between one engagement and another when he could

find an opportunity to do something for charitable societies such as he was pleased to do that evening. He hoped that his presence at the annual meeting of the hospital would prove of some service to it.

THE REGISTRATION OF DENTISTS.

On March 16th, in the Southern Division of the Police Court, Dublin, before Mr. Swifte, Mr. Louis Levey, 132, Stephen's Green, was summoned, at the instance of the British Dental Association, "to answer the complaint of Thomas J. Lawler that on the 9th November, 1894, at No. 132, Stephen's Green, not having been registered under the Dentist Act of 1878, and not being then a legally qualified medical practitioner, did unlawfully, within the space of six calendar months last past—to wit, on the 9th November, 1894, at 132, Stephen's Green aforesaid—take and use the name or title of dentist." Mr. Henry Hunt (instructed by Mr. W. G. Bradley and Son), appeared for the prosecution ; and Dr. Condon (instructed by Mr. J. J. O'Meara), appeared for the defence.

Mr. Hunt, in stating the case for the prosecution, said that the prosecution was at the instance of the British Dental Association, which was incorporated in 1880, and it was brought under the third section of the Dentist Act of 1878. This was the first prosecution of the kind in Ireland. The object of the Legislature was to protect the public from being imposed upon by persons untruly representing themselves to be qualified dentists. There had been several prosecutions in England. Under the Act of 1878 a private person could not bring a prosecution unless with the sanction of some of the medical authorities, such as the universities and licensing authorities, but under an amending Act, passed in 1886, private persons were allowed to prosecute for the purpose of facilitating the administration of the Act. Mr. Bradley, acting on the initiative of the association, sent Thomas J. Lawler, the complainant, with a card, on which was the name of the defendant, and after the name the word "dentist," to the address given, 132, Stephen's Green. That was on the 8th November. The complainant was told to call next day, and next morning between nine and ten o'clock he was shown into a room occupied by the defendant, and produced a card to the defendant and asked him was it his. Defendant said it was. Lawler asked him for

some more, and the defendant said he was getting some more printed, and would let him have them in a few days. The dentists' register was evidence under the Act, and the absence of a name was proof that the person whose name was omitted had not been registered. The penalty under the Act was not to exceed £20. Mr. Thomas J. Lawler was examined by Mr. Hunt. He deposed that on the 9th November he produced the card for the defendant at his residence, who said that he was getting some more printed and would have them in a few days. Mr. G. M. P. Murray produced the register of dentists, which did not contain the name of the defendant. Mr. Condon cross-examined the witness to show that qualified dentists had now registered persons employed under them, and as to whether the witness had known of Mr. Levy acting as a partner under registered dentists. Mr. Condon said that his defence was that Mr. Levey was personally entitled to be registered under the Act, but there was a provision that made it a sort of obligation that he should be registered, and that was the only point in the case. Mr. Levey was engaged in practice at the time of the passing of the Act. Under the Act every person was qualified to be registered who before the passing of the Act was practising as a dentist. Mr. Swifte: But the Act says not "unless he is entitled to be registered," but "unless he is registered." Mr. Condon said that was the technical offence. His client was practising before the passing of the Act, and had been practising since. His client had been in Dublin for the past sixteen years, and had commenced under an agreement as partner with a gentleman who was fairly eminent in his profession, and was registered, Mr. A. J. Bradshaw, of Great Brunswick Street. He produced a copy of the partnership agreement, date 21st October, 1880. Mr. Hunt: That is no evidence. Mr. Condon said that it was not evidence, but he tendered it is an element in the case. Later on his client was with Mr. Hindes, and was at the present moment in partnership with Mr. Hindes at 132, Stephen's Green. Mr. Thomas Hindes deposed that he had known Mr. Levey for a great number of years. He was with witness eight or nine years ago, and recently again they were in partnership, carrying on the profession under the name and title of American Dentists. Witness was there every day, and the defendant was there assisting him in the mechanical work. Mr. Hunt said that was no defence, and he had no question toask. This evidence could only react on the defendant. It was wholly

irrelevant. Mr. Swifte said that if Mr. Hindes was the predominant partner it was his name that would be on the cards, not the defendant's. Mr. Condon said that there was no evidence that the card presented to the defendant by Mr. Lawler was uttered by the defendant within the last six months. It was an old card, and there was no proof that Mr. Levey had used it within the last six months. Mr. Swifte said that the case seemed to him to have been clearly proved. If it were shown that though not registered the defendant was a duly qualified and competent practitioner it would be an extenuating circumstance. Mr. Condon said that a technical offence had been proved, but he asked his Worship to make note of the qualification and competency of the defendant by the agreement with Mr. Bradshaw. Mr. Swifte asked was it admitted that the defendant was entitled to be registered. Mr. Hunt said he did not admit it. Mr. Condon said that at this distance of time he found it difficult to get evidence of his client's practice before 1878. He submitted that the agreement with Mr. Bradshaw would actually justify the Court in holding that he was so, because Mr. Bradshaw took the defendant as a thoroughly expert practitioner. He was described in the agreement as "an assistant, either surgical or mechanical in the business of a dentist." He was taken on for two years as such. Mr. Swifte said that if it were shown that he was practicing before 1878 that would not show that he was qualified at that time. Mr. Condon said it was clear from the words of the agreement that before 1878 the defendant must have been at least an articled pupil or student in a practice. The period of apprenticeship was five years. Mr. Hunt said that before 1878 everyone then in practice was entitled to be registered. Now no one could be registered unless examined by the College of Surgeons. Mr. Swifte said that Mr. Hunt said that the defendant might be skilled, but he was not entitled to be registered. If the defendant would prove that through some neglect he did not get himself registered, while he was entitled to be registered, he would consider it. Mr. Condon said that on applying to the General Council they would get a special order, but in this case they had been taken by surprise, as they did not know who Mr. Lawler was until after the summons had been served. Mr. Hunt said that the defence aggravated the offence. He would leave the case in the hands of the Court, but asked for a penalty, as a deterrent to others.

Mr. Swifte, in announcing his decision, said that the Legislature had laid down a hard and fast line to protect the public. For all these years Mr. Levey had been describing himself in legal documents and otherwise as a dentist and thereby contravening the provisions of this Act. There was a conflict between counsel as to whether or not Mr. Levey was entitled to be registered. He was not going to give an opinion on that, as it was not the question. He thought, however, that if Mr. Levey could be registered he would have got himself registered during these years, and protect himself against such proceedings as the present. This statute had a very salutary object, the protection of the public from quack practitioners, to put it plainly. It might be that Mr. Levey was highly qualified. After all, if he were a man of any intelligence he should be a fully qualified and very competent dentist after all these years' practice. But he was not registered, which was the only thing to be considered in this case, and had, therefore, no defence to the real point in the case. As it was the first case of the kind in this country, he did not like to be too severe, but he should also remember that it might be very difficult to find out cases of this kind, and he did not think, in the interests of the public, that he could impose a less penalty than a fine of £5. He would give two guineas costs.—*The Evening Telegraph.*

Abstracts and Selections.

METHODS OF ATTACHING MR. NEWLAND-PEDLEY'S PORCELAIN CROWN.

Preparation of root.—The root should be cut nearly level with the gum, not flat, but just following the general contour of the gum, and this can be done readily with carborundum wheels.

Selection of crown.—A model of the mouth will be found useful, especially if the articulation be close. It is very important that the measurement between the hole and the anterior surface of the crown should correspond as closely as possible with the space between the pulp-chamber and the anterior margin of the root, for, if these measurements agree, the pin will pass readily into the root canal, and the anterior surface of the crown, when fitted, will be exactly

flush with the root in front, and will not require polishing. It is of little consequence if the porcelain crown be rather too large for the root at the sides or back, for it can readily be reduced by the carborundum wheel, and any part not in sight need not be polished.

Selection of pin.—Note that pins made for the upper front teeth are almost round, whilst those for the bicuspids are flattened. The pin selected should fit the crown as closely as possible, but it must be remembered that if the pin is wedged into the crown the tooth will split like an ordinary "tube tooth." The pin should be of elliptical shape through its entire length, but should taper towards the point. Six sizes of split pins are made for two-rooted bicuspids. The points of the pins can be reduced with a file, or with the corundum disc on a dental engine.

Fitting the pin.—This is best done with ordinary fissure burrs, but if the Herbst's burr be used, great caution will be required to prevent it from getting jammed into the canal and thus causing pain. Only the minimum of tooth substance should be removed that is requisite for the fitting of the pin, for the less the cement used, the stronger will be the attachment of the crown. A pair of pliers with grooved beaks will be found useful when it is necessary to bend the pin.

Fitting the crown.—The crown should be roughly fitted, and then an accurate model of the root should be taken by covering the base of the crown with gutta percha and pressing it on the root. Over this an impression is taken, in which the crown carrying the gutta percha is replaced, and a small model is made to which the crown can be closely fitted. Fine-fitting can be done in the mouth by painting the crown and touching the root with a burr or wheel; or a piece of thin articulating paper can be used.

Attaching the crown.—The pin should be serrated with a file, and the root canal should be well grooved at short intervals by means of a wheel burr swept round the cavity. The root canal should be dried and the apex filled in the usual way. Attach by :—

(1.) *White cement*, mixed thin. It is generally best to cement the pin to the crown first. When this has set, the pin can be coated with cement, and the root canal lined with the same material applied on a pellet of cotton wool wound round the tip of a burr or Morey drill. Press the crown home, and hold it in place till the cemet is firm.

(2.) *Sulphur.*—Melt a little sulphur in the crown, heat the pin and press it into place. Or, cement the crown to the pin first, then, as suggested by Mr. Douglas Wright, fill the root canal with chips of sulphur, heat the pin and press it home. The hot pin melts the sulphur, and they adhere firmly when cool.

(3.) *Amalgam.*—The pin can be fixed to the root with amalgam, and the crown attached with cement or sulphur. Or, a disc of amalgam can be interposed between the crown and the root; cement or sulphur being used elsewhere. In badly decayed roots the canal can be filled with amalgam packed round the pin, which is then withdrawn, and the operation is completed when the amalgam has set. The withdrawal of the pin is facilitated by slightly coating it with hot wax.

(4.) *Gutta Percha.*—Can be used in the root, or a disc of gutta percha can be merely interposed between the crown and the root.

(5.) *Silicates.*—With a low fusing power can be used to fix the crown to the pin.

Personally, I can only speak of osteo in the attachment of these crowns, and if the holes are ribbed, the pins and root canals serrated and dry, and if the cement is carefully applied, a firm attachment is certain. As regards the strength of the cement, we know that 100 pounds weight of pig-iron can be suspended to a pin cemented into a porcelain front tooth. Pins made of "dental alloy" stood less strain than those of German silver, and I found that the dental alloy pins stretched before the cement gave way. I am not aware of any movement of the jaw by which a direct downward strain can be brought to bear upon a tooth. For additional strength the root can be capped and a gold band can be fitted beneath the gum, The chief source of failure is in the error of enlarging the root canal too much, for then we have to rely entirely on the strength of the osteo, amalgam or sulphur. The front teeth are much easier to adjust, and with them success is more certain than with bicuspids. At the back of the mouth there is just a chance that the root canals may be imperfectly shaped, the crown defectively fitted, and the pulp-chamber lined with thick mucus. Then, if the cement is deluged with saliva before it has set, and the articulation is inadvertently raised so that the whole force of mastication falls on the one porcelain tooth, no surprise should be felt if a crown comes off or splits.—*Guy's Hospital Gazette.*

SODIUM PEROXIDE.

By Edward C. Kirk.

I am indebted to Dr. William H. Trueman for a suggestion which has been of very much value to me in the preparation of the sodium peroxide solution. Dr. Trueman advises that the inner soldered lid of the can in which sodium peroxide is dispensed be perforated by means of a fine engine drill with a number of small holes, somewhat like the lid of a pepper caster. By means of this device the powdered peroxide may be gradually sifted into the cold water in making the solution. By placing the outer screw-cap lid the contents of the can do not undergo change by absorption of atmospheric moisture as is quite likely to be the case where the soldered inner cap is removed to gain access to the material.—*Dental Cosmos.*

SALOL AS A ROOT FILLING.

By Dr. Burchard.

Since the publication of Dr. Mascort's excellent paper in the *Dental Cosmos* on "Salol as a Root-Filling," I have been using than substance almost exclusively for this purpose, and, so far as some ten months of trial can prove, with uniform success. A solution of sodium peroxide is first used to saponify fatty material, dissolve and drive out the contents of the tubuli. This is neutralized by a weak solution of sulphuric acid followed by thorough drying with alcohol and hot blast; then with a pair of long-pointed dressing pliers a portion of crystals is taken up and held above a small flame until it becomes fluid. The closed points are then placed as high up the canal as possible, and slowly opened, the fluid runs up the dry canal. An iridium broach warmed is used to pump the salol to the apex, and in the still fluid material a point of metal or gutta-percha is thrust. This is used in the event of reopening of the tooth ever becoming advisable. By warming the point it may be withdrawn, and with it the melted salol, rendering access to the apex easy. Experimenting with teeth out of the mouth has demonstrated some difficulty in removal where a central mass of other material has not been used.—*International.*

DENTISTRY IN SPANISH-AMERICA.

By Geo. W. Cool, D.D.S., Oakland, Cal.

In Mexico and most of the Central American countries there is no such thing as dental legislation. In Mexico and Guatemala I know of no restrictions upon the practitioner of dentistry other than his own conscience and the revengeful nature of the inhabitants. In Honduras and Salvador there is a form of examination which must be undergone by a person who seeks permission and license to practice dentistry. The examination, however, is such as would be considered very easy by the average American dental student. A nominal fee is charged by the examiners for each applicant appearing before them. A degree from any American college exempts the holder from this examination, he being admitted to practice upon the presentation of his diploma. Costa Rica is in marked contrast to the other Central American states in the matter of dental legislation. There one must hold the degree of Doctor of Dental Surgery before he can be permitted to take the examinations for admission to practice. The examinations, which are oral, are quite searching. All applicants are examined before the Proto-Medacrata, or Board of Medical Examiners, who usually call in two dentists of recognised standing and ability to assist them in determining the eligibility of candidates for dental licenses. The examination and license fee in Costa Rica is $25, but the Costa Rican certificate entitles its holder to practice, without further examination, in Spain, Cuba, the United States of Columbia, and Venezuela.

In none of the Central American states are the laws governing the actual practice of dentistry very strict. Practitioners of dentistry are not hampered by any restrictions (of any consequence at least) upon their professional methods. There is almost no way of punishing malpractice unless it is of a very flagrant nature, and even then the punishment by no means "fits the crime." Partly as a result of the laxity of the dental laws, and partly on account of existing social and economical conditions, there are many inferior dentists doing their deadly work in the Central American states and in Mexico; but these men have a clientèle composed entirely of the poorer class; and here I may remark that the social line between

the richer and poorer classes is much more distinctly drawn in the Spanish-American countries than it is in the United States. This is partly due to economic conditions which tend to make the rich richer, and the poor poorer; and partly through the hereditary aristocratic tendencies of the race. There seems to be a general idea in this country that any dentist, however slight his attainments, may get the highest prices for his work in Mexico and Central America. Nothing could be more erroneous. As a matter of fact, the class of dentists who work for the poorer people in those countries receive smaller compensation than men of light calibre get in this country. Nevertheless, legitimate dentistry is thoroughly appreciated and splendidly compensated in Spanish-American countries by the better classes. The people are naturally Conservative, and are particularly distrustful of people from the United States, but once an accomplished American stomatologist gains their confidence he may depend upon receiving the most liberal patronage. No people in the world more thoroughly appreciate good work; and they fill the dentist's heart with gratitude by the exactness with which they follow all his directions regarding the care of the teeth, etc. While practising in Central America the writer has frequently had his operating rooms filled with the friends of the patient, all watching with the greatest interest the progress of the work. In fact it is quite usual for ladies to attend the dentist's office in parties. I have said that these people have a great distrust of the average travelling American, and I discovered during my ten years' experience in Spanish-America that this distrust may only be removed, first, by the presentation of proper credentials and recommendations, and secondly, by demonstration of one's ability to do good work. When once their confidence, so hard to get, is fully gained, they are as loyal as one could wish. I was fortunate to be properly introduced and vouched for; and during these years, in which I was favoured by the practice of the wealthiest and most aristocratic people of the countries mentioned, I never had a complaint about fees, though my charges were what in some countries would be considered very high.

One peculiarity of the Salvadorians and Costa Ricans is that many of them will not go to a dental office to have their dental work done. In some of the wealthier families they will cheerfully pay the increased fee to have the operating done in their homes. In some

places where I have worked I made my office hours from 12 to 1 o'clock of each day, and spent the rest of the day working at the houses of the aristocracy. In this way I would visit two or three or even five houses in a day. Imagine the novelty of working under the palm-tree in the beautiful patio of some wealthy citizen, breathing the scented air that is as balmy as the descriptive breezes of Paradise ; joining now and then in the conversation of the dark-eyed señoritas disposed about in those graceful attitudes which are as natural to them as breathing. Such surroundings, such an operating room, and, above all such patients, make the usual humdrum office, however gorgeously appointed, seem a tame and uninteresting spot indeed. In certain places where I practised my day was considerably cut up on account of the eccentricities (if I may so speak) of the climate. During the dry season in such places I would rise at 5 a.m. and work until 9 o'clock ; then I would retire and sleep until 4 p.m., at which time I would rise and work until 6 or 7 o'clock ; and oftentimes, though I wore while working the thinnest decent apparel, I would be compelled to stop in the midst of my operation, retire to another apartment, and take a plunge in a tank of cool water before I could continue work. In the operating room life was made endurable to the patient and myself by the evaporation of the water which an Indian constantly kept pouring upon the tiled floor. Such weather is found only near the coast ; in the interior the weather is much more agreeable, and the energetic American is very apt to take hold of his work with all the vigour and industry that he would display at home. But he soon finds that this delightful climate is extremely enervating, and he is compelled struggle as hard as he may, to drop into the lazy ways of the inhabitants. The Spaniards say that the first year of an American's stay is spent in running around at the top of his speed ; the second year in laying in a hammock while others do his work.

A dentist who begins to practice in those countries without being familiar with the Spanish language often has ridiculous experiences. For example, when I began to practice in Mexico my stock of Spanish was so limited that I secured the services of a good-natured Mexican who understood English to write some common phrases with their English equivalents upon the walls of my operating room. When a patient entered the office I would consult this convenient lexicon before asking him to take a seat.

Then, when I got him into the operating chair, another glance at the "handwriting on the wall" would furnish me with knowledge sufficient to bid him open his mouth. The rest of the dialogue had to be carried on principally by means of signs and broken English.

The peculiar customs and conditions of the people are sometimes the cause of adventures of a thrilling nature. When I was in Culiacan, State of Sinaloa, Mexico, the celebrated bandit Ignacio Bernal made one of his raids upon the city, defying the constabulary and the soldiers, and levying tribute upon the merchants and bankers. I met him and found him to be a charming fellow and a perfect gentleman in manners. Truly he was by nature like Byron's "Corsair," who was

> As mild a mannered man
> As ever scuttled ship or cut a throat.

I was engaged by Bernal to go with him to his rendezvous in the mountains, there to operate for him and his leading lieutenants. Every possible attention was shown me, and I was given safe conduct to and from the place. I spent about ten days in the robbers' home in the heart of the mountains, and before I departed Señor Bernal paid me a very handsome fee for my services. I thanked him for the money, and he, referring to my bill, laughingly remarked that in paying me he was only dividing his money with a professional brother.

The great distance from the supply houses often proves embarrassing to the dentist in Spanish America. At one time I ran out of plaster of Paris, and there was none to be had, to my knowledge, within a thousand miles. In this exigency I was compelled to send, at very great expense, to the mountains for gypsum, which I baked and made into a very fair plaster. The big fees I often found were greatly reduced by the expenses of travelling and securing material. I have paid as high as 20 and 30 cents per pound for having my baggage transported a single day's journey. At another time I heard of a man who had some gold suitable for my use, being almost out of foil at the time, I travelled some distance to find him, and then paid him $180 per ounce for the material, and was glad to get it, too. At another time all of my engines happened to be disabled by the lack of small attachments that in San Francisco could be replaced in five minutes, but which were not to be had there for any money; so I was compelled to pay $150 for an

engine. In that region, where gas is almost an unknown invention, I used alcohol for vulcanising and soldering. Once, when my alcohol was exhausted, I remembered seeing a Chinaman in San Francisco soldering with a candle. After some hard work I succeeded in arranging an apparatus by which I could solder with tallow candles.

Though I was, so to speak, an exile from the land where the code of dental ethics prevails, I am proud to say that I always abided by its provisions. In Guatemala I never had a sign upon my office, never issued a business card, did not even use my professional title; and only during the last few months of my five years' stay in Guatemala did I ever have a door plate. That I purchased and used simply to avoid the confusion which sometimes arose from the similarity of the appearance of the houses.

The teeth of the inhabitants of those countries are characteristic of their nervous temperament, and among them possibly the nervo-lymphatic will predominate. The early loss of the teeth of the female population can be attributed to their early maturity and the lack of knowledge of dental hygiene. Marriage often takes place at the time when our daughters are hardly out of the grammar school. I have seen children at nine years of age in possession of all their permanent teeth with the exception of the wisdom. My experience with these soft, chalky teeth has been the cause of my enthusiastic advocacy of contour fillings and the use of tinfoil.

Little attention is paid to orthodontia in those countries, and the surgical treatment of the oral cavity is left to the physician and surgeon. Pyorrhea alveolaris is very noticeable in the mouths of the people, and the treatment as a rule is very crude, and consists principally of removing the excess of calcarious deposits about the teeth. Such treatment for this disease as I have seen at the clinics of the Stomatological Club is so far in advance of anything I have had any knowledge of that I feel well repaid for the time and money I have spent with this organisation.

Syphilis and scrofula are very common. The "Hutchinson tooth" is often seen among the aristocracy, and this may explain why these soft teeth are so numerous.

But, lest I should exceed the limits of your patience, I will bring this paper to an end, simply remarking that, though shut off from the advantages of association with others of my profession, I

endeavoured to avoid getting "rusty" by making yearly trips to this coast and New York, where I was enabled to study late methods and recent discoveries.—*Pacific Coast Dentist.*

Reviews.

CATCHING'S COMPENDIUM OF PRACTICAL DENTISTRY FOR 1894.

This issue of an annual publication, to which we always look forward with pleasure, fully maintains the reputation of the preceding numbers. The growth of Dental journalism has been so great that it is impossible to be acquainted with the whole, hence the use—the very great use—of books such as these, which select that which is worthy of permanent record, and present it to the reader in a handy form. The book deals only with practical points, and all the points are of practical value.

THE TRANSACTIONS OF THE WORLD'S COLUMBIAN DENTAL CONGRESS. Two volumes. Edited by Dr. A. W. HARLAN.

This official record of the meeting at Chicago in August, 1893, will prove of permanent value. It is well illustrated, printed on good paper, and carefully edited, a labour of love on which we congratulate the energetic Secretary-General of the Congress.

VULCANITE WORK. By HARRY ROSE, L.D.S. Published by J. P. Segg & Co., illustrated, price 2s. 6d.

The literature dealing with mechanical dentistry is so scanty that we gladly welcome a book dealing with this subject. And though in a little book of sixty-three pages it is obvious that the author cannot claim to have treated his subject exhaustively, still it fairly covers the whole ground, and is written in a short and clear style. The book contains many valuable suggestions and, allowing for divergences of opinion on some points, may be commended as a safe and useful guide to those studying mechanical dentistry. On a book likely to be subjected to rough usage in the laboratory, we could wish to have seen a more durable cover than can be given by paper boards, which, unfortunately, in our copy, already show a somewhat pronounced tendency to part company.

THE DENTAL RECORD.

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Original Communications.

DENTAL JURISPRUDENCE.*

By D. STUART HEPBURN, L.D.S.

ALTHOUGH it will probably be to our advantage, both as citizens and as dentists, to have as little connection with law and lawyers as possible, it may be useful to us to know definitely what privileges we possess, and what responsibilities we incur when we decide to practise the profession of Dental Surgery.

Any appearance which, as professional men, we may be obliged to make in a court of law must necessarily be in one of three characters, that of plaintiff, defendant, or witness, and it is as well that we should always remember that our professional status is judged by one standard and one alone—that of registration. No amount of qualifications or degrees of any kind *per se* receive any acknowledgment in the eyes of the law, they are guided simply and solely by the appearance of our name in the medical or dental registers.

The appearance of a dentist as a plaintiff may be taken as limited to those cases in which he is obliged to sue for the payment of professional services. We must remember that in undertaking to perform any professional work there is always a contract with our patient, either expressed or implied. Expressed contracts are not usual between operator and patient, but if a dentist agrees to do certain work for a certain sum, and discovers afterwards that, owing to the work being more difficult, or more extensive than he had calculated upon, the fee he had arranged to accept is insufficient to pay him for the time, labour or material expended upon the case, he cannot recover any further sum by legal proceedings, but must abide by the bargain he originally made.

* A Paper read before the Notts and Derby Dental Society.

When, however, a patient declines to pay, on the ground of the charges being exorbitant, it is necessary for the dentist to call evidence to show that his charges in such a case are not in advance of those he is in the habit of receiving for similar work. It is no defence to plead that similar work could have been done by another dentist for a smaller cost. I was pleased to see in a recent case, where a dentist sued a patient for the cost of a set of artificial teeth, and the defendant called another practitioner, who declared that he would have supplied an identical article for one-fourth of the sum charged, that the judge held that professional charges could not be regulated by rule of thumb, and that if a patient desired the services of a professional gentleman of eminence, he must be prepared to pay fees in proportion.

In those cases where a patient pleads unskilful treatment as an excuse for non-payment of his account, care must be taken to note the time at which the complaint is made, which, in many cases, is not until there is a threat of legal proceedings. Where artificial teeth are in dispute, it is advisable to sift very closely the statements of the patient. In a case of my own, a patient disappeared for two years, and when by chance I discovered her address, made the excuse that she had been unable to wear the plate for more than a week or two during the whole time. On examination, however, I found it to be so encrusted with tartar that the falsehood was manifest. Even if the practitioner admits that his treatment has been unsuccessful, it by no means follows that his fees are irrecoverable, any more than would be those of a doctor who was so unfortunate as to lose his patient. By the terms of his implied contract he guarantees to use reasonable care and skill in his treatment, and if by reason of unusual difficulties, or some other cause, his treatment did not benefit his patient, he is still entitled to recover remuneration for work done. I think, however, in such a case as I have suggested, it would be better policy for the dentist not to press his claim.

It may, however, happen that instead of the treatment having failed to benefit our patient, we may have done him a positive injury, and so find ourselves in court in the unenviable position of a defendant, to answer a charge of culpable negligence or gross want of skill. Accidents may happen during the extraction of teeth. The jaw may be fractured, the wrong tooth removed, a tooth may be broken or fall into the air passages, or pain and injury may be

caused by filling teeth over exposed or inflamed pulps, the application of arsenic, and many other causes. In such cases it is not enough for the plaintiff to prove a less degree of skill than some other practitioner might have shown, or even a less degree of care than the operator himself might have bestowed, nor is it enough even if he acknowledges a certain degree of want of care ; there must have been a want of competent and ordinary care and skill to such a degree as to lead to a bad result. The whole point of such cases lies in the clear understanding of what is meant by ordinary care and skill. Ordinary skill may be defined as that amount of professional knowledge, combined with practical dexterity, which every practitioner should possess to entitle him to practise his art, and no amount of care on his part can excuse the want of this necessary qualification. Of course, in a case of this kind, evidence that a man has attended a regular course of study and possesses a professional qualification would plead in his favour much more strongly than if he had merely the presence of his name upon the Dental Register to point to in proof of his fitness for the operation he had undertaken. Very much, however, seems to depend upon the view which the judge or coroner and jury may happen to take of the case. Some years ago there was an inquest held in the West of England upon an unfortunate person who had died under the influence of bichloride of methyline, daministered by a chemist and dentist, unassisted for the purpose of teeth extraction, the verdict being that death had occurred by misadventure, and that all due care had been taken by the operator, to whom no blame attached !

No amount of skill on the part of a dentist will make up for the want of due care in his treatment of the case. He is not legally bound to undertake the responsibility of any particular case, but, having done so, he is obliged to carry it to a conclusion, and to exercise due care in its conduct, the failure to do which constitutes culpable negligence. If, however, contributory negligence on the part of the patient could be proved, the dentist would probably be held excused even from a certain want of care on his own part. If, for instance, a preparation of arsenic is given to a patient, with instructions to insert a minute quantity in an aching tooth, and sloughing of the gums and cheek were to follow, it might be held that the dentist was guilty of negligence in entrusting a patient with the application of such a dangerous drug. If, however, the

patient used a much larger quantity than was ordered, or omitted to remove it in a specified time, he would probably be held to have by his own want of care contributed to the unfortunate result, and the adviser might escape any penalty.

Unenviable as is the position of a dentist who is called upon to defend a suit in a civil court, he is not nearly so unfortunate as one who is unhappy enough to become the victim of a criminal charge, and though the subject is not a pleasant one, there are so many among us who do not seem to be sufficiently careful of the risks they run in the administration of anæsthetics, that it may be as well to consider the position of a man who finds himself charged with having taken criminal advantage of the helpless and unconscious condition of his patient. I have been unable to find particulars of any case in British courts in which a dentist was obliged to defend himself from such a charge, but a well-known case occurred in America, to which, from the reasons I have given, it may be interesting to refer somewhat in detail.

An engaged young lady of good character called, accompanied by her future husband, upon a highly respected dentist in Philadelphia. Her *fiancé* left her at the door and she was left alone with this gentleman, who administered ether for the removal of a painful tooth. She declared that before she became unconscious, but after she had lost the power of speech and of resistance, she became the victim of a criminal outrage. She admitted afterwards that she parted in a friendly manner from the doctor, without reproaching him in any way, that she walked from his house, and on her way home partook of ice-cream at a restaurant, and though she arrived at her destination before dinner, made no complaint of what had occurred till after tea. It was also elicited that she was at the time in a condition when she would naturally be most liable to sexual excitement. In the result, the dentist received a sentence of imprisonment for four years and a-half. Now, when we consider that his conviction rested solely upon the unsupported evidence of the prosecutrix, when we consider her physical condition at the time, and especially when we remember the effects of an anæsthetic in producing erotic delusions, especially in nervous and hysterical women, I think we must allow that there is strong probability that a miscarriage of justice occurred. There is, however, a lesson to be learned from this case of the greatest importance to us all, and that

is the necessity of refusing, under any circumstances, to administer an anæsthetic to a woman except in the presence of a third person.

The third capacity in which we may be called upon to make an appearance before a jury of our countrymen, is that of witness, when we may appear as professional expert to give evidence on behalf of, or depreciation of, the skill of a fellow practitioner, or possibly to testify to our knowledge of the conformation and peculiarities of the mouth in some case of disputed identity, or even to assist in unveiling some hidden crime. In England, at all events, it seems that the importance of the evidence a dentist might be able to offer in such cases as those of disputed identity has not been sufficiently recognised. Fancy the significance of such evidence in a case like the Tichborne trial. Had it been possible to produce a dentist who had operated upon the mouth of the young baronet and kept a record of his work, or could have produced models of the jaws, the case would probably have collapsed at once when the difference between these models and the jaws of the bulky claimant were made manifest ; or, supposing them to coincide—such a piece of evidence would have been worth a dozen cases of recognition by doting mothers and interested dependants. Then, again, when we consider the strong resemblance which so often obtains between the teeth and jaws of children of the same parents we can perceive what value might attach to the evidence of the family dentist. A notable case occurred in Massachusetts, where a professor of chemistry at Harvard University was suspected of having murdered a well-known doctor of Boston, and of having cremated the body in his laboratory furnace. Some portions of bone, believed to be human, were found there, and in addition a number of grains of melted gold, and three blocks of mineral teeth, which were indubitably proved to have been worn by the doctor. The professor afterwards confessed his crime

A case occurred in England some years ago in which the criminal was detected through the keenness of a detective, aided by an important dental deficiency. A burglary had been committed, and the only discoverable clue was an apple which had been bitten by one of the thieves and thrown on one side. This showed that one of the front teeth was missing, and certain irregularities among the remaining ones. Guided by this the officer pursued his investigations in the

thieves' quarter, and soon discovered the object of his search. This incident has been made the basis of a detective story of the Sherlock Holmes type, but I believe there is no doubt that it actually occurred.

Should we be called upon to give evidence regarding the work of some fellow practitioner, we cannot be too careful to avoid the least suspicion of professional bias or jealousy. The work of few of us is so absolutely perfect that it would be impossible for a carping critic to find some fault, to pick out some flaw in regard to it, and when we are called upon to give an opinion upon a completed operation or specimen of mechanical work, we should remember that it may have been done under difficulties from various causes which we are quite unable to estimate. If it should be necessary, let us judge our colleague as leniently as possible, or if our approval be deserved, let us give it freely and frankly. We can never tell how soon we ourselves may be grateful for like consideration.

I have now glanced briefly at most of the parts which we, as dentists, are likely to be called upon to play in the theatre of justice. These may be looked upon as the responsibilities of our profession, Its privileges, as conferred upon us by registration, may be summed up in a few words. They consist of the right to practise the art and mystery of dentistry, and exemption from service upon juries and inquests, from all corporate, parochial ward, hundred and township offices, and from service in the militia.

In thanking you for your attention to these somewhat disjointed remarks, perhaps the kindest wish that I can express is that none of us may be enabled from personal experience to form the text of a new chapter on this very limited subject.

PRESIDENTIAL ADDRESS.*

By Elisha Renshaw, L.D.S.I.

Gentlemen,

In accepting the position of president of this society, it was with no inconsiderable amount of diffidence that I did so, and especially stepping, so to speak, into the shoes of our worthy and able ex-president, Mr. D. S. Hepburn. Unhappily feeling, as I do, that the said shoes are metaphorically a size too big for me; and again,

* Delivered before the Nottinghamshire and Derbyshire Dental Society, February 15th, 1895.

inasmuch as I must acknowledge my unfitness to fill the chair which he has so ably occupied during the past year, I thank you, gentlemen, for the honour you have conferred upon me, and I also take this opportunity of expressing my gratitude for the kindly courtesy which I have received from you during the past two years of the existence of this institution. It has been with no little pleasure with which I have looked forward to the meetings as they have assembled month by month. I regret that so many are seemingly adverse and indifferent to the opportunities of professional intercourse. The barriers of professional conservatism have been broken in upon somewhat, but we should be glad to see the breach becoming wider and wider. Those of you who have had some little experience of the various dental meetings of the British Dental Association, both those of the parent society as well as those of its branches, will agree with me that the rubbing of shoulder to shoulder, the intercommunication of professional thought, has not only been a source of pleasure, but also a means of edification and mutual advantage ; and such has also been the enjoyment experienced by each of us in our own community, that of the Nottinghamshire and Derbyshire Dental Society, which as yet has not grown great numerically ; yet I think I may say our influence has been felt and our confidence in and our friendship with each other has been strengthened, and I hope the time may not be far distant when our little society will be sufficiently strong for affiliation with the British Dental Association as one of its branches, and that of no mean order. Whilst as an association we have no direct relationship at present with the parent society, yet as individual members of the latter, we have considerable interest in its integrity, its dignity, and its well being. I think I am but expressing the feelings of each one present, when I say we are proud of our association with such an institution, an institution which has its representatives throughout the United Kingdom, a fact which it may be well for us to bear in mind should further legislation be deemed advisable ; at present the membership is close upon nine hundred. There are nine branches of the British Dental Association conforming with the regulations of the parent society, but each acting independently, and thus forming separate centres of influence and power, and I believe there is a representation of about two hundred towns, including six Irish towns, and apart from the representatives resident in Australia, Africa, Egypt, France, India,

Italy, and New Zealand. Such has been the growth of the society in question during the past twenty years, and soon, to use a familiar phrase, it will have reached its majority.

The year 1875 will ever be memorable in the history of dentistry as an epoch from which dates the forward and progressive movement of dental politics. The pioneers of that movement were men of repute, men of position, men who had the interest of the profession at heart, they were men of courage, enthusiasm, and determination, feeling a disgust with, and a contempt for, the ignominy to which the honour of our profession was subject. Charlatanism was then riding rampant, men totally unfitted socially and so far as dental education was concerned, were entering, and many had entered, the arena of professional life assuming what they had no moral right to do—the title of dentist. England boasts of her freedom, but, too frequently, her boast has proved to be her bane. The abuse of liberty often converts that liberty into corruptiveness, as for instance: —The misuse of titles ; the freedom to appear that which a man is not, and thus the public easily becomes the prey of the dupe and charlatan having this vaunted liberty used against them to their own disadvantage. Evidently such was the condition of things in 1875, so far as dentistry was concerned, when Mr. Sidney Wormald, of Stockport, called a meeting of dentists, which was held in Manchester on the 31st of August of that year. The said meeting was presided over by Mr. C. J. Fox, the then Editor of the *British Journal of Dental Science*. About eighty dentists were present upon that occasion, and the following resolutions were passed :—1st—"That it is desirable that a committee be formed to see what steps can be taken to arrest the continued influx into the profession of illegitimate practitioners by the adoption of the principles of registration and compulsory education." 2nd—It was also resolved, "That a subscription list be opened to defray the expenses of such committee in making an appeal to Parliament." It is needless for me to say with what result such efforts were attended, results which are familiar to each of us, in the fact, that within three years of the holding of the afore-mentioned meeting, Parliament legislated in favour of dental reform. It was a grand and bold step taken then, but not any too drastic for the measures required. And the book was then opened, and the names of all, from a tooth puller to those the most highly educated in dentistry were therein recorded, as the guineas

rolled into the treasury of the Medical Council, and certificates of registration were duly forwarded to the respective applicants—and glory, what a time! It was the charlatans' red letter day; by the stroke of the registrar's pen to be enrolled as dentist, to receive a certificate of registration and the privileges of a fully-fledged dentist, and the legitimate right to append R.D.S. England, to one's name. What surpassing honour, far above and beyond the dreams of one's balmiest days! Gentlemen, such a concession of privilege to the unfit does seem an injustice to the true dental community, an injustice which will take many years to efface. Such concessions never should have been made, neither should any name have been enrolled on the dental register without a proof of fitness. I am fully aware that the Dental Act was not so much a retrospective as a prospective measure, and that it was not convenient to interfere with the existing usage of those who were then following dentistry only in part as tooth extractors in conjunction with their other calling. But why not have had a separate register for these men, and thus maintain the dental register in its integrity for the enrolment of the only *bonâ fide* practitioner? Call a spade a spade, and a dentist a dentist, then we shall approach nearer the fitness of things. Yes, time will or may efface the grievance; men will inevitably die off, but it remains for death to be the scavenger to rid the register of such men. Since then the years have been rolling steadily along. Perhaps a few of these men are clothing themselves ere this with an air of respectability; some few may have entered within the fold of the B.D.A., in the which, methinks, they have found an elevating tendency, forgetting the things of the past and reaching forward to a higher standard of professional excellence. But in what position do we find ourselves as a profession? Has the Dental Act done all for us that is required? Certainly not; much has been done, but there still remains much to do. We have cause for self-congratulation,—the raising of the standard of our profession. We have the recognition and respect of our medical friends; the public, though slowly, are being led to see that our avocation is no sinecure, but is one demanding merit and respectability. We have had our large gatherings in the various populous centres of the kingdom; we are also growing in the recognition and favour of the public press. Gentlemen, are we satisfied? No, we are not. And why? The cry is still the same as that of twenty years ago, namely, the influx

of illegitimate practitioners, "the pirates of modern times." Vainly the hope has been that time would eradicate the evil. The same monstrosities exist, garbed but in other clothing. We have our dental supply companies, dental institutions, dental surgeries, and manufacturers of artificial teeth, all alike covering the head of the louting charlatan with such an appearance of professionalism as to deceive public ken. It sounds very nice to educate the public to a knowledge of the radical difference which exists between the dupe and he who by education and examination has become a fully qualified dental surgeon, but the public are slow to learn, and time is all-important for the establishing of the advertising quack. Is there no remedy?

Sometimes one feels somewhat pessimistic, especially as looming in the distance the capitalist will in all probability seek to monopolise in dentistry as he has in that of other branches of trade and commerce. I trust the time is coming when further legislation will be deemed necessary in order to protect the interests of those who have fulfilled the conditions to qualify for the positions they now hold as English dentists. The Dental Act may have been considered by some as one of model construction, the same was passed as a prohibitory measure, but we are all aware it has signally failed to prevent the evident evasions which have been of continual occurrence, which have been detrimental to our honourable and legalised calling. In my opinion the time now is when the voice of the whole British Dental Association should make itself heard on these matters. When it should seek to fulfil one of the provisions of its programme, viz:—"The maintenance of the spirit and provisions of the Dentists Act by such lawful means as may be necessary." So far as I can see, nothing short of an amendment of that Act will meet the needs of the case. Is such impossible? Financially? The expenditure might be met by a comparatively small levy upon each member of the association. Our representatives in Parliament might be approached individually, and the whole matter laid before them explaining in detail the circumstances of the case and thus, if possible, securing their co-operation in such a movement. These are but few suggestions at an attempt being made to carry the matter to a successful issue. An issue which would be fulfilling the wish which twenty years ago sought, then as their remedy for the existing evils, "redress by parliamentary

legislation." And now, returning to matters more immediately relating to this society, I wish it every success during the coming year, and, as you have honoured me by election to the position I now occupy, I simply ask that you accord to me the like support which you have so kindly accorded to my predecessors.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ORDINARY MONTHLY MEETING was held on the 1st ult., the President, Mr. F. Canton, in the Chair.

The minutes of the previous meeting were read and confirmed. The following gentlemen were elected members of the Society :— Messrs. Francis Mark Farmer, L.D.S., Eng., 17, Great Marlborough Street, W.; Harry Symes Prideaux, L.D.S., Eng., 41, Wimpole Street, W.; F. G. Frankland Rooke, L.D.S., Eng., 42, Kensington Gardens Square, W. (resident); J. Main Nicol, L.R.C.P., M.R.C.S., L.D.S., Eng., 2, Clarendon Road, Leeds; George Arthur Peake, L.R.C.P., M.R.C.S., L.D.S., Alma House, Cheltenham; Frank C. Porter, L.R.C.P., M.R.C.S., L.D.S., 12, Oxford Street, Nottingham; George Nash Skipp, L.D.S., Eng., Sale, Cheshire (non-resident).

The following gentlemen were proposed as non-resident members of the Society :—Messrs. John William Tomlinson, L.D.S., Eng., 8, Warrior Square, St. Leonard's-on-Sea; William Jarvie, M.D.S., 105, Clinton Street, Brooklyn, New York.

The LIBRARIAN, Mr. W. A. Maggs, announced that Mr. R. H. Woodhouse had presented 17 bound volumes of the Medical Society's Transactions to the Library. The usual exchanges had also been made.

The CURATOR, Mr. Storer Bennett, desired to repeat a request, made some time previously, that any gentleman possessing old specimens in mechanical dentistry would present them to the Society, more particularly ivory plates and those with natural teeth upon them. These dentures year by year were becoming more rare—probably most of them were thrown away—whereas in their museum, where a number of them could be viewed together and compared, they would be valuable and useful, much more so than in private collections. No doubt many members had such specimens, and he would gratefully accept them on behalf of the museum.

Mr. G. Brunton (Leeds) exhibited a modification of the Hodge right angle, the portion which carries the bur was shortened so as to accommodate it to shorter bites, and enable the operator to get at positions in the mouth difficult of access. He found the modification especially useful in dealing with children's mouths. The nut at the back was shortened, and he had provided a key for tightening it up, but in practice he found it was rarely necessary to use the key. The modification had been carried out for him by the Dental Manufacturing Company, who were ready to supply it to the profession to order. Mr. Brunton also showed a simple balance for weighing amalgam, and a rack for holding plugger points so that the point could be changed with one hand.

Mr. G. G. Campion (Manchester) then read a paper entitled "Studies in Superior Protrusion." The paper was illustrated by a large number of lantern slides thrown on a screen. Mr. Campion said Mr. David Hepburn, in a paper read before the Society in March, 1892, described with some minuteness that variety of the deformity which cannot be attributed to mechanical influences, and spoke of this distinctive protrusion as being associated with an increase of bone in the premaxillary region ; he pointed out that in these cases the upper canines were erupted in normal antagonism to their opponents, but, judging from the number of specimens Mr. Campion had examined, he was inclined to think that the upper canines, although often in antagonism with their opponents, were not in "normal" antagonism. Slide 1 showed the general appearance of this form of protrusion, referred to by Kingsley in his work on "Oral Deformities," in which the results obtained by jumping the bite are demonstrated. One or two other similar cases treated in the same way were on record, but were regarded by practitioners generally rather in the nature of rarities, whereas Mr. Campion believed that an examination of a large number of models would show them to be in reality common. One of the models which Mr. Hepburn figured in the Society's transactions showed this mal-occlusion, though Mr. Hepburn did not himself call special attention to it. During the past 18 months Mr. Campion had made a list of 39 cases of different kinds and degrees of protrusion that had come under his notice, and in only four of them, or just over 10%, was the molar occlusion normal on both sides of the mouth, while in 24 cases, or 61%, the lower teeth articulated

the breadth of a bicuspid behind their normal position. In other cases, the articulation varied on the right and left sides of the mouth, and in some the molars and bicuspids met cusp to cusp, or half the breadth of a bicuspid posterior to the normal bite. The list probably exaggerated the number of those with back occlusion on both sides, because in several of the models teeth had been lost, and the position of several of the others consequently deranged. Mr. Campion was a good deal surprised by the result ; if not quite exact, the figures at any rate showed that in a large proportion of cases a derangement which, whatever its origin and causes, is established in early life, for it was to be seen not only in the permanent, but also in the temporary teeth. He found too, that this mal-occlusion was by no means confined to cases of protrusion, but existed also in many cases of general crowding of the upper teeth, of overlapping centrals, instanding or outstanding laterals, and projecting canines. In dealing with a derangement of the arches it was not easy to see the exact significance of it, nor to account for it. At first sight it seemed as if it might be accounted for in one of three ways (1) a bodily protrusion of the maxilla (2), a want of development of the mandible (3), posterior displacement of the latter bone if it were of normal size. Kingsley appeared to hold to the last view, but Mr. Campion thought it inadequate to explain the different conditions met with, for it took no account of the development of the mental prominence of the mandible, which was shown by the photograph to be an all-important factor in determining the projection of the chin ; and it failed to account also for those cases where, with a chin of normal projection, and a mandible of apparently normal size, one still got back occlusion of the lower molars. His own impression was that in some cases they had to do with a defective development of the mandible, and in others with a bodily protruding maxilla, but the point was a very difficult one to settle. It could not be decided by absolute measurement of the mandible, for at the age of 12 or 14 the angle of this bone is not sufficiently developed to afford any point definite enough to measure from, and, in addition, the determination of the average size of this bone at different ages and in the different sexes would present too many fallacies to make the method of any use where such comparatively small differences were of importance. But it had occurred to him that some proportional measurements made in a similar way to that used by anthropologists in determining

the projection of the dental arch in relation to the rest of the face by means of the gnathic index might give more definite results. Another feature in these cases worthy of notice, which had never, so far as he was aware, been carefully studied, was the breadth of the dental arch, and its relation to the length. The words brachoid and dolichoid, used by anthropologists in cranial measurements to denote respectively arches which were above the average measurements in breadth and length, seemed convenient for adoption in any discriminating classification of the different forms of arches, if their application were based on relative measurements, for this would allow for any variation in the absolute size of the teeth; but the application of these terms could obviously only be made after a careful and extended study and measurements of a large number of fairly normal arches. Mr. Campion had attempted to apply this method of relative measurement to the arches in cases of protrusion for comparison with normal dentures, and the result was striking, and suggested some interesting conclusions. His fixed points in measuring were :—For length, the distance from the mesial extremity of the cutting edge of the central incisor to the centre of the posterior border of the masticating surface of the six-year-old molar. The mean of the measurements on each side was taken as the length of the arch, there being often a slight discrepancy between the measurement of the two sides. For breadth, he took the measurement across the arch between the most prominent points on the labial surfaces of the first bicuspids or first temporary molars. The first bicuspids were chosen for the point of measurement of breadth as being about midway between the extremities of length, and also because there was more variation in the breadth in the bicuspid than in the molar region ; and it was precisely this variation which he wished to study. And, taking the extreme points for length measurements, it seemed well to take them also in determining breadth, and so the labial surfaces were fixed on, instead of the centre of the masticating surfaces which were chosen by Mr. Tomes some three years ago when studying a series of models in the Museum of the College of Surgeons to ascertain their bearing on the accepted views as to the development of the jaws; the length and breadth being determined, their relation was calculated in the same way as the cephalic index.

$$\frac{\text{Breadth} \times 100}{\text{Length.}} = \text{Breadth index of the arch.}$$

Determining in this way the relative length and breadth of a certain number of fairly normal arches, he found the index to range approximately from 105 to 115. As compared with these he found in twenty-eight cases, showing different degrees of protrusion, that the indices varied from 84 to 102. Four only had an index of 100 or over, *i.e*, had almost normal arches, and all four presented the posterior occlusion of the lower molars. In three of them the protrusion was more than accounted for by this mal-occlusion, and in the fourth, by placing the models in their proper articulation, the protrusion was rendered comparatively slight, so slight as to be readily cured by pressing the incisors back till the slight spaces between them should be obliterated; this case being one in which the protrusion caused by the posterior occlusion of the lower jaw had been exaggerated by thumb-sucking. In other cases the index averaged about 93 or 94, showing arches relatively narrow. This, of course, was to be expected. A moment's consideration would make it clear that an arch with protruded incisors, even if of normal width, must, in absolute measurement, appear narrow in relation to its length. But in these cases of protrusion an absolute as well as relative diminution of width would be found. In eleven cases of normal arches the average width was 46·9 mm., and in twenty-six cases of protrusion only 41·3 mm., the average width of the normal arches thus exceeding that of the protruded arches by 5·6 mm. This was very interesting and suggestive, although the number of normal arches measured was too small to eliminate the possible fallacy arising from the different sizes of teeth in the different arches. But it certainly suggested that there might be some casual relation between the narrowness of the protruded arches and their length. It was one thing, however, to show a relative or even absolute diminution of the width of protruded arches, and quite another to prove a connection between the narrowness and the protrusion. The argument looked seductive, but facts might, without much difficulty, be stated so as to suggest precisely the opposite conclusion. An examination of these cases, it might be said, shows in many of these an abnormal development of bony tissue in the region of the upper incisors. This excessive formation of bone, due to an abnormal proliferation of bone cells, carries the teeth forward with it, and with the pressure which we know to be constantly exercised by the cheeks and lips on the exterior of the dental arch, what more natural

than that, as a result of its elongation, its sides should partially collapse? This seemed to be, partially at any rate, the view of Dr. Talbot, but his phrase about "the normal proliferation of bone cells" had always struck Mr. Campion as a particularly unhappy one. It was one of those explanations which offer no explanation. It had much the appearance of one of those phrases contrived more as a means of concealing our ignorance than of stating our knowledge, and to be inadequately contrived even for that. He was far from denying that there may be in a few cases some "inherent vice," to borrow Mr. Tomes' phrase, in the development of the bone itself at this point, but that this is so in the majority of cases needed certainly more proof than exists at present. On the other hand, that the narrowness of the arch has some casual relation to its protrusion, is shown, he thought, by those cases occasionally seen where on one side of a protruded arch one of the teeth has failed to erupt. Here it would be found that there is a *vis a tergo* on the opposite side which has driven the centre to the side of the unerupted tooth, and has left one central (the one belonging to the side on which there is the full complement of teeth) more prominent than the other. It would be fair to conclude that in these cases, had the missing tooth remained, and erupted in line, the protrusion would have been symmetrical and more pronounced than was actually the case. And, further, it might be concluded that the same cause, according to the position of the developing teeth in their alveoli, might eventuate either in protrusion, in general crowding or overlapping of the incisors, or in the exclusion of one or more of the teeth from the dental arch, and that protrusion, in at any rate many cases, could no longer be looked upon as essentially and peculiarly a deformity by itself. The conclusions which he thought might be drawn from the points to which he had called attention were: (1) That protrusion (where it is not due to external mechanical causes) is not simply a deformity of the front teeth, but one in which the arch on a whole is involved; (2) that it cannot be altogether regarded as a deformity *sui generis*, but is, in many cases, simply an alternative result of the action of the same causes which produce general crowding of the teeth, transitional forms being seen which exhibit both abnormalities in combination; (3) that, if not actually found in the temporary teeth, it is at least foreshadowed in a large number of cases by posterior occlusion of the

temporary molars; and (4) that in estimating the relative importance of the different factors concerned in its etiology, a large share as a determining cause must be assigned to the narrowness of the dental arch. It was obviously impossible in a short paper to discuss at length all the factors concerned in the production of protrusion. He contented himself with calling attention to two, the importance of which had, so far, perhaps been rather under-valued than unobserved; the shortness of the vertical ramus of the mandible, the influence of the variations of its angle, the rising of the lower incisors and their impingement on the upper gum or teeth; and the influence of the lower arch in determining the character and extent of the protrusion of the upper. Of these and their varying combinations there was much to be learnt before they would be able to discriminate fully between the different varieties of the deformity and arrive at any adequate classification of them, and yet it was evident that even an approximate classification might modify considerably the usual routine method of treatment. Here they had matter for further study, the value of which from a practical point of view could not easily be over-stated.

Mr. David Hepburn said they owed a debt of gratitude to Mr. Campion for his delightful paper on an important and difficult subject. While they could not disregard the influence of heredity—and Mr. Campion had proved up to the hilt that in special cases of superior protrusion the peculiarity was decidedly one which was inherited from one or both parents—still, on the other hand, there was an extraordinarily large number which appeared to spring up *de novo*, the child striking out a line of its own, as it were, and developing this abnormality of the jaw and teeth, although the parents did not participate in any way. He could recall to his own mind two or three very pronounced cases under treatment at the present time, in which the parents had perfectly normal jaws and particularly fine sets of teeth, with normal bites, and everything in perfect order, and yet the children, or one child perhaps of the family, had developed this peculiar condition. Whether it was due to some peculiar state of development of the cranial bones at a very early stage imparting a peculiarity to the jaws as they developed at a later date, or whether it arose, as had been suggested, from an abnormal growth of bone on certain portions of the jaw, was very difficult to decide. It seemed on the face of it that the abnormality was more evident at a certain

time of life than at another, *i.e.*, apparently commencing with the eruption of the upper permanent teeth, increasing in intensity for three or four years, and then ceasing. He had risen particularly to mention a very marked case that had come under his notice within the last two months. He regretted that he had not at the present moment been able to obtain a model of the case, but he would do so and would certainly submit it to Mr. Campion for examination. It was a case of pronounced superior protrusion in a child aged four-and-a-half years. He had never seen such a case before, one did not look for it, perhaps, but still in the treatment of the mouths of young children he had never seen, beyond perhaps a slight advance of the superior incisors, anything which could be called distinctly superior protrusion. He had sometimes seen in children conditions which he thought indicated a future state of protrusion, such, for instance, as an abnormally long alveolus with two rounded eminences above the temporary incisor teeth. He did not know whether that indicated future protrusion or not, but in his own mind he associated that condition with the chance of it in the future. This particular child, aged four-and-a-half, a very bright little fellow in his way, whose parents had perfectly normal jaws, had distinct superior protrusion to the extent of about half-an-inch. No doubt others had seen such cases, but that was the only one that had come under his notice, and he therefore thought it worth mentioning.

The PRESIDENT remarked that he had noticed in some such cases the patients seemed to be suffering from post nasal growths. Possibly that might have something to do with the protrusion, though he was not prepared to say in what way, but the two seemed to co-exist.

Mr. STORER BENNETT very much regretted the failure of the lantern just at the last part of the paper, because, in the first place, it had prevented their seeing one or two more of Mr. Campion's extremely interesting slides, and secondly, because it had prevented his (Mr. Bennett) having the opportunity of showing a few slides which he had prepared, which would have been of interest in illustrating one or two observations he wished to make with regard to the subject of superior protrusion. On the table there were four specimens from which photographs were taken, and to which he wished to draw attention. As far as he could gather, Mr. Campion did not draw any special attention to the extreme shortness of the molars in these cases. It was a matter of common observation in all cases

of superior protrusion that the molars were extremely short, in other words they were erupted to a very slight extent, and that was very well shown in the photograph exhibited in which the shortness was very obvious. He thought that had a very large influence in determining these cases of superior protrusion. Then there was another element that had of course to do with it, *viz.*, a higher condition of the lower incisors and the noticeable fan-shaped arrangement of the lower incisors: the lower incisors biting against the backs of the upper ones and later on against the gums drove the upper teeth forward. The reason for the high lower incisors in many instances might be two fold, it was in many cases brought about by difficulty in the eruption of the lower canines; on examining one of the specimens it would be seen that the lower canines were pressing against the roots of the lower incisors and driving them inwards; there was the commencement of the fan-shaped arrangement of the four lower incisors. In a second specimen it was more marked still, and this was, he thought, brought about by the sides of the crowns of the lower canines pressing just against the lower incisors, driving together the apices of the roots of the incisors, with the result, of course, that the crowns were spread; then as the lower canines tended to erupt they would tend to drive the incisors upward and forward. Another of the specimens showed very distinctly the fan-shaped arrangement of the lower incisors in connection with superior protrusion. He thought the rising of the lower incisors was due to this difficulty of eruption of the lower canines, and also that the biting of the lower incisors against the upper ones was not prevented in consequence of the extreme shortness of the molars. The photographs shown by Mr. Campion illustrated very beautifully the extreme shortness, and the same thing was very noticeable in the models. Those were two of the factors starting superior protrusion. The moment the front upper teeth began to travel forward, the lower lip invariably dropped behind, and that had a very large influence in continuing the protrusion when it once started. Very often the upper lip was thrown out, so as to be more over the roots than over the crowns, thereby having no counteracting influence to overcome the effect of the lower lip. The lower lip drove the teeth further forward till a certain distance was reached when it no longer influenced them. These were three points that had large influence in such cases. The thanks of the society were greatly due to Mr. Campion for the extreme

lucidity with which he had brought forward his explanations, but as it appeared that he did not intend to enter into an explanation of the whole phenomena of superior protrusion, but only part of it, he (Mr. Bennett) had brought down a few slides intending to show them, as it might possibly be interesting to draw attention to these points.

The PRESIDENT said they should hope to see Mr. Bennett's slides on a future occasion.

Mr. CAMPION, in reply, said no one having criticised his paper very damagingly, there seemed to be nothing very specially demanding an answer. Mr. Hepburn had alluded to inheritance as a factor in some of these cases. He would most readily agree with Mr. Hepburn that it was, but it was a question to his mind whether even heredity did not act through the narrowness of the arch. He mentioned a case in which the parents having perfectly normal arches, one of the children suffered from this defect. From his observation of such cases, there appeared to be very little doubt that the narrowness of the arch was a very large determining factor—not the only factor by any means, for there were many others. Mr. Bennett had kindly supplemented what he had said by alluding to one or two more, but as he (Mr. Campion) had said, it was quite impossible to treat all these factors in one short paper; he therefore preferred to confine his attention to two, and to discuss these as thoroughly as he could in the time allowed. Mr. Hepburn had referred to a case of superior protrusion in a child of four, and it curiously happened that a similar case was to have been shown in one of the slides at the end. He had there a model of a child of four with very pronounced protrusion of the upper and receding of the lower incisors, in which there was a very undoubted history of thumb sucking. A most interesting point alluded to by Mr. Bennett was the shortness of the molars and the uprising of the lower incisors. That was a point which he very much wished to investigate, and he should be extremely interested to hear Mr. Bennett's views upon it. He had often thought whether the uprising of the lower incisors was some development in itself, or was simply due to the fact that the molars had not come up to the proper level, and that therefore the rising of the incisors was apparent rather than real. That was a very interesting point on which he had formed no conclusion, and one in which he had made really no investigation. Mr. Bennett's allusion to the difficult eruption of canines as a cause of the fan-shaped appearance of the lower incisors

was also very interesting. His hypothesis seemed to be remarkably rational, but, there again, going a little further back they came to this, that very difficult eruption of the incisors and the consequent compression of their roots was really due to an abnormal narrowness of the arch. Those were the main points touched upon, and he had only, in conclusion, to thank the members for the very patient hearing they had given to him. A large number of models of this deformity were on the table for inspection.

The usual votes of thanks concluded the meeting.

A German chemist, Wolffenstein, has observed that hydrogen peroxide is much more stable than is commonly supposed. A solution containing 4·5 per cent. can be evaporated on a sand bath until the percentage rises to 66·6, the loss is considerable when the strength is over 15 per cent., but is due to vaporisation, not to decomposition. Such evaporation, however, can only be successfully accomplished if the solution be free from every trace of alkali, compounds of heavy metals, and solid bodies of any kind, even if chemically indifferent By concentrating a solution—by shaking with ether, evaporating the ethereal liquid, and fractionally distilling into a vacuum (68 mm.) at 70°-80° C.—a product was obtained containing 99·1 per cent. of hydrogen peroxide.

THE Librarian of the Royal College of Surgeons of England—Mr. J. Blake Bailey—contributes an interesting paper on "The Art of making References" to the *British Medical Journal.* The importance of giving a correct reference, so that a reader may be able to hunt up the original paper, is fairly obvious, and Mr. Blake Bailey illustrates, by some apt illustrations, how difficult this may become when the reference is badly or wrongly given. Thus, not long ago, Mr. Blake saw a reference to *Macmillan's Journal of Anatomy*, though this firm has not published the Journal for the last ten years. Then, too, in quoting from a journal to refer to date of the publication of the number is bad, it saves time and trouble to give the volume and page. The writer's concluding sentence is suggestive, he says :—"nearly all writers grumble at the incorrectness of their brother authors, but very few seem to take much pains to be more correct themselves."

THE DENTAL RECORD, LONDON: MAY 1, 1895.

EXPERIMENTS *versus* EXPERIENCE.

We learn by experience: and experience is begotten of experiment. But there is often a marked contrast, amounting sometimes to antagonism, between the lesson learnt from experiments made with a definite object and that experience which is gained by observation of daily work. Perhaps instead of antagonism we might more correctly have said apparent want of agreement, for, after all, the results must be in unison if the experiments be accurate and the deductions sound. There are, unfortunately, many points on which we come to grief when attempting to apply the result of an experiment to a practical purpose. Difficult as it may be to read our experiments correctly, or to free our minds from bias of a preconceived notion, it is infinitely more so to prove that the conditions of the experiment and of the application of its result are one and the same. Thus, iodoform has been shown experimentally to be valueless as a germicide, yet its use has the almost unanimous support of practical surgeons. The conditions of the experiment and those under which iodoform is used are not the same. In the one case the germ culture is on an inert material, in the other, the germs are growing, or may grow, in or near a living tissue. Thus, though iodoform may not be a direct germicide, yet it may indirectly be so when dusted over a wound, by reason of its action on this living tissue, probably preventing the exudation of serum, dead animal matter, the paradise of germ growth. So, again, with reference to the debated value of coagulants as dressings for root canals, which experimentally we may prove of doubtful value, and theoretically fail to see the use of, yet are probably more largely used than any other drug, and with beneficial results. Let us at once recognise that experiments are not in accord as to the self limiting action

of coagulants, let us admit, for argument's sake, that Dr. Harlan's theory is right, and thus waive further discussion, still we would ask "Are the conditions of the experiment and of the practical use of coagulants the same?" "Is the theoretical conception of what we require root dressings to do in accord with what we actually need them to do?" We think not. Leaving, as out of court, those cases in which the desideratum is a free drain down the pulp cavity, and which a mass of coagulum will obviously obstruct, the conception of a dead tooth is a cavity full of septic *débris*, surrounded by a wall permeated by fine tubes full of similar material, which tubes are in direct connection with a vascular membrane. Yet this is an exaggeration of the actual, for, though undoubtedly dentine is permeated by tubes, and equally surely the cells of the periosteum are placed through the cement corpuscles in communication with the protoplasmic contents of the tubes; yet these tubes and their communications are microscopical in size, so much so that the permeability of a tooth to fluids can only be shown with difficulty. Even granting that micro-organisms fill the tubes in the dentine of the root of a dead tooth, they will, in the absence of a *vis a tergo* be scarcely likely to find their way into the periosteum. Suppose the root tightly filled, whence comes the propelling force? There is nothing. On what, too, shall these germs live? Warmth they have, truly, but moisture and soft, dead animal matter have been removed or dried up by our filling. They are like an enemy with its baggage train intercepted and the communications broken. They cannot live, and they must be innocuous, for the moribund stragglers which the ingenious may fancy finding their way through into the periosteum, will get anything but a kindly reception from this vascular tissue. Given a clean pulp cavity, well filled, we believe that the cementum and periosteum will not suffer inconvenience or harm. We, personally, reserve our sympathy for the germs bottled up in the dentinal tubules.

News and Notes.

THE next meeting of the Odontological Society of Great Britain will take place on Monday, May 6th, at 8 o'clock, when a Paper will be read by Mr. F. J. Bennett, on "The Subject of Dental Caries" (with illustrative specimens). Mr. Storer Bennett will exhibit and describe: (*a*) "An Odontome Arising in Connection with a Human Upper Central Incisor." (*b*) Two Odontomes connected with the lower Canines of a domestic pig." A Casual Communication will be brought forward by Mr. Oswald Fergus on (*a*) "A Pair of Scissors for Adjusting Rubber Dam and Ligatures around Teeth." (*b*) "Three Pairs of Pliers for Lower Crown work." (*c*) "An Automatic Alloy Holder."

IT will be seen that the new Dental Act of British Columbia, of which we give a reprint, is considerably in advance of our own in that it makes it illegal to practise or attempt to practise dental surgery unless duly qualified. Our own contents itself with forbidding the use of the title Dental Surgeon or its equivalent. We wish that in this instance the Mother Country would follow the lead of its offspring.

THE next Dental Examination at the Royal College of Surgeons, England, commences on Friday, the 10th inst.

THE Social headquarters during the Annual Meeting of the British Dental Association in Edinburgh will be at Waterloo Hotel. The meeting will be during the last few days of August.

MR. E. LLOYD WILLIAMS advocates the addition of a solution of gum acacia to plaster when used either for casting models or for taking impressions. When using it for the latter purpose, he adds about an ounce of the Mucilago Acaciæ (B. P.) to the pint of alum solution. For casting models slightly less is required. Mr. Lloyd Williams states that this addition renders the plaster less friable, and more dense, giving it a silky look.

IT is, of course, well-known that should anything prevent the normal wear of curved teeth having persistent pulps, they grow into

a complete circle, the point penetrating the bone of the jaw close to the root of the tooth. In the interesting and valuable work on Mammals, by Flower and Lydekker, it is stated that the Fiji Islanders avail themselves of this circumstance to produce one of their most valued ornaments—a circular boar's tusk—the upper canines being extracted the lower ones are allowed to grow to the desired form.

THE *Cosmos* states that Mr. W. J. Evans, of McKesson and Robbins, the makers of the pyrozone preparations, suggests the following method for bleaching discoloured teeth. The tooth to be bleached is prepared and desiccated, with the rubber-dam adjusted, as in the manner for ordinary bleaching operations. A pledget of cotton saturated with twenty-five per cent. pyrozone is introduced into the pulp-chamber, canal, and cavity of decay, and the positive pole of a battery of low tension, furnished with a needle-like platinum electrode, is touched to the surface of the pyrozone. The negative electrode may be held in the hand of the patient, or when mounted with a suitable platinum point may be applied to the outer enamel surface, and the current short-circuited through the tooth-structure in any desired direction. Decomposition of the pyrozone at once follows completion of the circuit, and bleaching of the tooth rapidly ensues. By applying the negative electrode to the enamel surface the bleaching effect is produced immediately under the point of contact, and can thus be brought to bear on any area of local discoloration at will.

NEWCASTLE DENTAL HOSPITAL.

FORMAL OPENING BY THE MAYOR.

ON April 22nd, the Mayor of Newcastle (Ald. W. H. Stephenson) formally opened the new Dental Hospital, in Nelson Street, Newcastle. In a circular issued by the committee, it is stated that the Newcastle-upon-Tyne Dental Hospital has been established to provide gratuitous advice and aid for poor and deserving patients suffering from diseases and irregularities of the teeth. No class of disease has been so much neglected amongst the poor, and yet there are few diseases so universal, or which cause so much suffering and

derangement of the general health. Hitherto Newcastle has been singularly behind other cities in provision for treatment of diseases of this kind. It is true that a dental surgeon has for some years past been attached to the staff of the chief medical charities in the city; but, of necessity, the relief afforded has been confined to extraction, with the result that a great number of teeth have been lost that might with care and attention have been preserved. As evidence of the need for the establishment of a dental hospital, it may be mentioned that during the year 1894 more than 3,400 cases were treated by the honorary dental surgeons in connection with the medical charities of the city. To provide such an institution being beyond the scope of the existing medical charities, a meeting of all the licentiates in dental surgery practising in Newcastle-upon-Tyne was called, at the instance of Mr. R. L. Markham, the honorary dental surgeon to the Royal Infirmary and to the Newcastle-upon-Tyne Dispensary, and the gentlemen present formed themselves into a committee with a view to the formation of the hospital, and personally guaranteed to secure its continuance for at least three years. Sufficient funds having already been obtained to meet the current expenses of the hospital for the present year, it is proposed to credit all subscriptions hereafter received to the year 1896. There is, nevertheless, still much required before the equipment of the hospital can be considered thoroughly efficient, and donations are solicited for that purpose. The honorary staff and committee are as follows:—Hon. consulting physician, George Hare Philipson, M.A., M.D., D.C.L., F.R.C.P.; hon. consulting surgeon, James Rutherford Morison, M.B., F.R.C.S., Eng.; hon. consulting dental surgeon, E. Fothergill, L.D.S., Eng.; hon. dental surgeons, J. W. Daniels, L.D.S., Edin., J. T. Jameson, L.D.S., Edin., J. C. S. Harper, L.D.S., I., R. L. Markham, L.D.S., I., W. D. Moon, L.D.S., Eng., and W. G. Routledge, L.D.S., Edin.; hon. anæsthetists, George Metcalfe, M.B., B.S., Edward F. Pratt, L.R.C.P., London, and Septimus Basham, L.R.C.P. and S., Edin.; provisional committee, Ald. W. H. Stephenson, J.P. (Mayor of Newcastle-upon-Tyne), Ald. W. D. Stephens, Ald. W. Sutton, Mr. G. B. Bainbridge, Councillor J. A. Baty, Mr. James Logan, jun., and Mr. G. R. Brewis, and the hon. dental surgeons; hon. treasurer, Mr. J. C. S. Harper, Gresham House, Newcastle; hon. secretary, Frank Marshall, 27 Mosley Street, Newcastle.

At the opening ceremony, the Mayor was attended by Mr. Frank Marshall, honorary secretary, and there were present: The Rev. Principal Gurney (Durham College of Science), Ald. Sutton, Mr. James Logan, jun., Dr. Ellis, Mr. C. L. Routledge, Mr. Brummell, Miss R. C. Routledge, Dr. Metcalfe, Professor Oliver, and members of the staff and committee of the hospital, and others. Letters of apology for absence were read from Professor Philipson, Mr. E. Fothergill, Mr. G. R. Brewis, and Mr. W. G. Routledge. Professor Philipson wrote that it was his intention at the meeting to have explained how, in connection with the Durham Colleges of Medicine and Science, the hospital, when recognised by the General Medical Council, would afford an opportunity for dental students to complete their professional curriculum in Newcastle.

Mr. Frank Marshall said he had been requested to ask Alderman Stephenson, as Chief Magistrate, to declare the Dental Hospital formally open that day, and to accept it as an addition to the public charitable institutions of the city. The formation of the institution was due to the fact, brought prominently before the dental surgeons attached to the various medical charities in Newcastle, of the large amount of suffering that might be cured, and certainly in many cases prevented, by a dental hospital adequately equipped and attended by an efficicient staff of dentists. Their committee asked the Mayor, as Chief Magistrate of the city, and also in his capacity as an individual who had always shown the greatest interest in philanthropic and charitable work, to be present and inaugurate the hospital.

The Mayor expressed his pleasure at being present to show his sympathy with and appreciation of the efforts which had been put forth by Mr. Markham and his coadjutors, the praiseworthy effort he took it to be, to meet what was undoubtedly an acknowledged want in the city. As Mr. Marshall had said, the city abounds in charities, and no one had a better opportunity of judging the value of those institutions than men like Ald. Sutton and himself, who had filled the Mayoral chair, had in the visits of inspection which they made. Of all the institutions that had their assistance in Newcastle, he ventured to say that that which they were then inaugurating was not the least important. They had institutions for the blind, they had an Hospital for Diseases of the Chest, and

also a Throat and Ear Hospital. They had a Deaf and Dumb Institution, the Dispensary, and the Skin Hospital, a Surgical Aid Society, a Home for Incurables, and he did not know what all besides; but it appeared to him, as an amateur in such matters, that the fundamental of the whole of the bodily constitution was the stomach, and their duty ought to be to try and keep it in good order. He was certain the stomach could not be kept in good order unless the process of mastication is perfect and the organs of deglutition are in their proper condition. It was, therefore, of the utmost importance to have good teeth. That institution commended itself to the hearty approval of right-thinking people for many considerations, and one of the first was that it was intended to give gratuitous service to the necessitous poor. He thought the regulations of the new hospital were framed with an idea to the good order and systematic good government of the institution. The hospital was well-staffed and well-manned. They had ability, energy and enterprise, and, if they liked, money as well combined, set forth in the names of their staff and committee. He mentioned that, in the sixteen days the hospital had been opened, no less than 93 cases had been dealt with satisfactorily. Having announced his intention to subscribe a guinea a year to the funds of the hospital, he concluded by declaring it open. and wishing it every success.

The Rev. Principal Gurney moved a vote of thanks to the Mayor, and expressed a hope that the hospital would be useful also as helpful to form a school for dental surgeons in connection with the Durham College of Science and Medicine.

Mr. Markham seconded the motion, which was carried by acclamation, and, the Mayor having responded, the proceedings were brought to a close.

Abstracts and Selections.

THE INFLUENCE OF PREGNANCY UPON DENTAL CARIES.

By Reuben Peterson, M.D., Grand Rapids, Michigan.
Fellow American Association of Obstetricians and Gynecologists.

Are the teeth more liable to become carious during pregnancy? It will be noticed that I begin this paper, which I have had the honour of being asked to prepare for your society, with a question. This is appropriate, for it is in this spirit that I desire to bring the subject

before you. As it has not been within my province to make a critical examination of teeth affected with caries, it is evident that I must depend for my facts in regard to this disease upon the members of the dental profession. I find that the literature upon this subject is voluminous, and that not only has its course been accurately described, but also that many important discoveries have been made during the past few years which tend to make its etiology more clear.

I find also that the condition of pregnancy has been most carefully studied and all its phenomena thoroughly discussed. But when I endeavour to discover some recorded observations upon the subject which will occupy our attention this evening, I meet with a disappointment, for, although I have carefully searched both the "Index Catalogue" and the "Index Medicus," I can find but little that has been written upon the relationship existing between pregnancy and dental caries. What little I have discovered has been in the form of short sentences, scattered through the different articles, and especially aggravating because of their brevity and assumption of the reality of certain conditions which are far from being proved. This proof must be furnished by the dental surgeons, and not by general practitioners; and if I shall by this paper arouse you to an increasing interest in caries affecting the pregnant female, so that you may discover some of the missing links in the chain of evidence, I shall feel more than satisfied.

There is little reason to question the probable correctness of the opinion generally held that the teeth are more liable to become carious during pregnancy. I am unable, however, to find any collected statistics upon the subject. I do not see why such observations should not be made and recorded, and the question settled beyond dispute. Surely, if an accurate history be taken of patients who seek your advice because of caries rapidly developing during the pregnant condition, you soon would be possessed of sufficient data to scientifically demonstrate the truth of the opinion which is almost universally held. But inasmuch as I am unable to find such records, I must assume, at least for the purpose of this paper, that pregnancy does have some influence in the production of dental caries.

The attempt to explain the nature of this influence is the task that is imposed upon me this evening. And in order that this may be done in an intelligent manner, I must ask that you bear with me while

I briefly outline the salient features of dental caries, at the same time excusing any inaccuracies in one who must necessarily glean his facts from the literature of the subject, and not from daily observations of clinical material.

To the general practitioner, and especially to the surgeon, nothing can be more proven than the chemico-parisitic theory of caries, of which Dr. Miller, of Berlin, is the principal exponent. This careful investigator has applied the rules laid down by Koch for the study of pathogenic organisms, and has demonstrated that under certain conditions there exists in the human mouth a living ferment capable of self-reproduction (Robert Ormiston, M.D., *Dental Cosmos*, vol. xxx., 1889); that this ferment produces an acid at the point of contact with the tooth, capable of dissolving lime-salts. It was also shown that this was lactid acid, and that the micro-organisms were anaërobic, and therefore could live and thrive deep down in the carious mass. (G. V. Black, "American System of Dentistry," vol. i. page 761.) In some fissure of the enamel not washed by the saliva, and thus giving a chance for the lodgment of food, the micro-organism begins its work. The acid is produced and the hard enamel decalcified, and the softer dentine within exposed. By means of the dentinal tubules the micro-organisms gain an easy access to the interior of the dentine. The tubules are packed full, and more lactic acid is produced and more decalcification follows, until the carious cavity is produced. Because of the ramification of the tubules just beneath the enamel, there is a marked tendency to decalcification from the action of an acid devoid of the presence of micro-organisms. The fact that the tubules are not widened is one among other proofs which go to show that bacteria are at the bottom of the carious process.

This, in brief, is the modern theory of dental caries. It relegates to the past all the other theories, which had for their foundation a purely chemical basis, or sought to explain the phenomena through the agency of a vital process having its origin within the pulp-cavity.

This being the case, how are we to explain our first proposition,—namely, that pregnancy exerts a marked influence upon caries of the teeth? It is evident that the increased frequency with which caries is met with in pregnant patients must be due:—

1. To influences which make themselves felt primarily upon the interior of the tooth; or

2. To influences acting primarily upon the external surfaces of the tooth ; or

3. To influences which are directed at the same time both upon the external and internal surfaces.

1. Influences which make themselves felt primarily upon the interior of the tooth.

I shall not weary you with any description of the theories which have been advanced to explain the etiology of dental caries, all of them based upon the idea that it was inflammatory in its nature and started from within. I shall simply examine two of the theories which are advanced at the present day to explain the cause of dental caries occurring during pregnancy. The first is one most commonly accepted as the explanation of the phenomena we are considering. It is, that the lime-salts are abstracted from the tooth in order to supply the demands of the growing fœtus. I am unable to see why such a theory should be so universally accepted, for I am unable to find one scientific fact which can be brought forward in its support. In the absence of any microscopical examinations of the teeth during pregnancy for the purpose of ascertaining if an absorption of lime-salts is taking place, we are forced to consider the question more or less theoretically. If I am correct in my histology, the teeth are not supplied with any system of absorbents whereby the lime-salts can be abstracted for the purposes named. (Barrett, *Dental Practitioner*, vol. xxiv., April, 1893). How, then, are they to be carried to the fœtus from the tooth? The absence of any conveyance is certainly a serious drawback to any theory of the transportation of lime-salts.

For evident reasons, the teeth, of all the tissues in the body, are least liable to undergo the changes dependent upon nutrition. If this were not so, a few months of low diet would leave the hungry person without suitable teeth to masticate the much-desired food when obtained. If it were necessary to rob Peter to pay Paul, and abstract from the osseous system of the mother enough lime-salts to supply the needs of the fœtus, why should the teeth be chosen? Why should not the bones, which are supplied with absorbent vessels, be selected for the sacrifice? But there are no evidences that these latter are affected in the way it is claimed the teeth are.

The endeavour has been made to show an analogy between osteo-malacia and dental caries. At the first glance the two diseases have points of similarity. Pregnancy exerts a marked influence over

both, the majority of cases of osteomalacia occurring during gestation. In both there is a loss of lime-salts. But microscopic examination of diseased structures in osteomalacia has shown that at some stages it is a true inflammation, which cannot be said of caries. Dr. George Dock, in a case of the former, reported before the American Association of Physicians (Transactions, 1894), says that the bacteriological origin of the disease must be given up, as it is without foundation His explanation of the cause is that it is a tropho-neurosis. In a private communication he states that the difference in the two diseases lies in the fact that dental caries is due to the action of micro-organisms, while some other explanation must be sought for the origin of osteomalacia. I fail, moreover, to find any mention of the teeth being affected in the latter disease. I think, however, that there is another condition present in both diseases which is etiologically very important. I shall mention this later on.

The theory which has been advanced to explain the supposed withdrawal of the lime-salts from the tooth is, that just enough phosphates are taken into the system during pregnancy to supply the needs of the fœtus, and that the natural waste of lime-salts of the tooth is not replaced, and hence the tooth suffers in the loss of its inorganic elements. This, to my mind, is a much more plausible theory than the first one considered, in that it does not deliberately make a freebooter of Dame Nature in charging her with robbing the tooth of its stored-up treasure. There is probably more or less waste and repair going on in the tooth all the time, and in the absence of known facts regarding the quantity of these products, it would be within the rage of possibility for the tooth to become impoverished were the supply of phosphates not sufficient. But here is the weak point in the theory. I find the following statement in the editorial article quoted above (Barrett, *Dental Practitioner*, vol. xxiv., April, 1893), the accuracy of which I cannot vouch for, as the references are not given : " The following computation has been made : If rice flour, which contains as little of the phosphates as any other common food, were the sole nutrition of a pregnant woman, and if she consumed barely enough to maintain a healthy existence, she might obtain from that alone double the amount that would be needed for herself and the growing child. It is well-known that women always excrete phosphates during gestation." That the mother's organism is sufficiently supplied with lime-salts during

pregnancy, it would seem as if there were normally the excess mentioned above, if we consider that osteophytes are found in the inner surfaces of the calvaria and even in the pelvic bones. They have been found to exist in over one-half the cases of women dying after the fifthmonth of pregnancy. (Jaggard, Am. Sys. Obst., vol. i, p. 350).

2. *Influences acting primarily upon the external surfaces of the teeth.*

I believe that it is much more rational to endeavour to explain the influences of pregnancy upon dental caries by directing our study to the changes in the secretions of the oral cavity which may arise during gestation. If we can show that these secretions become more acid during this period we will have made a considerable advance in our investigation of the subject under consideration. For acid secretions will evidently furnish the most assistance to the entrance of the micro-organisms into the interior of the teeth, by causing a decalcification of the enamel, or furnishing a soil suitable to the rapid development of the bacteria. I am unable to find that the oral secretions have been tested in relation to their acidity during the pregnant condition. Such a series of examinations should be made, and would prove of great value in solving the problem before us. But there is considerable probability that such a condition does exist. We must look to the changes in the blood for an explanation of the phenomena. These changes have been carefully studied, and are well known to you all, and need not be enumerated. There is every reason to believe, however, that besides the increase in white corpuscles, fibrin, and water, there is a decided diminution in the alkalinity of the blood. In an important article ("Lithiasis in Pregnancy," *Jour. Am. Med. Asso.*, 1887, vol. ix., No. 23), Dr. J. E. Kelly seeks to ascribe this condition of the blood to the influence of lithemia upon the material organism. The similarity between the symptoms produced by the lithemic condition and those accompanying pregnancy are certainly striking, and have been set forth by the writer in a masterly manner. Of so much importance do I consider this article, as offering an explanation to the increased acidity of the secretions of the mouth, that I will quote the last paragraph of the paper entire: "As in the *résumé* of lithiasis, I wish to recall the persistent effects upon the system caused by the occurrence of a single pregnancy which manifesting themselves by

various lesions not to be ascribed to any other influence, and indicating the permanent adoption by the constitution of a morbid action, which must be regarded as being closely related to lithiasis. In endeavouring to establish a parallel, if not an identity, between the constitutional tendency produced by lithiasis and pregnancy, I have indicated that both originate in a grave disturbance of nutrition; they present a similar modification of the blood; the pathological changes bear a close resemblance; the prominent functional disturbances are broadly identical, the numerous sequelæ are similar, and lastly, after one or more visitations, the constitution is prone to adopt the induced condition as a diathesis."

The disease gingivitis is well known to you all. Here it is a well-proven fact that the saliva is extremely acid. I understand also that this disease is more prevalent, and of greater severity, in persons of a rheumatic or gouty diathesis. These diseases are characterised by excess of uric acid in the system and a diminution of alkalinity of the blood.

It is here that I would call attention once more to osteomalacia. Senator, in speaking of this disease (Ziemssen's Cyclopædia, vol. xvi., p. 221), says, "It (diminished alkalinity of the blood) might result from the hyperæmic state of the marrow of the bones, which (as I have pointed out in speaking of rickets) may resemble the splenic tissue, to which it is closely allied, in being proved to generate an excess of certain organic acids when in a state of irritation (*e.g.*, in leukemia.)" It is agreed that pregnancy is an essential factor in the production of this disease, although the exact manner in which it acts has not been discovered. It is not too much to expect that further investigations will throw more light upon this very obscure subject, and possibly aid us in understanding why there is a diminished alkalinity of the blood and an increase of the acid secretions during gestation. I doubt very much whether this position is tenable. It is probable that the acid by itself is too weak to act upon the enamel, and could only therefore aid by rendering the saliva still more acid, and more favourable to the subsequent action of the micro-organisms. Nature has taken precautions to guard the teeth against the temporary action of acids. by causing an increased flow of alkaline saliva, which neutralises or washes away the acid which has entered the oral cavity. If it were not for this provision, the teeth would necessarily suffer more than

they now do. If it be true, as we suspect, that the saliva in pregnancy is abnormally acid, then much of its neutralizing action would be lost, and the acid contained in the vomitus might do more injury than would be possible under ordinary circumstances. Still, my opinion is that the effect is but slight.

Another explanation for the increased frequency of caries during the pregnant condition has been offered by assuming that during this period the tooth brush is called into play less frequently, and hence the teeth decay from neglect. I only mention this as a fair sample of a number of theories I have met with in reviewing the literature of the subject, and not because I consider it of great value as throwing light upon the etiology of the disease under consideration. Pregnancy occurs at an age when habits in regard to personal cleanliness have become established, and the woman either customarily cleanses her teeth or neglects it altogether, as the case may be. If pregnacy were to have any effect, it would act as an incentive to the use of the tooth brush, because of the bad taste in the mouth, which is well known to exist at such times. It will be unnecessary to take up the third proposition in regard to the cause of pregnancy, as it has already been discussed when considering the other two.

I have purposely avoided any mention of treatment, as it has not been my intention to take up that portion of the subject, and because it really is unnecessary. If the proposition I have advanced this evening be correct, and if the frequency with which dental caries is met with during pregnancy be due to some condition of the blood, which in turn causes some changes in the composition of the secretions of the mouth, whereby a better habitat is offered for the growth of the destructive micro-organisms, then it necessarily will follow that the treatment of such a condition will naturally fall upon the family physician. It certainly would be interesting to watch the effect of treatment directed along this line, and to ascertain if an anti-lithemic treatment would be productive of favourable results. It seems to me that such medication is indicated as much as that which is more commonly used, as for example the administration of some form of lime-salts. The local treatment of the condition we have been studying, it is unnecessary to say, will fall naturally to the family dentist, and will be treated with his customary skill, and will be productive of the usual happy results.

SUMMARY.

1. It is probably true that dental caries is more liable to occur during pregnancy.

2. Dental caries is a disease characterised by a molecular disintegration of the normal constituents of the teeth.

3. The disease is caused by the action of certain pathogenic micro-organisms which produce lactic acid, which in turn decalcifies the enamel and exposes the dentine to the attacks of the bacteria.

4. It is improbable that the lime-salts are abstracted from the teeth to supply the needs of the growing fœtus.

5. More than enough phosphates are ingested to supply the needs of both mother and child, hence the maternal teeth do not suffer from lack of nutrition.

6. During gestation, osteophytes are found, showing an excess of lime-salts in the system.

7. The true explanation must be looked for in some change in the oral secretions, which thereby furnish a more favourable soil for the development of the micro-organisms.

8. There is evidence to prove that the saliva is more acid during pregnancy.

9. This condition is probably due to changes in the blood, whereby its alkalinity is diminished.

10. The analogy between this and the lithemic condition is striking.

11. Vomiting of pregnancy, while it may to some extent aid, cannot be considered a potent factor in the production of caries.

12. Neglect of the teeth during pregnancy cannot be proved to be more prevalent than at other times, and therefore should not be considered among the causes of caries.—*Cosmos.*

AN ELECTRICAL CONTINUOUS GUM FURNACE.

Dr. L. E. Custer, of Dayton, O., has perhaps made as great advances as any other man in the utilisation of electricity for dental purposes. His latest invention is an electrical oven for baking porcelain work. This is not larger than a vulcanising flask, and like that is divided into two parts, through each of which a current that can be governed by means of a rheostat is conducted. The upper part of the miniature oven contains an aperture through

which the process can be viewed and the exact period of fusing determined, when the current is at once shut off and the piece allowed to cool without removal. A yet smaller muffle is used for crown and bridge work. Of course, there can be no "gasing," there is no furnace, nor are there any fires to be built. The baking is accomplished in the smallest possible amount of time, and there is no work to be done, save to turn a switch-key. The method promises to idealise the making of continuous gum work, and to supercede every other method of baking porcelain. Dr. Custer visited Buffalo and New York with his furnace in the month of February.—*Dental Practitioner.*

A CURIOSITY IN DENTAL CHEMISTRY.

In repairing a plate having plain teeth soldered to a gold base, and an artificial gum of pink rubber, the fixture was immersed in sulphuric acid (commercial) and allowed to boil; after this the plate was heated and the rubber detached. The repair tooth was soldered to the plate, and the fixture was placed in a one to ten solution of sulphuric acid in a copper cup and heated. For a few seconds it boiled quietly, when suddenly there was a violent ebullition of the solution, attended by the evolution of H_2S, and the solution became almost black. After washing the plate in water, there was found a slight amalgamation of part of its surface, and a colouring substance resembling carmine was found in some of the interstices. The only source of mercury possible was the vermilion used in colouring the pink rubber; but as the case was heated to at least 1600° F., it seems strange that this was not entirely decomposed and the mercury volatilised; but there it was, with some coloring-matter, in addition to the spots of amalgamation. The reaction liberating the H_2S was doubtless as follows: The sulphuric acid of the solution, acting upon the vermilion, decomposed it,—thus $H_2SO_4 + HgS = HgSO_4 + H_2S$,—giving sulphate of mercury and hydrogen sulphd. The precipitation of the mercury no doubt resulted from decomposition of the mecury salt by the metallic copper of the containing vessel. Its precipitation upon the gold plate was probably determined by galvanic action, the elements of the galvanic couple being the gold plate and the copper disc, and the electrolyte being the acid solution of mercuric sulphate.—H. B.—*Cosmos.*

THE RELATIVE EFFICIENCY OF DIFFERENT ABRASIVE WHEELS.

By Prof. S. J. Willey.

The above is the title of a very interesting article by Mr. Charles M. Jenks, which appeared in a late number of the *Scientific American Supplement*. He states that during the summer and early fall of 1893 he was an active participant in a careful series of experimental tests, instituted for the purpose of determining the relative efficiency from the many corundums obtained from different localities thoughout the world.

These tests, at first limited to corundum, finally led to a further series of comparative tests, which embraced most of the abrasive products in commercial use.

In looking about for the proper methods by which he should make his tests, he finally selected a firm on whom he could absolutely rely as to the character and quality of the work. After having determined on a plan of operation, he then proceeded to the Chicago Fair, for the purpose of gaining additional information on wheel tests and abrasive products. He remained there over a month, and had interviews with over three hundred workmen, representing as many concerns, and from all parts of the manufacturing world. He found as a result that there prevailed the densest ignorance regarding the relative values and efficiency of the different abrasive products in common use, even among those where it would seem self-interest should have prompted investigation.

He found that no value could be attached to any tests when made by one manufacturer of wheels against his competitors for the purpose of advertising, unless the conditions be such as to guarantee against improper partiality. He further says that to obtain the greatest efficiency and economy in wheels they should be made to order, that is, wheels should be made to suit the exact needs of the consumer.

He proceeds to give an exhaustive statement of the trials and tests made by him. They were made with all the various products, such as quartz against garnet, emery and corundum, carborundum against corundum, emery, garnet, &c. The numbers employed in corundum

emery, garnet, &c., were 8, 14, 16, 20, 24, 36, 60, and some others, and in carborundum the largest size obtainable, No. 60. This, of course, being pitted against a corresponding number in corundum, emery, &c.

His opinion concerning vitrified wheels is very important, and concerns the dentist quite as much as the manufacturer. He says it may be claimed that another process from the one he employed (the vitrified) changes the character of the abrasive to such an extent as to make it a more durable and efficient wheel. This he can safely assert it is not so where corundum is employed, as the heat obtained in the vitrifying process in no way affects the corundum, and the cements and fluxes used in either process are not selected with reference to their abrasive properties.

Vitrified wheels, especially selected for rapid cutting, though not made under the conditions herein given of both corundum and emery, were repeatedly tested against wheels of proximately the same degree of hardness made by the cement process, and he could see no reason to believe a vitrified wheel can be made of either corundum or emery or of any other product, which will do more efficient work than a cement wheel of the same products.

In summing up he says it was not his intention to provoke a controversy regarding the individual merits of abrasive wheels, or to advocate any particular wheel, but that he submitted the following table, as showing the number of abrasives in the relative order of their efficiency when made into wheels and subjected to practical use, and it will be found to be proximately correct:—1st, Diamonds; 2nd, North Carolina corundum; 3rd, North Carolina and Georgia corundum; 4th, Chester, Mass., corundum; 5th, Turkish emery; 6th, Bengal corunduin; 7th, Naxos emery; 8th, Peekskill emery; 9th, Garnet (best North Carolina); 10th, Carborundum; 11th, Preparations of crushed and chemically prepared steel grains; 12th Best flint, quartz crystals and ordinary garnet; 13th, Common quartz, flint, buhr stones, sand, &c.

As a result of his tests and information previously acquired, he was not at all convinced that a wheel made of pulverised diamonds would do the rapid and continuous cutting that a pure corundum wheel would do. Like carborundum it might prove in practical use of poor efficiency and economy.—*Items.*

UTILISING AMALGAM WASTE.

By W. H. Trueman.

The only really economical method of utilising amalgam waste practicable for the average dentist is to reduce it to dental alloy by remelting, and thus expelling the mercury. It can then be cast into an ingot and reduced to fillings. Professor George T. Barker suggested it to me many years ago, and from frequent favorable notices of the process in the dental journals from time to time, I presume it has proved to others, as it has to me, generally satisfactory.

If the waste is all of the same make or formula, my experience invariably has been that the product is a little better than the original. If a general mixture of all kinds, I would not advise its use in the mouth till it has been well tested out of the mouth, especially for hardness and shrinkage. If there is the least doubt of its being good it had better be thrown away.

The method is this. Place the waste in a crucible much too large, apply sufficient heat to merely fuse the mass. As the mercury is apt to be expelled somewhat explosively, cover the crucible with a slab of anything non-metallic that will resist a red heat, to prevent its contents being thrown out. When the heat reaches about 700°, the mercury begins to distil off, rising in white fumes. It is very important that these fumes be not breathed, the fire should be so arranged that they are carried off by the draft. After visible fumes cease to be given off, I hold the polished face of a cold hammer over the crucible for a moment, if any mercury is still escaping, its presence is indicated by coating the hammer with minute globules. When the mercury seems to have been completely expelled, add a little borax, increase the heat to a full bright red, and after a few moments pour into the ingot, holding back the dross with an iron rod.

To avoid disappointment, before attempting to refine amalgam waste, a litte simple arithmetic may be in order. We may assume, roughly, that dental alloy prepared for amalgamation averages less than half an ounce of pure silver to each ounce of alloy; we may also assume that each ounce of waste is about half mercury. Therefore, one ounce of waste contains about one-fourth ounce of pure silver. This will hold good with most of the alloys now on

the market. Gold, the only other metal of value it is likely to contain, would amount to so little in several ounces of waste that the isolation, while interesting as a chemical experiment, would cost far more than its worth. Now pure silver is worth at the present time from sixty-five to eighty-five cents an ounce. We may also consider that there is always an actual loss in all refining processes; that this loss is nearly as great in refining one ounce as in refining twenty. Before begining, we can thus proximate the value of the maximum amount of silver possible to recover. We can easily, by consulting any text book on chemistry or metallurgy, closely proximate the cost of acids, fuel, etc., required, and decide whether the probable gain will compensate for the time, the injury the acid fumes may cause to the tools in the workroom, the soiled hands, and possible injury to clothing. I have taken, so far, no account of the mercury. By placing the waste in an iron retort, with suitable connections, the mercury can be recovered. I have found it always contaminated, and not in a condition for immediate use for making dental amalgam. I so far have failed, after repeated efforts, to make it usable for that purpose at a less cost than a purchasable article. It complicates matters, and a narrow escape from accident convinced me that the attempt to save it might prove expensive economy.

In the old days—may they never return !—when we had to refine our gold and silver, and the laboratory was properly equipped for such work, and the workman in constant practice, we thought no more of it than running a plaster-cast. The method is simple enough, and may be found in many good works on metallurgy. It is interesting as a laboratory experiment, but as economy, with less than a pound or two of waste to work on, it does not pay. I have done it hundreds of times, and that has been my experience.—*Items.*

MISCELLANEOUS FORMULÆ.

Cement for Mother of Pearl.

Isinglass in thin sheets	4 drachms
Mastic	2 drachms
Ammonium chloride, powdered... ...	1 drachm
Alcohol	$3\frac{1}{2}$ ounces
Water	4 ounces

Steep the isinglass in the water for one day, and then dissolve by aid of a gentle heat, add 16 drachms of alcohol, pass through a cloth strainer, and to the hot solution add, with constant stirring, the mastic, previously dissolved in 12 drachms of alcohol.—*Dieterich. Bulletin of Pharmacy, Jan., 1895.*

Cement for Mortars.

Melt together equal parts of gutta percha and shellac in an iron vessel, on a sand bath.

Apply a thin coat of the mass upon the strongly heated fractured surface ; press forcibly together, and allow to cool.

Cement for China.

Skimmed milk	½ pint
Vinegar	½ pint
Mix, and separate the curd ; wash, and mix with Whites of	5 eggs
Litharge, in finest powder	1 drachm

Quicklime, sufficient to form a paste.—*British and Colonial Druggist.*

Cement for Meerschaum.

Casein	20 parts
Calcined Magnesia	1 part

Silicate of sodium, syrupy, a sufficient quantity.

Cement for Ivory.

Moisten a small quantity of very finely powdered quicklime with white of egg to form a paste. Use at once, clamp parts firmly together, and leave for twenty-four hours. Use as little cement as possible.

Cement for Bicycle Tyres.

Shellac	10 parts
Gutta-percha	10 parts
Red lead	1 part
Sulphur	1 part

Melt the shellac and gutta-percha, and add, with constant stirring, the red lead and sulphur, melted. Use while hot.

To Cement Celluloid to Paper or Leather.

Camphor	1 ounce av.
Shellac	6 ounces av.
Alcohol	30 fluid ounces

—*Pacific Druggist.*

THE PREPARATIONS OF PYROZONE.

By Dr. J. N. Carr.

Since the preparations of pyrozone are now being so generally used, I would like to suggest a few thoughts in regard to them. First, as to the care that should be exercised in opening a tube of either the 5 or 25 per cent. to avoid explosion: Place the tube on a block of ice for a few minutes and hold it in a wet napkin while grinding off the end. Second, to keep it from evaporating after transferring to a glass-stoppered bottle, first coat the stopper with vaseline and insert, then melt paraffin and pour over it. This is the only way I have found whereby I can preserve it after once opening a tube. Now, in regard to using them. Of course, the soft tissues must be protected by the rubber dam, and the face and eyes well protected when the spray is used from a pyrozone atomizer. In using these agents for bleaching, care should be taken that the greater part of the root should be hermetically sealed, or else atoms of oxygen will pass through the apicial foramen and cause considerable pain after the tooth has been filled. I always prefer to seal the root with the best quality of cement, and give sufficient time for it to harden, as where the rubber or gutta-percha stopping is used the ether will penetrate to some extent by softening and dissolving it; at any rate, trouble is very apt to occur if the cavity is immediately filled after using this kind of root-stopping. Your patient will sometimes return with the tooth quite sore and "quivering." Of course when used to evacuate pulp canal contents, it does not matter how far it may penetrate, as the loosely-held atoms of oxygen will exert their force at the point of least resistance, which, of course, is in the direction of the cavity, and after pus has ceased to discharge, by simply spraying canals with 3 per cent. pyrozone, then drying thoroughly with absorbent cotton and hot air, the tooth may be immediately filled, though I think it safer to use a 50 per cent. solution of sodium peroxide, if you wish to practise immediate root-filling, or Dr. Schrier's preparation of sodium and potassium, both of which have proven entirely successful in my hands for nearly two years past. The pyrozone used with the atomizer will cleanse the chamber and canals, as well as tubuli of dentine, more quickly than anything I know of. Of course, judgment and care should be exercised in the use of either

of the compounds mentioned, and no operation should be begun upon the teeth when they are used until the rubber dam has been first thoroughly adjusted. These few thoughts are offered in the hope that someone will be helped who has not had quite as long an experience with them as I have.—*Southern Dental Journal.*

TEACHING STUDENTS.

Theoretical and clinical teaching is year by year demanding more devotion and research on the part of teachers, not only in the direct art of conveying instructions, but in separating the wheat from the chaff and the avoidance of bewilderment of the student with questions that are in the throes of controversy. Anyone familiar with the pathological theories presented as "facts," even ten years ago, must realise the embarrassment to the honest teacher who has to keep up with the advance in thought and investigation. The very text books appointed for reference may in some important features convey theories of disease and treatment altogether erroneous, yet they are deliberately recommended while they may be as deliberately refuted. To clear away the mists that must inevitably surround them, to keep pace with the monthly changes that occur, involves an almost daily watchfulness that neither students nor those who are not engaged in teaching appreciate at their full value. This may be emphasized perhaps with respect to instruction in dentistry more than in any other profession, and is, no doubt, one of the chief reasons why capable and conscientious men are not as eager to rush in where flippant and ill-prepared men may fearlessly attempt to soar.

It is a very trite remark, that the critics of books are generally men who have never written one. It may also be said that the critics of lecturers are men who never dared face the music of lecturing. A teacher who has to convey instructions to students who are faithful readers discovers that they expect the cream, and that they know the skim-milk of instruction from the genuine article. It is a greater gratification to the well-prepared teacher to have just such students under him than to have dunces. But naturally the strain week after week of supplying the condensed pabulum demanded, and at the same time attending to his own professional and domestic demands, would seem to suggest that the day may come when lecturers may be entirely relieved from the

latter by such generous endowments as will enable them to give the most and the best of their time to research and to instruction. It is absolutely impossible that any teacher can do the best that is in him for students unless he is quite able to ignore the superior claims which press upon him in the daily battle with what the Germans call "the science of bread and butter." Happily, in medical teaching, this question has, in connection with some departments, been solved by public benefactions, and medical students get the benefit. Unhappily, in connection with all departments of dental instruction, the solution is still left for the distant future. Nevertheless, teachers to-day unselfishly sacrifice personal profit and frequently personal health in unrewarded, and, we fear, unappreciated service to the profession and the public. We trust that the cloud will some day show a silver lining.—Editorial, in *Dominion Dental Journal.*

LEGISLATION.

Assembly Bill No. 21, Province of British Columbia.

An Act to amend and consolidate the "Act to Regulate the Practise of Dentistry in the Province of British Columbia."

(Passed Third Reading, 11th February, 1895.)

WHEREAS the profession of dentistry is extensively practised in Europe, the United States and the Dominion of Canada; and whereas the said profession of dentistry is protected by law in Europe, the greater portion of the United States, and in parts of Canada; and whereas it is expedient for the further protection of the public that there should by enactment be established a certain standard of qualification required of each practitioner of the said profession or calling, and that certain privileges and protection should be afforded to such practitioners:

Therefore, Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of British Columbia, enacts as follows:

1. This Act may be cited as the "Dentistry Consolidation Act, 1895."

2. It shall be unlawful for any person to practise, or attempt to practise, the profession of dentistry or dental surgery in the

Province of British Columbia who is not a member ofany College of Dentistry of any of the Provinces of the Dominion of Canada having authority to grant certificates of license to practise dentistry; or who is not a member of any College or School of Dentistry having like powers ; and who does not produce sufficient evidence of such membership, and testimonials of good character ; and who does not pass a satisfactory examination before the Board of Examiners duly authorised by this Act, and pay the required fees : Provided that nothing in this Act shall be so construed as to prevent physicians and surgeons and others from extracting teeth, but no person extracting teeth under the powers conferred by this section, excepting properly qualified dentists, physicians or surgeons, shall collect payment for such extracting of teeth.

3. A Board of Examiners, consisting of five practising dentists, residents of this Province, is hereby created, who shall issue certificates to persons in the practise of dentistry or dental surgery in this Province, and whose duty it shall be to carry out the purposes and enforce the provisions of this Act.

4. The members of the said Board of Examiners shall be appointed by the Lieut.-Governor in Council, who shall select them from ten candidates, members of the British Columbia Dental Association, the said ten candidates' names to be submitted by the said British Columbia Dental Association. The term for which the members of said Board shall hold their offices shall be five years, except that the members of the Board first to be appointed under this Act shall hold their offices for the terms of one, two, three, four and five years respectively, and until their successors have been duly appointed. In case of any vacancy occurring in such Board, such vacancy shall be filled by the Lieut.-Governor in Council from twice the number of names of members of the British Columbia Dental Association submitted to him.

5. The said Board of Examiners shall keep a record in which shall be registered the names and residences or places of business of all persons authorised under this Act to practise dentistry in this Province. The said Board shall elect from its members a President, Secretary and Treasurer, and shall meet at least once a year, or quarterly if required. A majority of the members of the said Board shall constitute a quorum.

6. Every person desirous of being examined by the said Board

touching his qualifications for the practise of the said profession of dentistry, shall, at least one month before the sitting of the said Board, pay into the hands of the Secretary the required fees, together with satisfactory evidence of the qualification and requirements of Section 2 of this Act.

7. To provide for the proper enforcement of this Act the said Board of Examiners shall be entitled to the following fees, to wit: For each certificate issued to persons engaged in the practise of dentistry in this Province at the time of the passage of this Act, the sum of ten dollars; for each certificate issued to persons not engaged in the practice of dentistry at the time of the passage of this Act, the sum of thirty dollars.

8. There shall be allowed and paid to each of the members of the said Board of Examiners such fees for attendance not exceeding ten dollars per day, and such reasonable travelling expenses as the said Board shall allow from time to time; said expenses shall be paid out of the fees and penalties received by the said Board under the provisions of this Act.

9. All moneys shall be held by the Treasurer of said Board as a special fund for meeting the expenses of said Board, he giving such bonds as security as the Board may from time to time direct.

10. The said Board at its first meeting, and from time to time thereafter, shall make such rules, regulations and bye-laws not inconsistent with the provisions of this Act as may be necessary for the proper and better guidance of the said Board, which rules, regulations and bye-laws shall first be published for one month in the *British Columbia Gazette*, and in one or more newspapers circulating in the Province. Any or all of which rules, regulations or bye-laws shall be liable to be cancelled and annulled by an order of the Lieut.-Governor in Council.

11. The Secretary of the said Board shall, on or before the fifteenth day of January in each and every year, enclose to the Provincial Secretary an annual report of its proceedings, together with an account of all moneys received and disbursed by said Board of Examiners; also a list of the names of all persons to whom certificates have been granted, and the qualifications therefor, and such list shall be published in the *Gazette*.

12. In case a charge is made against any licentiate of unprofessional conduct, or other misconduct provided for by the bye-laws to

be passed under the provisions of this Act, the Board of Examiners shall have power to hear and determine the same, and for this purpose to summon witnesses before them and administer an oath or affirmation to such witnesses, and if any licentiate shall be found guilty of the charge preferred against him he shall forfeit his certificate and title, and the same shall be cancelled, subject to appeal to a Judge of the Supreme Court if brought within ten days; such forfeiture, however, may be annulled and the said license and all rights and privileges thereunder fully renewed and restored by said Board in such manner and upon such conditions and terms as the said Board shall think fit; Provided, however, that nothing in this Act contained shall empower the said Board to deal with any criminal or other offence provided for by law.

13. If any person after the period of three months after the passage of this Act, not holding a valid certificate, practises the said profession or calling of dentistry, or dental surgery, or wilfully and falsely pretends to hold a certificate under this Act; or takes or uses any name addition or description implying that he is duly authorised to practise the profession or calling of dentistry, or dental surgery, he shall, upon a summary conviction thereof before any Justice of the Peace, for any and every such offence, pay a penalty not exceeding one hundred dollars or less than twenty-five dollars, to be recovered on summary conviction, and the half of any such penalty shall be paid to the Board of Examiners; and it is further provided that no person who is not qualified under the provisions of this Act shall recover in any court of law for any work done or materials used by him in the ordinary work of a dentist.

14. The said Board shall also have the power and authority to fix and determine from time to time a curriculum of studies to be pursued by students, and to fix and determine the period for which every student shall be articled and employed under some duly licensed practitioner, said term not to exceed three years, and the examination necessary to be passed before the Board, and the fees to be paid into the hands of the Secretary of said Board, before receiving a certificate of license to practise the profession of dentistry.

15. All notices required by this Act to be published in the *Gazette*, and all expenses to be incurred under this Act shall be at the cost of the Board, to be paid out of the funds mentioned in Section 9; in case of deficiency, to be levied by assessment against the members of the profession.

16. The "Act to regulate the Practise of Dentistry," Chap. 34, Consolidated Statutes, 1888, is hereby repealed.—*Dominion Dental Journal.*

THE DENTAL RECORD.

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Original Communications.

LUXATION, OR THE IMMEDIATE METHOD IN THE TREATMENT OF IRREGULAR TEETH.

By GEORGE CUNNINGHAM, M.A. (Cantab.), D.M.D. (Harv.), L.D.S., Eng.

WHEN an erupting permanent upper incisor has become twisted on its long axis so that its mesial and distal surfaces assume a labiopalatal direction, and its cutting edge is more or less at right angles to the opposing tooth of the lower jaw, it has been the practice of several English practitioners to treat such cases by what is termed "torsion." This operation consists in grasping the tooth near its neck with a suitable pair of forceps, the beaks of which have been guarded with sheet lead or some other substance to prevent injury to the enamel, and then steadily, but forcibly, rotating the tooth within the socket into its normal position.

Though a certain number of teeth so treated have been subsequently lost by putrefaction of the pulp and abscess formation, or by necrosis and absorption (Coleman's Manual of Dental Surgery, 1881, p. 50), there is ample evidence that the operation has been completely successful in a sufficient number of cases to warrant the operator continuing the practice under such circumstances as the patient being unwilling or unable to undergo the slower but more certain method of rotation by mechanical appliances.

It is evident that an important factor in the treatment of such a case must be the particular stage of root formation. The rotation of such a tooth for a young patient where the root is incomplete, and therefore attached to the surrounding tissues by the larger or smaller solid cord of tissue filling up the funnel-shaped root, must

differ very materially as to conditions, from the rotation of a similar one with the fully completed root, where the central soft tissue connection must be filamentous rather than cord-like. I am not aware of any reliable statistics which indicate that the operation is more practicable in one case than the other, nor what are the reasonable prospects and percentage of successful cases. In my own practice I have, therefore, always adopted slow rotation by mechanical means in such cases.

The fact that immediate rotation has been successful, coupled with the knowledge of the extraordinary repair which takes place in cases of fracture of the jaw even accompanied with complete dislocation of the teeth, induced me to resort to luxation in the treatment of irregularities where the ordinary treatment was not applicable. In the course of my papers and discussions on implantation, I have suggested that this artificial production of a

FIG. I.

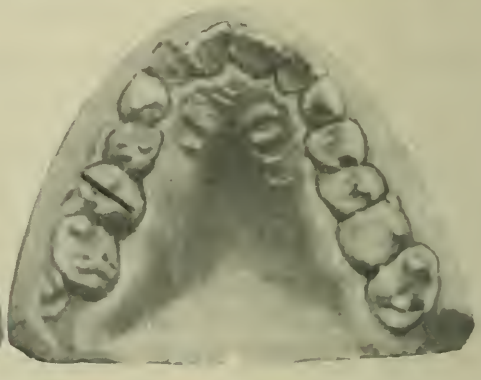

FIG. II.

fracture of the alveolus is appropriate in certain cases, and possesses the advantage of enabling one to move a tooth into a new position without separating it from its attachments to periosteum and the socket.

On July 29, 1886, a healthy undergraduate presented himself for treatment of a right upper first molar, extensively decayed and affected with acute pulpitis, while inflammation was also becoming acute in the periosteum. The position of the molar was quite close to the first bicuspid, while the second bicuspid was not only rotated on its long axis, but occupied a position completely outside the arch on its palatal aspect. (Fig. I.) It was determined to extract the first molar, an operation which proved of considerable difficulty, owing to the curvature of the roots and the thickness of the alveolus.

The second bicuspid occupied such a position that it interfered with the patient's speech, and was absolutely functionless. The patient was, therefore, induced to regard it for all practical purposes as being already lost, and kindly consented to lend it, as it were, to me for experimental purposes. With a pair of ordinary forceps, of which the beaks were suitably guarded, the bicuspid was first forcibly rotated on its axis, but only with extreme difficulty ; and then, on considerable application of force in an outward direction, the alveolus yielded, and the tooth was then drawn into the position recently occupied by the first molar. (Fig. II.)

The occlusion of the tooth with the lower jaw seemed sufficient to retain it in position without the application of either ligatures or splints. An effort was made to keep the wound in as nearly an aseptic condition as possible by freely syringing with mercuric chloride (1 in 1000). Injection of cocaine failed to materially reduce the pain of the operation. On the following day, th^{e} bicuspid was found to be extremely loose, and had already altered its position. The crown was disked in order to obviate the change in position. On the second day after the operation, the tooth was much firmer and in a good position. There was very little pain, no swelling, and only slight inflammation. The antiseptic treatment was continued. Four days later the edges of the gum were freely incised in order to promote contraction round the neck of the tooth. On the 18th day of May, in the following year, the patient again presented himself for examination and it was found that the tooth was still loose. Rather more than a year later (June 21, 1888), it was evident that the pulp was no longer alive ; and as the tooth was carious, excavation was continued into the pulp chamber and the contents removed. The pulp canals were treated by the immediate method and the carious cavity filled with amalgam. On October 28th, in the same year, the tooth was found to be much firmer, but the cementum was considerably exposed at the neck of the tooth and showed signs of slight superficial caries, though not of such a nature as to warrant operative interference. The patient soon after left Cambridge, and I have had no further opportunity of watching the case ; but, as the patient informed me in 1892, more than six years after the operation, that all was well, and has faithfully promised to send me my tooth when its sojourn in his mouth is ended, I have every reason to believe that it is still in position.

Another case of a different character is also, I think, instructive. On the 3rd of November, 1888, I was consulted by an undergraduate, aged 22, as to the advisability of extracting two upper cuspids occupying a very irregular position within the palate and filling the space by the insertion of an artificial denture. (Fig. III.) After carefully considering the models taken of the case, I advised

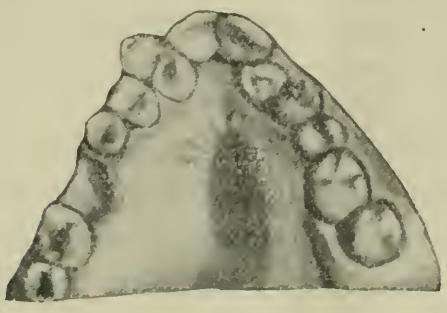

FIG. III.

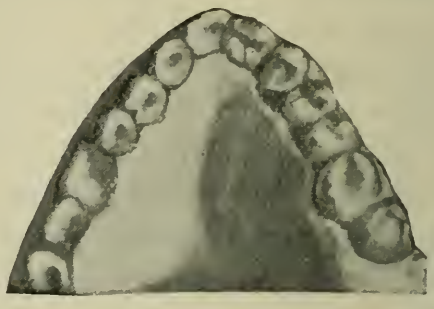

FIG. IV.

luxation of the teeth rather than extraction. Before proceeding to operate, however, the teeth were carefully scaled and the inflamed gums brought into a reasonable condition of health. On the 14th of November, the right upper cuspid was luxated into position after the removal of the temporary cuspid which still persisted and completely hid the former from view ; the tooth was fixed in its new position by means of thin platinum wire and silk ligatures. On the following day the patient reported that there had not been much after-pain, except from the ligatures on the neighbouring teeth. The tooth was already discoloured and of a yellowish brown hade. This discolouration was probably due to staining of the dentine from the rupture of the blood vessels of the pulp. On the 3rd of December, the left upper cuspid was luxated forcibly into position from the palate and retained in position by means of platinum wire and silk ligatures. (Fig. IV.) On the following day the patient reported that he had had considerable pain in the evening after the operation, but that he was now quite comfortable. The ligatures were removed nine days later.

On the 12th of December an effort was made to correct the irregularity in the crowded underhung lower jaw. The left lower lateral incisor was extracted, and an effort made to luxate the left lower cuspid towards the centre of the mouth, but in doing so the diagonally placed long tapering twisted rooted cuspid leaped between

the beaks of the forceps. It was then determined to replant the tooth in a new position encroaching considerably on the socket of the lateral incisor. At a critical moment in drilling this new alveolus the patient swerved in such a way that the alveolus and gum were perforated at about the level of the frænum of the tongue. It was with considerable difficulty that a new alveolus was formed and the cuspid replanted and ligated with silk. The tooth was merely washed clean without the addition of any antiseptic and without removing the pulp; a mode of treatment I should not now adopt.

In the second case cocaine was not injected, from my experience of its general unreliability and its failure to anæsthetize parts so deeply seated as those concerned in this operation.

On the 13th of December the right upper cuspid, to which I have already alluded as being discolored, was found on examination to be non-sensitive to the application of heat. After trephining the pulp it bled freely, but was quite insensitive to the nerve instruments, except towards the apex. The discolored dentine was removed as thoroughly as possible, and the anterior wall lined with extremely white colored zinc oxychloride filling, which greatly improved its appearance. The pulp canal was treated and the tooth filled in the usual manner. The left upper cuspid also failed to respond to the heat test, but not the slightest discoloration was then observable, that is, ten days after the operation, whereas discoloration of the right cuspid was observable on the second day.

About August, 1891, nearly three years after, the conditions of this case was noted as follows: Right upper cuspid discolored but still firm, left upper cuspid all right in color and firm, lower left cuspid implantation with live pulp a failure, like nearly, if not all, of my attempts to implant teeth with live pulps.

From my own experience in these and other cases, which I have not hitherto published from the fact that a considerable lapse of time is necessary before one can adequately judge of the justifiability of such operations, I have perused with keen interest Dr. Bryan's experiments of a similar nature.*

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* The present communication is an extension of one forwarded to the American Dental Society of Europe in 1891, simultaneously with one from Dr. Bryan. Neither paper was read. Dr. Bryan altered his communication, which was read in 1892; mine, by advice of the committee, was not presented and therefore never published.

With regard to Dr. Bryan's method, I must confess that I feel dubious about the advisability of lifting the alveolar wall, and I should still prefer to push it out in front of the root without rupturing its normal attachments, even if I found it necessary to facilitate that movement by incising the border of the alveolus on each side of the socket.

Nor can I say that I am prepared to accept his views as to the extent to which the nerves and vessels may be safely stretched.

With regard to Dr. Gysi's compilation of well-known physiological facts, I beg to offer the following remarks: Firstly, it is not at all proved by Dr. Bryan's clinical experiments that the pulp connections may be stretched six millimeters or more, although nerves are not very extensible, but lie somewhat slack. There is nothing analogous in the stretching of the delicate filamentous nerve attachments of a tooth with the well-known surgical operation of stretching a large and important nerve trunk like the inferior dental nerve. In a large nerve trunk the stretching is probably more of the connective tissue than of the actual nerve fibres. The extension of the actual nerve fibres, or what is essential in this connection, the axis cylinder, to any appreciable extent, is scarcely conceivable.

Without disputing in any way his assertion as to the recuperative powers of nerves, arteries and veins, it does not necessarily follow that they fully explain the results of experience. That a tooth may thus be forcibly moved or removed and replaced, and yet retain its natural appearance, is borne out by the recorded experience of several observers. In such cases it is usually assumed that the pulp life has been fully restored, but that has not been completely proved. Dr. Bryan, in his paper, really produces no evidence that the sensibility of the tooth has not been destroyed.

With regard to the advisability or probability of the reunion of the pulp with the tissues outside the tooth, I would call your attention to the following quotation from an excellent paper on the Replantation and Transplantation of Teeth, by Professor Stack of Dublin. (Transactions of the Academy of Medicine in Ireland, 1883.)

"It has been repeatedly stated, up till a recent period, that no one has proved to demonstration that a union of the pulp vessels and nerves with their parent trunks could take place through the small apical foramen. At the London meeting of the International Medical

Congress, Dr. Joseph Iszlai, of Buda Pesth, stated that there were only two museum specimens known bearing on the subject. These, I believe, were made on the lower animals. Some years ago, however, Dr. Isidor Lyons, in London, found the dentine of a replanted tooth very sensitive, which must, I think, prove that in that case the nerves of the pulp united with their trunks. However, the honour of actually demonstrating this union by observations on replanted and transplanted teeth removed from the human mouth, belongs, I think, to Mr. Arthur Baker, Mr. Abrahams and myself. In a case of great irregularity where two bicuspids had to be removed—that on one side of the mouth growing horizontally in towards the tongue, and that on the opposite side protruding towards the cheek—I was permitted to transpose the teeth, under nitrous oxide. The teeth fitted into their sockets nicely, but after a fortnight the tooth that had been transplanted into the right socket was attacked with alveolar abscess. It had apparently got all right after the operation, but I suppose putrefaction of the pulp had then set in, resulting in the necessity of removing the tooth. The other tooth united firmly, however, and kept a good color. After two months I determined to remove it, but before I did so, I drilled in cautiously through the crown. After each few revolutions I asked if I gave pain, but found I gave none ; nor did I give any when the drill entered the surface of the pulp, but at once there was bleeding from the wounded organ. The tooth was then removed and handed to Mr. Abrahams for microscopic examination. In other cases that have come under Mr. Baker's and my notice, where a tooth which had ultimately to be removed for irregularity was replanted for a short time, the microscopic examination has shown evidence of life in the pulp. In all, six teeth have been examined in this way, in four of which were found signs of life, while in two, viz. : one that has already been mentioned, and another, were found bacteria or other evidences of putrefaction."

Stack's cases and the condition of the right upper cuspid described in my second patient seem to indicate that vascular may be re-established but not necessarily the nerve connection.

Fredel's and Scheff's microscopic investigations in this direction seem to prove that this re-establishment of vascular connection is something more than a mere reunion of ruptured vessels, namely : that the pulp atrophies and is replaced by an entirely new ingrowth of vascular pulp tissue into the pulp cavity. At any rate there is

sufficient evidence to show that the reunion of the tissues of the pulp is not quite so simple a matter as it would at first sight appear.

After section of any ordinary nerve trunk, complete degeneration of the peripheral end of the nerve ensues while centrally the generation ascends to the next node of Ranvier. If no great distance exists between the cut ends regeneration takes place, not by reunion, but by new fibres growing down the old nerve sheath. Scheff states that he has seen from three to five nerve fibres running into the newly found restitution.

I am not quite able to understand what Dr. Gysi means by his statement that the circulation may be restored by innervation, and certainly I would demur to his statement that the facts he has quoted demonstrate theoretically that the pulp connections may be safely stretched one-fourth of an inch or more when it is found necessary to elongate the tooth in its socket. Nor am I convinced that Dr. Bryan has proved it clinically, although I accept in every way his assertion as to the success of the operation which he describes.

At a recent dental meeting in London, Mr. Gill described the case of a servant who fell down the stairs and fractured the outer plate of the alveolus of the upper jaw so that the teeth were forced out of position and in various degrees of looseness. In forcing the teeth back into their position, some of them were absolutely removed, yet all the teeth, even those which had been removed, presented all the appearance of normal teeth several years after the accident.

Whatever the rationale of the process of repair may be, I should like to support, in the strongest terms possible, my approval of Dr. Bryan's contention as to the advisability of the treatment of certain forms of irregularities under exceptional conditions by surgical means. From the danger and the uncertainty of complications which may possibly arise from injury to the pulp, it is evident that it should not replace the safer treatment by mechanical means. There are, however, cases where mechanical means are out of the question, and thus this new method of treatment may be regarded as filling a niche not previously occupied by any other operative means at our disposal.

(*To be continued.*)

LOCAL ANÆSTHETICS.*

By Mr. T. E. King.

Gentlemen,—I have no intention of entering into the question whether the employment of general anæsthetics is open to objection, or of giving you a detailed history of their use in the past. I think it sufficient to remind you that in the Bible account of the creation of woman, as given in the Book of Genesis, the Almighty put Adam to sleep, and it was while in a state of unconsciousness that he took out one of his ribs. This shows at once that we have good authority for inducing a state of unconsciousness when an operation has to be performed, and at the same time shows that we are dealing with a custom of long standing.

From that time to this many attempts have been made, and many agents employed, to produce a state of unconsciousness with more or less success.

There is still no general anæsthetic which is perfect, and the employment of even the safest is attended with a certain amount of risk and inconvenience, and may give rise to incidents which terminate in an unauspicious manner, or cause more or less trouble to the system for some time after their employment.

The question whether dentists should administer general anæsthetics is an important one, and one upon which there appears to be some difference of opinion. I am not aware whether or not I am in order in introducing dental politics at a meeting of this Society, but if it is contrary to the custom and outside the sphere of privilege to discuss other than strictly scientific subjects you must please excuse me. I venture to allude to this subject in passing, as it is one which has been brought to the front lately and is of such great importance that I think it should receive come consideration at the present time. A new Medical Act has been recently introduced into France which embraces dentistry. It requires, among other things, that dentists should pass an examination in anæsthesia, and it empowers dentists to administer general anæsthetics, and prohibits any unqualified person from so doing. Perhaps you are aware that at the present time there is an attempt being made to amend the Medical Acts of this country. I think it behoves us to see that, in case of alteration dentists are not deprived of duties which have by custom always been recognised as within their province.

*A Paper read at the North of England Odontological Society, March, 1895.

Although feeling strongly the importance of general anæsthesia, and the necessity of dentists receiving a thorough training in its use, a great many of the operations we are called upon to perform are of a more or less minor nature and it is advantageous to be able to dispense with general anæsthetics as much as possible. My intention this evening is to bring before your notice those local anæsthetics which are the most employed, so that we may have an opportunity of discussing the subject, and ascertaining the opinion of our members, and what is the experience of those who are present to-night with regard to the use of local anæsthetics in general.

The injection of agents into the surrounding tissues, and the application of cold to the surface are the processes which have been employed in the past.

Cocaine was used extensively a few years ago, and is still considered by some to be the best local anæsthetic, but its employment presents certain inconveniences, and it is not used now nearly so much as formerly. Applied externally, its effect is so superficial as to make it quite useless for preventing the pain caused by the extraction of a tooth, and when injected is liable to produce effects more far reaching than is desirable. As you have already had a paper and discussion on this anæsthetic I need not detain you by saying anything further about it.

That the production of intense cold deprives the parts of all feeling has been known for a long time, and as there has lately been a revival of this mode of producing local anæsthesia, I will draw your attention to the various modes employed to produce the desired effect.

My earliest experience of the freezing process was with Dr. Richardson's apparatus for throwing a spray of ether on the parts to be acted upon. It was difficult to prevent the spray from spreading to the surrounding parts, and it was very unpleasant for the patient, as it caused irritation to the throat. It could only be applied to the front part of the mouth, and could therefore only be used for the extraction of the incisors, canines, and bicuspid teeth. It took from four to five minutes to produce freezing.

More recently chloride of methyl and the chloride of ethyl have been employed to produce freezing, and have answered the purpose much better than ether.

The chloride of methyl, requiring a strong and heavy receptacle to hold it, cannot be conveniently employed for dental purposes.

The apparatus is clumsy and difficult to manipulate. It also produces too intense cold, and is in danger of producing sloughing or mortification.

Chloride of ethyl can be kept in quite small phials, and is therefore much more handy to use. The warmth of the hand is enough to volatilize it, and a fine jet can be thrown upon the exact spot required. All that is necessary is to have the parts well dried, and to keep the saliva well out of the way during the application of the anæsthetic. It is well to protect the surrounding parts with a napkin. The jet is first directed against the napkin, and you ascertain the direction of the jet, and can then guide it to the required spot without risk of sending it into the eye of the patient or down his throat. It is well, as far as possible, to apply pressure to the surrounding parts, so as to impede the circulation of the blood, and so keep back the incessant source of heat, which interferes with the congelation of the parts.

The process of congelation being comparatively slow, there is no fear of causing mortification of the parts acted upon, and little or no pain is experienced when the parts regain their normal state. As it is sometimes difficult to keep the jet steady, it is well to have the hand or arm resting on something to steady it.

The jet should be applied to both sides of the root of the tooth to be operated upon, and as near the apex of the root as possible, and long enough to produce a white zone on the gum surrounding the roots to be removed. A glass of cold water should be at hand, to put the tube into as soon as the process of congelation is complete, as there is a great danger of breaking it and causing an unpleasant explosion.

The latest agent used to produce congelation consists of a mixture of the chloride of methyl and the chloride of ethyl, and while producing more intense action than the chloride of ethyl, it is not so rapid in its action as the chloride of methyl alone. It is called coryl, and requires a special apparatus to hold it and to apply it in the form of spray to the required place.

I believe that coryl was first produced in France, although it was at a Medical Congress, held at Brussels, that it was first brought publicly into notice. It was well received at the congress, and the manufacturers delayed presenting it to the profession in France until they had on hand a sufficiently large stock to supply the demand. It

is just about two years ago that a paper was read on it before the Odontological Society of Paris. I have a copy of the paper here, if any of you would like to read it I shall be glad to let you have it.

Coryl is a colourless liquid with a slight smell and taste of ether, and highly inflammable. The apparatus for applying the coryl you have doubtless most of you seen. I will, however, hand round one of small size for your inspection. It is called a Coryleur, or Coryliser. To use it you grasp it in the hand and hold it downwards, turning the key with the left hand until the spray is adjusted to the required degree of fineness. It is then directed to the desired spot, and turned off as soon as anæsthesia is complete. Before beginning to apply the spray it is well to tell the patient to breathe as much as possible through the nose, and to rinse out the mouth with cold water to prevent a too sudden change of temperature. The gums should then be well dried and the jet applied to the part as soon as possible. Freezing takes place almost immediately, and in from fifteen to twenty seconds the parts become covered with white frost. Anæsthesia is then complete, and the operation may be begun. It is not wise to continue the application too long at a time, but by letting the patient rinse out the mouth it may be repeated two or three times. The effect is far more rapid each time, and produces a deeper anæsthesia. These successive applications may be renewed without danger.

The freezing process may be used for a variety of operations as well as for extractions. It has been successfully used in cases of sensitive dentine, and for the extraction of pulps. I have found it most useful for the removal of polypus of the pulp or gum, and for the removal of small epulis. The tumour can be frozen hard and removed without pain, and there is no blood to interfere with the operation. I hope those members here to-night who have opportunities for observation will let us know the uses they find coryl most suitable for.

Coryl is most useful for opening abscesses. It is itself an antiseptic, and can do no harm by mixing with the saliva or blood. It is also useful in cases of bleeding after extraction. It will arrest the bleeding for a time while a plug can be carefully adjusted. I have found it useful for cooling composition when taking an impression of the mouth.

It has been stated that the freezing makes the teeth brittle and more liable to break during the process of extraction, but I believe there is no evidence to substantiate that assertion. I believe the contraction caused by the cold causes the tooth to be much more easily removed from its socket. Coryl may be used in conjunction with cocaine. The parts being first frozen by means of one of the freezing agents and the cocaine injected while the parts are insensible to the pain of the puncture.

There is another mixture somewhat similar to coryl, called Anestyle. Its application is the same as the chloride of ethyl, but it is not so convenient for dental purposes as coryl.

I have not entered into the subject of electricity, as I believe it to be generally recognised that it has no anæsthetic action. It merely acts as a sort of counter irritant, and although it may draw the patient's attention from the seat of pain, it can only do so effectually by causing a greater discomfort elsewhere.

Although I have found local anæsthetics of great value, and I should not like to be without them, there is room for their further development. It was in the hope that I might inspire you with a desire to work out this subject that I chose it for my paper this evening. If in the course of time we can so improve our means of producing local anæsthesia that we are able to dispense with general anæsthesia altogether for dental operations, it will go a long way towards solving the question whether dentists should administer general anæsthetics, or if it may be left entirely in the hands of the general practitioner. Until this time arrives I think we ought to take care that we become qualified, and to see that we do not shirk a branch of our work which is of so much importance, and which owes so much to the action of dentists in the past and up to the present time.

"INVENTION" says that "Viscose" is a new industrial substance which is being manufactured by a syndicate at Erith. It is a species of fireproof celluloid, which can, it is claimed, be manufactured with almost any degree of resistance, varying from that of ivory, ebony or horn to almost that of indiarubber. The process of manufacture is said to be comparatively inexpensive with that employed for the ordinary celluloid, whilst the raw stock, consisting mainly of waste products, conduces still further to economy of production.

HUNT'S DENTAL ENGINE MANDRIL.

By W. A. Hunt, L.R.C.P. Lond., &c., Yeovil.

Mandrils for carrying large corundum wheels have to me always seemed inadequate. For years I have myself made some which met this want, and the Dental Manufacturing Company, Limited, have kindly constructed some to my pattern — which is here illustrated—where A represents a collar of gun metal twice as large as those to be found at the depôts. These collars are turned concave next the corundum wheel, with the edge absolutely true. The axle at B is square, and a little larger than the hole in the corundum wheel. The concave collar may be filled with "sticky wax," then the mandril heated over the spirit lamp, and the corundum wheel forced on until it takes up an absolutely true bearing on the edge of the collar.

This corundum wheel will at once run in the engine faultlessly and truly, I need not say with what comfort to both operator and patient.

I have never had to refix such a wheel, it will wear down to the uttermost without giving any trouble of that kind.

Similar remarks apply to the carborundum wheels; but as these are of baked porcelain, of course a heated square mandril could not be pushed into the slightly smaller round hole of the carborundum wheel. All that is needed is to file off the angles of the square part at B until the mandril will go into the centre hole of the carborundum wheel, and then fix as suggested with "sticky wax." I may here pay a tribute to carborundum. I hardly use anything else; and with a large wheel running faultlessly, truly, and with plenty of water, work can be quickly carried on without discomfort to the patient.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Usual Monthly Meeting was held on the 6th ult., the President, Mr. Frederick Canton in the Chair.

The minutes of the previous meeting having been read and confirmed, Messrs. Curnock and Sydney Spokes were appointed to

audit the accounts of the year. The following gentlemen were balloted for and duly elected members of the Society:—Messrs. Leslie M. Stocken, L.R.C.P., M.R.C.S., L.D.S. Eng., Ealing, and F. R. Flintan, L.D.S. Eng., Weybridge. Messrs. J. N. Nicol and R. Herschel signed the obligation form, and were admitted members. Mr. A. W. W. Hoffman was proposed for membership.

The PRESIDENT announced with regret that since their last meeting the death of a former president, Mr. James Parkinson, had taken place. They had lost another of their members, Mr. M. J. Bloom, of Dublin. Letters of condolence had been sent by the Council to the families of each of these gentlemen. The death of another gentleman should also be mentioned, though he was not a member of their society, Mr. Ludwig A. Weil, of Munich.

The LIBRARIAN (Mr. W. A. Maggs) reported the receipt of the usual exchanges, and took the opportunity of stating that the new list of members in course of preparation would be issued after the next monthly meeting, and he would be glad to receive any notification of change of address or additional qualifications.

The CURATOR (Mr. Storer Bennett) stated that Mr. Turton, a Student of the Dental Hospital of London, had presented models of an extreme example of what was known as a saddle shaped arch, the first molars and bicuspids of both sides being very much driven in towards the middle line. One central only was present, the other have been extracted some months, or possibly years, previously. He had not seen the case, but the model seemed an extremely interesting one, showing to how great an extent the deformity might develop. It was commonly stated in the text books, and was no doubt a fact, that irregularity of the temporary teeth was rare, but the kind of irregularity that was usually met with was crowding of the central incisors, and curiously, it was very commonly the case that when this crowding was met with the median edges of the lower centrals turned towards each other, forming a sort of V. Mr. J. W. Dalton, another student, had recently given him models of the upper and lower jaw of a girl aged four showing this deformity, and also, which was still more interesting, models of the brother, aged two, showing the same deformity. It was difficult to understand how crowding of the temporary incisors could take place before the temporary molars had erupted. There was also a crowding of the lateral incisor behind the left central. The models being those of brother and sister made

an extremely interesting series. It would be remembered that some months ago Mr. Bowman Macleod, being unable to present a very extraordinary skull which he exhibited, kindly left the specimen in his (the Curator's) hands, in order that a cast might be taken. It was not a very easy specimen to take a cast of, but he had obtained one which he thought would be admitted to be a very beautiful specimen of what might be done by the gelatine process, introduced some years ago by Mr. Walter Whitehouse. By no other means could so excellent a cast have been obtained. The skull had the most remarkable number of abnormalities which he (the Curator) had ever met with. It was an adult skull, with the right upper canine and also the first permanent molar (lying horizontally with its crown outwards, and having between two of its roots two enamel nodules) were unerupted. On the left side the bicuspids and canines were transposed, and both bicuspids were so twisted that the buccal sides were turned inwards.

The PRESIDENT asked Mr. Bennett if anything was known about the missing central in the first model, whether it had been erupted or extracted.

Mr. BRUNTON asked if Mr. Bennett could say why he considered the skull to be that of an adult.

Mr. BENNETT replied that the central had been extracted. As to the skull being that of an adult, he thought the appearance of the sutures showed that it must be so ; the position of the teeth he did not regard as a guide in a case of this kind. The wisdom teeth had, sometime or other, dropped out. The bicuspids were erupted, though the second molars, at any rate on the left side, were not fully erupted. The crypts were large, and the development of the teeth therefore must have been pretty well advanced.

Mr. GARTLEY presented models showing transposition of the first upper bicuspid and canine.

Mr. GEORGE BRUNTON (Leeds) also presented models showing transposition of laterals and canines in a patient 54 years of age.

Mr. CARL SCHELLING presented specimens of old mechanical work, chiefly in bone and ivory, in response to the request of the Curator at a former meeting.

Mr. F. J. BENNETT then read a paper on "The Nature of the Transparent Zone of Dental Caries," which was illustrated by a number of micro-photographs thrown upon a screen. He said that

among the phenomena of dental caries there were none of greater interest, none upon which opinions still differed more, than those relating to the zone of transparency. A true knowledge of the nature of this appearance was desirable, not only in relation to dental caries, but also as throwing light on the properties of dentine itself. For should the zone of transparency prove to be a manifestation of a physiological activity of the living parts of dentine, that structure would be brought into much closer affinity with the other tissues of the body than would be possible to ascribe to it otherwise. The evidence which he would place before them might be considered as the outcome of an enquiry on his part as to how far the zone of transparency favoured the view of vital activity in response to the stimulus of caries, or the reverse. Dentine in this condition had formed the subject of so many able and well known enquiries on the part of others, that he could do no more than summarise the results. The opinions generally resolved themselves into the question: "Is the transparency due to increased calcification of the part or not?" There could be no doubt that this point, clearly proved, would go far to settle the matter. The most damaging argument against those who held the view of increased calcification of the fibril, was that which asserted that a transparent zone was to be found in natural teeth mounted on plates, and which had subsequently been attacked by caries. For it would be difficult to understand how a fibril could become calcified when once the tooth was dead. However, the presence of the transparent zone in relation to caries, in such teeth, appeared to be doubted by Dr. Miller. But although he speaks of having "split about sixty" which appeared specially suited for the purpose, one case only revealed a phenomenon resembling transparency, but even in this case it was not possible to say the change was not brought about whilst the tooth was still living. It should be remarked, however, that Dr. Miller did not mention having examined the specimens under the microscope. Dr. Miller, returning to the general question of the zone of transparency, said: "A decalcification, however, has most certainly not taken place in the transparency in question." The matter being left an open question, Mr. Bennett determined to examine specimens stained with gold chloride, and further, select, amongst others, teeth in which there was a partial or complete arrest of the caries, as in these the fibril might be supposed to be

calcified from the fact of the arrest. With two obvious exceptions the teeth were all fresh, with living pulps. No acid whatever was used in any part of the process. They were ground, polished, soaked in the gold chloride solution, and finally mounted in glycerine jelly. The dentinal fibril and the carious portions are the deeply stained portions. The specimens were then shown on the screen, and the appearances of each describe.

A number of slides were then shown from which Mr. Bennett found support for the following conclusion, stated in his own words: "Inasmuch as enlaged and thickened tubes can be demonstrated in parts—I do not say in every part, and in all cases—we cannot regard the zone of transparency as an area of increased calcification, and that the phenomena point to the zone as representing a precursory stage of dental caries."

Mr. Howard Mummery regarded the paper as a very interesting contribution to the pathology of caries. He thought it possible that the occurrence of the enlarged tubes and tube walls might be accounted for by the encroachment of the zone of decalcification on the translucent zone, thus accounting for the appearance in the dentine. He considered that the zone shown by Mr. Bennett was distinctly the old transparent zone, but there was some encroachment upon it by the zone of partial decalcification.

Mr. J. F. Colyer asked whether in the incisor tooth, of which sections had been shown, the author was quite certain that caries had not started previously to it being fixed on the plate. He also inquired how the author accounted for the translucent appearance shown in the dentine long before the whole of the enamel was quite disintegrated, and said that a translucent zone was often seen in teeth which were not the subject of caries at all, but of abrasion or erosion.

Mr. Storer Bennett wished to draw attention to one point which seemed to have escaped attention. The author had said in the early part of his paper that this was an investigation set on foot for the purpose of determining a certain thing, whether there was an increased calcification, or, on the other hand, softening in the zone of transparency. The evidence of the paper was to show distinctly that there was no vital action in the tooth, and no attempt at calcification in forming a zone to arrest the approach of caries, but, on the other hand, what had formerly been described as the

transparent zone, which was supposed at one time to be a barrier set up against advancing caries, was pretty clearly shown by the specimens to be an enlargement, not contraction of the tubes as there would be if excessive calcification had taken place in them. He did not quite understand from Mr. Mummery whether he proposed to suggest that there were two zones of transparency, one the old zone described by the early writers, and the other undoubtedly due to acids described by Miller. The point he wished to enforce was that the paper specially aimed at examining the vital action in connection with caries. As this zone was very well marked indeed in teeth that had been worn on artificial plates, these facts seemed to him a most convincing argument against the vital theory.

Mr. MUMMERY said what he meant to convey was, that he understood the zone shown to be the ordinary translucent zone (as Mr. Bennett had said) of the old masters, and there had been an encroachment at some period upon it by the zone of decalcification, which accounted for the appearance in the dentine. There had been caries and arrested caries, and the decalcification zone had worked as it were into the zone of translucency, because in most of the specimens the disappearance of the dentine was near the line of micro-organisms, not very far down the zone of transluency.

Dr. G. CUNNINGHAM would have been glad to have examined microscopical sections before proceeding further with the discussion, as it was a little difficult to criticise and arrive at conclusions from demonstrations made upon the screen. He did not quite see with the eyes of the demonstrator, and thought that possibly the thickness of the tubes was somewhat due to their diagonal cut, so that they exhibited an appearance which he believed not pathological at all.

Mr. SEFTON SEWILL fully endorsed Mr. Bennett's conclusions on the theory of vital action. Seeing that tooth structure was composed of 76 per cent. or more of mineral matter, and contained no blood vessels, it seemed to him evident that no vital action could have taken place. It would have been interesting if the specimens had been stained for micro-organisms, it would then have been possible to see more exactly where the micro-organisms had penetrated, and probably have discovered, as Mr. Mummery pointed out, that they must have gone very near indeed to the zone of translucency. The pipe stem was sufficiently accounted for by the swelling and enlarging

of the dental tubules. Several gentlemen had mentioned the fact of these appearances being seen in teeth worn on artificial plates ; it must have resulted from dental caries produced artificially, and no doubt Mr. Bennett had put them entirely right on this point.

Mr. F. J. Bennet, in reply, said Mr. Mummery's point seemed to be that the translucent zone had subsequently been affected by the previously existing caries, in other words the old caries might have produced the translucent zone. As a matter of fact, the caries were all one, because although it might have been arrested at one point it was continued at another ; it was not a second case of caries which had arisen. If the enlarged tubes were due to primary caries, why should not caries affect the secondary dentine? That appeared to be a strong argument, seeing that the secondary dentine was shown to be normal. They knew also that the first thing that attacked caries was stain, then why, if the enlarged tube was stained as shown in the slide, should not the stain have followed on to the translucent zone. He thought that wherever active caries was going on they would get a stain. However, it was far from his desire to be dogmatic, and in Mr. Mummery's criticism he recognised nothing but a desire to elucidate the truth. With regard to the specimens handed to him by Mr. Colyer, he failed to find any trace of decay having occurred previously to the mounting of the tooth. Again, if the teeth were taken off the pins and examined, the caries was found to be in a part in which it was impossible to have been present during life, that was to say underneath where the pin came through the tooth, because until the tooth was cut in half it could not have become exposed round the margin of the pulp cavity. With respect to Mr. Colyer's remark that there was a zone in attrition, and a zone in erosion, his paper was really a branch of a larger enquiry into the changed condition in attrition. He should be very pleased indeed if Mr. Colyer could furnish him with specimens in which he said there was a zone of translucency in attrition, and still more so if he would show a specimen in which erosion showed the smallest attempt at a translucent zone. They might get a secondary deposit of decalcification, but having made many sections of erosion in different positions he had never seen the faintest tendency to increase calcification or a zone of translucency in such a section. Mr. Cunningham had suggested that the specimens on the screen were a little deceptive, and that when they came to

the microscope itself they might read a different story. All that he could say was that Mr. Cunningham was welcome to make a very close and critical examination of the specimens to see whether they did not accord with the microscopic sections.

The usual vote of thanks concluded the Meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING, held Monday, May 20th, 1895.

The minutes of the previous General Meeting were read and confirmed.

The following new members were admitted:—Messrs. S. D. Hey; H. C. Hessenauer; J. H. Robertson; T. C. Myers.

On casual communications being called for:—

MR. H. DUNLOP showed a model of a boy's mouth, age nine years; the permanent left upper central incisor being united by true gemmation to a supernumerary tooth placed at its mesial side. The crowns were united throughout their whole length, but the condition of the roots could not be ascertained, as the teeth were not extracted. He remarked that true gemmation was a rare condition, and when it did occur was usually found uniting a central and lateral, or a central and supernumerary tooth. A few cases of molar teeth united by true gemmation had been recorded. He also showed a left upper second molar with very abnormal roots. The three roots as they left the crown were divergent, and the last third of each was twisted upon itself at a right angle. It was probably the result of pressure applied before the roots were completely calcified.

Mr. DOUGLAS exhibited a model showing an upper left lateral tooth, the root of which had been split longitudinally by the slipping of a gold plugger, whilst the operator was using great force, in building up a gold tip on the adjoining canine. The accident took place in Manilla about five years ago, and since then the patient had almost constantly been troubled with small abscesses at the apex of the fractured root. The affected tooth had risen considerably in its socket. He thought it was exremely rare for a fractured tooth to be retained for so long a period.

The PRESIDENT said that teeth fractured longitudinally did not as a rule last long, and that particles of food getting wedged in the

fissure was one of the causes that hastened their destruction. Fractured roots were best treated by adjusting a tightly fitting gold collar; the patient at the same time being told that the tooth could not be preserved for long.

Mr. DENSHAM wanted to know whether the fracture had exposed the pulp, or whether death of the pulp had been due to the pyorrhœa alveolaris which evidently existed. He said he knew of three instances of fractured roots, each case had occurred after refixing pivots with gutta percha, the original pivots having been worn for many years. A collar crown would often preserve such fractured roots for 4 or 5 years.

Mr. D. P. GABELL wanted to know whether fractured roots ever became united by cementum.

The PRESIDENT said that he did not think that union by cementum had ever been known to occur.

Mr. W. J. MAY showed a molar tooth; the crown was normal, but the roots were fused into a large globular mass. He thought it was probably an odontome. He also exhibited two lower canines, each having two distinct roots.

The PRESIDENT said the specimens of canines called up the question: "What is a canine?" It was held by some that the canine teeth were really the first premolars, and the fact of canines being found with two roots was in favour of such a theory. The President then stated that owing to indisposition, Mr. Parrôt was unable to read his paper on "Regulation Cases." He then addressed the meeting on the subject of the "Zone of translucency" in carious teeth; illustrated by lantern slides, and specimens under the microscopes.

Mr. W. J. MAY and Mr. D. P. GABELL took part in the discussion which followed.

Mr. D. P. GABELL proposed a vote of thanks to the President for his kindness in addressing the meeting at so short a notice.

The PRESIDENT stated that the next meeting would take place in October, when Mr. H. W. Turner will read a paper on "Neuralgia and Referred Dental Pain."

The proceedings then terminated.

THE DENTAL RECORD, LONDON: JUNE 1, 1895.

A CURIOUS CONTENTION.

A WRITER in a recent issue of a transatlantic dental journal, criticising a review published therein, concludes his letter with a very suggestive sentence. It is immaterial to our point to say more than that the matter in dispute is the correctness or otherwise of Heitzmann's description of microscopical observations; there are many doubters, and to these writes this reviewer of reviews: "Heitzmann's answer to doubt is the only correct one—come and see. Come to his laboratory and learn how to see. Anyone who is unable to see the reticulum does not know how to see it. He that will not accept Heitzmann's drawings will not accept even the coming photographs, and probably he that will not accept these evidences is not willing to go to the expense of time and trouble to learn how to see for himself; certainly that individual expense should not be all saddled on Heitzmann or Bödecker, *et al.*" The concluding sentence of this quotation contains two distinct statements, the first is but a new version of the proverb "None are so blind as those who will not see," and this, being an accepted postulate, we will dismiss, but the second is really an inverted form of the proposition that the observer or discoverer shall not be required to prove his case gratuitously. From this we are led to enquire, what does Science demand of its disciples? What help may one worker in the bye-paths of science reasonably expect from another who may have preceded him? We feel we are not arguing a personal question, it is an abstract one with, perhaps, the personal application that we are engaged in the often needed task of defending distinguished authors from their friends. There are always two aspects to a scientific question, the one commercial, the other abstract. It would be silly to deny the commercial side; few of us, however fully imbued with professional instincts and feelings as regards matters of our own

immediate sphere, would forego the reward of a discovery in other fields, say in chemistry, but even here it is the commercial application of the fact rather than the fact itself which we would surround with that mystery which may be needed to prevent competition. Our better nature revels in a discovery for its own sake. It is a step nearer truth—the truth of the great mysteries—Nature, life, death, disease. Money is a mere bagatelle compared to these, to merely help towards this great end is reward enough. There can be no commercial aspect to questions like these, unless we would be classed with the soothsayer and the gipsy vagrant. Proof is the great end: to prove that which we say is true. Money may be needed, our own if we have it, other peoples' if we have not. Money to conduct experiments, money to live on while we work, or when we are too old to work, money to publish our work. If the expense of obtaining proofs of this or any other discovery is too great for individual effort, then by all manner of means let those who are interested lend a helping hand, not to prove it to Tom, Dick, or Harry, but to advanced workers in this field, whose opinion will carry conviction to those less able to form one of their own. A man is bound to prove his discovery or theory, to prove he speaks the truth; because impartial minds may help him to detect errors; because he owes more to previous workers in the same field, who have provided him with the means of work, and the groundwork on which to build, than the work of a single life can possibly repay; because it will bring lasting honours to himself.

News and Notes.

THERE are two vacancies for dental surgeons at the Dental Hospital, Leicester Square, caused, we understand, by the resignation of Messrs. Wm. Hern and Robert Woodhouse.

Drs. Arthur Baker and Theodore Stack have been appointed Examiners in Dental Surgery and Pathology at the Royal College of Surgeons in Ireland.

Dr. Thorne Thorne has been appointed by the Government Member of the Medical Council in the place of Sir John Simon, K.C.B., resigned.

We regret to notice the death of John J. R. Patrick, of Belleville, U.S., who doubtless became personally known to a good number of our readers during his visit a year or so back. He was known not only for his work in dental matters, but as a scientific investigator, especially of Pre-Historic Crania.

Mr. C. S. Tomes having resigned his seat on the Board of Examiners in Dental Surgery of the Royal College of Surgeons of England, and Mr. A. W. Barrett's period of office having expired, these two vacancies in the Dental Section of the Board will be filled at the meeting of the Council in July next. Applications should be sent to the Secretary before Thursday, 6th June next.

At a recent meeting of the Council of the Royal College of Surgeons, England, the following resolution was communicated :— "That the Medical Committee of the National Dental Hospital and College request the licensing bodies to arrange for an examination in Mechanical Dentistry for dental students, previous to their commencing their surgical training."—It was referred to the Dental Board to be considered and reported on.

Mr. Thomas St. Johnston (Birmingham) having passed the necessary examinations, has been admitted a Licentiate in Dental Surgery of the Royal College of Surgeons in Ireland. The next examination is fixed to take place in November.

From the report on Dental Education presented to the American Dental Association, we learn that during 1894 nine hundred and five men graduated at the various American colleges. In 1892, the

number was 1483, the decrease is due to the operation of the three years course. In the discussion which followed the report many opinions were expressed in favour of an entrance examination in arts.

THE following candidates passed the first examination of the Royal College of Surgeons of Edinburgh for the Licence in Dental Surgery:—David Johnston Cameron, Kincardineshire; John Morris Stewart, Edinburgh; John Morison Hood, Edinburgh; John Kirke Nash, Edinburgh; William Gardner, Edinburgh; Archibald Roland Maclean, Portobello; James Dalgleish Hamilton Jamieson, Edinburgh; John Norman Macdonald, Lincoln; Herbert William Kaiser, Birkenhead; Robert Ranleigh Jones, County Carnarvon; Edward William Albert Jeffery, Hastings; Matthew Rodway Leeming, Salford; and John Walter Horne, Slamanan.

THE following candidates passed the final examination and were admitted Licentiates in Dental Surgery, Edinburgh:—Lilian Murray, London; Henry Alfred Coleman, Wrexham; John Alexander Young, Edinburgh; Ralph Carr, Newcastle-on-Tyne; Seymour William Nicholas Swales, Sheerness; and John Douglas Logan, Dublin.

THE last meeting of the Session of the Glasgow Dental Students Society was held on Wednesday, 1st May. The President, Dr. McMillan, gave a very interesting paper on "Diseases of the Mouth." Before the paper was given, a letter from Ash & Sons was read, presenting a number of volumes to the Students' Library, for which a hearty vote of thanks was given.

THE following list of "passes" at the recent L.D.S. examination at the English College is, we believe, correct as far as it goes.—Students of the Dental Hospital of London, 23 out of 32 candidates; Guy's, 11 out of 15; National 5 out of 6; Manchester, 3 out of 4; Liverpool, 2 out of 2; Bristol, 1. The referred candidates are subject to the following new regulation:—"A candidate who is referred at the examination for the Licence in Dental Surgery will be required

to produce, before admission to re-examination, a certificate of three months' additional study at a general hospital and a special dental hospital, the precise attendances required at each hospital being left to the discretion of the respective hospital authorities.

James Mayer, 79, was choked on Saturday, April 17th, through his false teeth slipping and getting in his throat. He lived at 32, Spring Gardens, Farington, near Preston, and was taking supper when he was noticed by a man named Henry Harrison to be choking. The latter put his finger in deceased's mouth and found his false teeth sticking fast in his throat. He pulled them out as fast as he could, but the old man sank and died before the doctor, who had been sent for, arrived.

Mr. J. Dencer Whittles writes to the British Dental Association Journal that he had occasion to use a recently recharged cylinder of coryl, and after placing it in a small jug of hot water, and whilst carrying it from the workroom in the basement up a few steps to his consulting room, the cylinder exploded just as he emerged from off the steps—the bottom of the cylinder crashing through the jug, and the remaining portion violently striking the ceiling of the hall, bringing down a large amount of plaster. The nozzle was bent in two places, and the side of the cylinder flattened where it rebutted against the wall. "It is satisfactory to think," says our contemporary, "that the accident did not cause any bodily harm, and goes to show that the bottles containing coryl require to be made and tested as carefully as those used for storing nitrous oxide."

We all know Captain John Good, R.N., and his false teeth, and how he wrought wonders therewith away in the wilds of Africa. Yet truth is stranger than fiction, and in Mr. Wheeler's new book "The Ameer Abdur Rahman," we come across the following passage:—"Dr. Gray, who was afterwards in medical attendance on Abdur Rahman, relates that when the Ameer held his Court at Mazar-i-Sharif he would sometimes remove his teeth in the presence of his jieges, clean and polish them with a brush, and solemnly put them back again, while all who beheld this marvel, more especially if they

happened to be simple villagers or uncouth hillmen, would look aghast at the king who could thus take himself to pieces before their very eyes." We wonder if this is the "false set." the cost of which, rumour told us, ran into four figures, the first of which was neither one nor two. But then this included a long journey, and the risk of not requiring the return half of the ticket, if tickets are issued in that country.

"INVENTION" says that Fredureau's "diffuser globes" for lamps are made up of rings of clear glass, each of which has an upper curved and a lower plain surface. The light is reflected downwards, and the brightness below the lamp is said to be very great. The light in the globe seems spread out into a great mass of glow, the whole height of the globe itself, and the illumination, besides being well diffused, is very intense. The globes are shaped by moulding under pressure, and the reflections are claimed to be such as to turn aside the violet and other highly refrangible rays to a great extent, thus having a comparatively cool and restful effect on the eye.

A RED line on the gums is, according to Dr. Andreesen, of Yalta, frequently present in the subjects of pulmonary tubercle. In 800 patients examined, this sign was found in 92, and of these 69 were phthisical patients having bacilli in their expectoration, and other pathognomonic signs. In the 23 others in whom the line was present there was a suspicion of tubercle. In 14 cases of confirmed pulmonary tuberculosis the red line was absent, as was also the case in 33 patients in whom phthisis was suspected. The line may be readily recognised by its intensely red colour, and cannot possibly be mistaken for the livid mark visible in persons suffering from chronic affections of the digestive tract. In the majority of cases in which the line existed, the affection was of a somewhat grave and acute character, while those cases in which the line was absent, the evolution of the morbid symptom was slow and comparatively benign. The line gets less when there is a general improvement in the health of a phthisical patient, and again deepens if the pulmonary condition becomes worse. A similar mark is at times observed on the gums of pregnant women; so that under these circumstances the line is of less diagnostic value.

Abstracts and Selections.

ANGINA LUDOVICI.

Clinical Lecture by Dr. Perry.

The lecturer remarked that after some consideration he had selected for the subject of his lecture the disease known as Angina Ludovici, the accounts of which in text-books were commonly somewhat brief and unsatisfactory. He then proceeded as follows :—

Having selected a subject, I naturally consulted Dr. Fagge's treatise on medicine, and there I found an account, very accurate so far as it went (as all Fagge's works are), but also very brief. He defines the disease as a diffuse inflammation of the tissues of the neck which may or may not be accompanied with œdema of larynx. I then remembered, in the obituary of Dr. Fagge, which appeared in our Reports, an anecdote of Mr. Hilton, how that, being at the bedside of a patient suffering from this disease, he asked the general practitioner in attendance why the breathing was so laboured, and proceeded to answer his own question by saying that the pneumo-gastric nerve was implicated in the inflammatory process.

Dr. Ludwig himself thus describes what he terms "the new kind of inflammation of the cellular tissues of the neck." He says: "Along with symptoms which precede a rheumatic, or rather, an erysipelatous angina, there develops, sometimes on both sides, generally on one side of the neck, a hard swelling, commonly in the tissue which surrounds the submaxillary gland, more rarely in that which surrounds the sublingual or parotid. This cellular inflammation spreads and similarly affects all the cellular tissue which it involves, spreading at first towards the chin, even to the opposite side, then downwards to the larynx and backward to the parotid, at the same time that it swells considerably. It involves in like manner all the inter-muscular planes and the muscles themselves between the mouth and the hyoid bone. The tongue rests on a floor of hardened tissue, deeply congested, which becomes more especially prominent and like a bolster in the mouth just inside the symphysis of the lower jaw. The power of opening the mouth is much curtailed, and attempts to do so are painful. The tongue thus rests on a floor which is indurated and reddened, and it is pushed upwards and backwards; the movements of the jaw and the power of swallowing and speaking are materially interfered with

. . . . During the further course of the disease the skin over the tumour begins to get red, particularly in places, and if it has not previously occurred, in the interior of the mouth there appear deposits of phlogistic lymph. The swelling under the tongue becomes softer, as though serum had been poured out beneath the serous membranes and had partially coagulated. On the exterior, some parts have become locally softened and pit on pressure, and to the finger now give the feeling of crepitation, from the development of gas. Elsewhere a more distinct feeling of fluctuation is perceived, as if here and there it might come to active suppuration ; this, however, does not actually take place, for the process either stands still or it recedes."

I may summarise the rest of his remarks as a description of gangrene and death in the "typhoid state."

As regards ætiology, Dr. Ludwig believed that an erysipelatous process underlay the disease, which either on account of "epidemic influences" or in consequence of some peculiar condition of the patient, was prevented from getting to the surface, and which then "determined to the deeper parts heterogeneous to its nature" ; hence this gangrenous inflammatory condition of the cellular tissue was brought about : or it might be due to conditions proceeding from the nervous system as epidemic influence develops itself, so that the disease derives its tendency to gangrenous inflammation from the erysipelatous factor as in malignant carbuncle, and its tendency to induration and paralysis from the nervous factor, as in malignant parotitis."

The diagnostic points he makes are—first, the slight inflammation of the throat, which even when it exists disappears after a day or two ; secondly, the peculiar wood-like induration of the connective tissue which will not receive impressions ; third, the hard swelling under the tongue, with bolster-like swelling around the interior of the lower jaw, of deep red or bluish-red colour ; fourth, the uniform spread of the induration so as to be sharply bounded by a border of entirely unaffected cellular tissue ; fifth, the escape of the glands, though the cellular tissue surrounding them is implicated.

I may now read to you my notes of a case of this kind that has been under my care in "Clinical" Ward.

The patient, a male, æt. 16 months, was admitted on the 24th of April, with symptoms of acute laryngitis, which, in the absence of

any affection of the fauces or skin, was considered to be of the catarrhal variety. On admission, the temperature was 100·6, pulse 113, and respiration 60. There was evidently considerable obstruction to the entry of air into the chest, the lower ribs being drawn in with inspiration. There was stridulous breathing and slight cyanosis. Physical examination of the lungs afforded no evidence of broncho-pneumonia or pleurisy. There was no swelling or redness of the neck. On the 25th, the temperature was 102, and the breathing still rapid. On the 27th, the child seemed to be much better, the stridor having disappeared, and the temperature being lower (100). On the 28th, he was worse, with increased cyanosis, and a very feeble pulse. On the 29th, the right side of the chest was dull behind, but the dulness did not seem to be absolute, and loud bronchial breathing with crackling râles was heard both in front and behind. Hence it was thought that the pulmonary condition was that of consolidation. On the evening of this day the patient seemed rather better, but next morning he became suddenly worse and died about noon.

On post-mortem examination, the tonsils and fauces appeared to be quite normal, and the œsophagus was also free from disease. There was slight œdema of the arytæno-epiglotidean folds, but otherwise nothing abnormal was detected. There was, however, a diffuse suppuration in the deep cellular tissues of the neck. A continuous tract of purulent infiltration extended on the left side of the neck, from the level of the pharynx down into the anterior and posterior mediastinum, and in the anterior mediastinum there was suppuration apparently in the thymus gland, and from this the inflammation affected the pericardium at the base of the heart, and on opening the sac a little lymph with a patch of redness was visible on its inner surface. The suppuration was chiefly on the left side of the neck, but there was also some suppuration at the upper part on the right side. The whole of the left lung was covered with recent lymph, and in the pleura were 12 ounces of pus. The lung was compressed and small, but was not further examined, as it was required for the Museum. On the right side there was no inflammation of the pleura, but the lower lobe of the lung presented large areas of hepatization, of red and grey colour, at its hinder part. Pus taken from the cellular tissue at the upper part of the mediastinum was submitted to bacteriological examination by

Mr. Pakes, and yielded an almost pure cultivation of the staphylococcus pyogenes aureus. The colon at its upper part presented a "shaven-beard" appearance. The spleen weighed one and a-half ounces, the liver fourteen ounces, and the kidneys two and a-half ounces. Except as above described the viscera were normal.

I have to add two notes from Mr. Mumford, the Clinical Assistant's, report, viz., that the patient seems to have been well up to the day before admission, and that on the 26th he was noticed to have a slight discharge from his left ear. This was unknown to me at the time, and I regret that the petrous bones were not specially examined, because, though I do not think it probable, we might possibly have found the cause of the cellulitis in them.

Now, I think we may assert confidently that all cases of Angina Ludovici are of *septic* origin, and although it is true that pus is not invariably found, one cannot say that it is never present. An acute septic process is, however, often rapidly fatal before pus has had time to form, and, as we know in the case of anthrax, certain micro-organisms may have little pyogenic tendency.

Now as to the causes of this disease :—

First.—Traumatism in its wide sense. These cases belong to the surgeon rather than to the physician, and I shall only enumerate them as follows :—Cut-throat, tracheotomy and other operations about the mouth and neck, gunshot wounds and other injuries of these parts, and impaction of foreign bodies in the larynx.

Next we come to cases due to extension of infection from the neighbouring parts, *e.g.*, sores in mouth (mercurialism), tonsilitis and laryngitis in diphtheria, scarlet fever and measles, suppurating glands in neck with or without caseation, alveolar abscess, periostitis (fractured jaw), and suppuration about tumours, *e.g.*, goitres or epithelioma of œsophagus. The disease may also occur as a complication of typhoid and pyæmia (in one instance after parturition).

To illustrate the formidable character which an alveolar abscess may assume, the following case is cited from the *Lancet* of October 25th, 1879 :—A married lady, aged 23, suckling a child six months old, towards the end of August, had a severe attack of toothache from taking cold. It was attended with swelling of the right cheek ; the swelling passed down towards the neck, which was painful on pressure. As the patient had several carious teeth, nothing serious

was suspected. The symptoms, however, did not yield to treatment, but were rather aggravated. Then inflammation of the parotid was diagnosed. The neck was stiff and very painful; it was indurated as far as the clavicles; the skin was shiny and tense, of a reddish-brown colour, and very painful when touched. The pharynx and fauces could not be examined on account of the difficulty of opening the mouth. Swallowing was painful. The disease progressed during the next days. On September 5th, after an attack of coughing, she spat up a quantity of very stinking pus. On September 7th the patient complained of apnœa, and was troubled with cough. Pulse was small, and there was oppression over the heart. The patient went off in a dead faint, which lasted some time. On the following day the pain and oppression in the chest were increased. She died in the evening.

The autopsy revealed extensive sloughing of the cellular tissue of the neck, with implication of the muscles. The parotid and submaxillary glands were gangrenous; the skin over the right side of the neck was also gangrenous; a quantity of very fœtid ichor discharged itself after death. A communication was also found with the pharynx. The right lung was collapsed in great part, and the pleural cavity filled with a fœtid serum in which flocculi were abundantly present. The left lung was undergoing caseous degeneration; its pleural cavity contained a quantity of unaltered serum. The pericardium was adherent to the lungs, and reddened on its exterior aspect; it contained a pint of sero-lymphatic fluid. The surface of the heart was everywhere covered with a layer of granulations six lines thick.

Another cause, not usually recognised, is, I believe, to be found in an acute septic perichondritis of cartilage, analogous to acute suppurative periostitis of bones.

As to *age*, the disease is commonest from childhood to middle life, but it may occur later. As a predisposing cause may be mentioned chronic alcoholism, as it appears that patients suffering from this disease have been for the most part addicted to drink.

Butchers also, whose occupation exposes them especially to septic inoculation, more often contract the disease than others.

Many of the older writers, influenced by prevailing views of epidemic influences, described the disease as an epidemic, or at least as liable to occur in groups. This does not appear to be borne

out by fact, but it is at least true that there are many cases of Ludwig's Angina, which have still to be regarded as idiopathic, meaning only by this term that we are unable to trace the manner in which the septic organism has gained access to the deep tissues of the neck.

It is possible, and indeed probable, that in certain inflammatory conditions of the upper respiratory and alimentary passages, organisms are able to go through the mucous membrane and so to reach the deeper parts.

It should be stated that the local manifestations of suppuration in the neck may be very insignificant, inasmuch as the mischief may be at first entirely beneath the deep cervical fascia, into the attachment of which I need not go in detail. From the arrangement of this fascia it follows that suppuration may make its way upwards beneath the floor of the mouth, backwards amongst the muscles of the neck, or downwards into the anterior and posterior mediastinum.

The chief symptoms of the disease are, or may be :—Fulness and tenderness in the neck—sometimes ill-marked and obscure, at others of an obviously phlegmonous character—sore throat and occasionally dysphagia.

A patient having the last-named symptom was some years ago under the care of the late Mr. Durham, and so marked was the difficulty in swallowing that he was suspected to be suffering from an aneurysm pressing on the œsophagus. However, at the post-mortem the cellular tissue of the neck was found to be infiltrated with pus. There is also often present dyspnœa, with quickened respiration. On examination of the mouth, nothing of importance may be evident. With the laryngoscope a little œdema of the epiglotis may be evident. In one instance an abscess was discovered opening between the epiglotis and tonsil.

Symptoms may also be present depending on the inflammation of nerve-trunks, the pneumo-gastric being most commonly implicated in the suppurative process. The pleura and pericardium may also be affected by inflammation, and may speedily be filled with purulent effusion.

The temperature is, as a rule, pyrexial, but in the case of those who die very rapidly, it may be little if at all raised.

Treatment.—Some success has been obtained by the injection by carbolic acid in solution, but there can be no doubt that in the

present day, and especially in hospital practice, the right treatment is by surgical methods. An early incision should be made, either in the middle line of the neck, or along the anterior border of the sterno-mastoid. In the way of constitutional treatment it is well to support the patient's strength with nourishing food, which may be administered by a tube (if necessary), and stimulants will usually be indicated.—*Guy's Hospital Gazette.*

SOME PRINCIPLES RELATING TO AMALGAMS.*

By Edward C. Kirk, D.D.S., Philadelphia.

The knowledge which we possess relating to dental amalgams has been achieved almost wholly as a result of the empirical method of study. The observation that filings from a silver coin, when made into a plastic mass with mercury, possessed the power of setting or hardening into a compact solid body probably first suggested the use of amalgam as a filling-material. The defects, which by experience in its use were disclosed in this amalgam, led to a further study of the subject, the object of investigation being the elimination of the defective features of the amalgam, with the hope of securing one that should possess certain desirable physical and chemical properties, thus raising its standard of excellence to a position more nearly approaching that evanescent vision, the ideal filling-material. In the course of time, and through the collective investigations of certainly a majority of dental practitioners, each member of the whole list of available metals, in varying proportions and relationships, has been impressed into the dental amalgam service, and made to show cause why it should not furnish the key to unlock the dental Utopia. But though each combination has been weighed in the balance of practical experience and found wanting in some essential feature when measured by the ideal standard, still the average character of amalgam alloys has exhibited a most marked improvement, and there are now to be found, and are everywhere obtainable, alloys that fulfil their function as savers of teeth under certain conditions, in a manner unapproached by any other material.

* Read before the New York Odontological Society.

As has been previously stated, this improvement of amalgams has been largely the outgrowth of the empirical, I might say "rule of thumb," method of study. No disparagement of that method is intended, nor should any reflection be cast upon it when its function is fairly recognized, for it is an essential part of the scientific method, and the basis of scientific advancement. It represents the fact-gathering stage of knowledge, and furnishes the plasma from which scientific generalisation and reasoning has its growth and draws its sustenance. The element of weakness in the empirical method of study is that, unless pursued by those whose powers of observation are trained to accurate work, the resulting statement of the phenomena observed is likely to include irrelevant factors which detract from its value. This feature, unfortunately, characterizes much of the reported results of study of amalgams and their value as filling-materials. I hope to furnish concrete illustration of this point later.

A general review of the nature of the work which has been done with reference to amalgams will, I think, disclose the fact that investigation has addressed itself principally to the ingredients of the amalgam alloy, and the modifications which these ingredients, in kind, number, and amount, exert upon the physical and chemical properties of the resulting amalgam. Regarding them simply as mixtures of metals, it will be readily seen that practically an infinite number of amalgam alloys, each differing from all the others in some respect or degree, may be made with but three or four constituent elements. And further, that by the addition of mercury in variable amounts to a given alloy, still another series of amalgams, each differing from all others of the series in physical and chemical properties, may be produced. We may then, for our present purposes, classify amalgams into, first, a series in which the properties of the resulting amalgams are modified by alterations in the kind, number, or amount of the ingredient elements of the alloy, and, secondly, a series in which the amalgam is modified by changes in the proportionate amount of mercury with which the alloy is combined. The classification here proposed is simply a convenience for the study of the subject. As a matter of fact, no philosophical conception of the structure, properties, and composition of alloys should admit of a separate classification for alloys without and those with mercury as a constituent. Mercury being

in all respects a metallic element, its fluid state is simply a matter of relative temperature. The alloys which are products of the union of mercury with other metals are termed amalgams, simply because of the increased softness and fusibility which mercury confers upon its alloys, but these are nevertheless alloys in exactly the same sense that we apply that term to combinations of other metals into which mercury does not enter as a constituent. We may still further classify amalgams into those which are combinations of mercury with but one other metallic element, for which class I have proposed the term binary amalgams, and secondly, those which consist of more than one metallic element in combination with mercury, which class may be termed ternary amalgams. While quite a number of binary amalgams are known, but two have had any extended use as filling-materials,—viz., copper amalgam and palladium amalgam. Silver amalgam might possibly be included in this class, but there is no record to my knowledge of the extended use of an amalgam of pure silver and mercury. The old coin-silver amalgam once used, owed its value to the small percentage of copper which it contained, and this would include it among the ternary amalgams.

In 1863, Matthiessen suggested it as probable that "an alloy is either (1) a solution of one metal in another (2), a chemical combination (3), a mechanical mixture, or (4) a solution or mixture of two or all of the foregoing." Investigation has served to strengthen the correctness of this view of the constitution of alloys, and dental amalgams afford some striking confirmations of it. In all amalgams which possess the quality of setting or hardening from a plastic mass, we have to deal almost certainly with a chemical combination. The property of setting is itself an evidence of chemical combination, and the formation of many amalgams is attended with elevation of temperature, more or less marked, which is another indication of chemical combination. Changes of the volume of the mass attendant upon the act of setting still further indicate that chemical union of some portion of the constituent elements of the amalgam has taken place.

There can be no doubt that the best results attainable in the formation of a dental amalgam will be those based upon the production of one in which all the constituents are chemically united in atomic ratios. Under these circumstances only have we the

right to expect to produce an amalgam in which all the affinities of its constituents are satisfied, and which for that reason will not be liable to physical or chemical change. An amalgam in which all the constituent elements are not chemically united is necessarily in a condition of stress, and more subject to the influence of the chemical affinities of its environment, which perhaps slowly, but not the less surely, develop evidences of instability in the fillings made from it. While this principle has been recognised as an important and desirable one in the production of an amalgam, and though attempts have been made to practically utilise it in the preparation of amalgam fillings, the methods proposed do not seem to have achieved the object aimed at—viz., to secure an amalgam filling in which the chemical affinities of the constituent elements are mutually satisfied. As an aid to a clearer comprehension of what it is desired to achieve in this direction, let us examine for a moment the binary combination of copper and mercury, which we know as copper amalgam. Both copper and mercury being bivalent elements, their chemical combination would naturally be made up of one atom each, and the formula of the compound would therefore be CuHg. As a matter of fact this atomic combination of mercury and copper has been found to exist. It may be made by bringing the two elements together with mercury in excess, allowing the compound to crystallize, and then squeezing out by a pressure of about sixty tons per square inch the excess of mercury. There are two other chemical compounds of mercury and copper theoretically possible, but they need not be considered here. It is only necessary to bear in mind that copper and mercury do unite chemically with each other in definite atomic proportions, that the compound is crystalline, and has the formula CuHg. It should be further noted that the atomic combination of mercury and copper, CuHg, is soluble in mercury, and that mercury may be added to it in considerable quantity without preventing its setting property or power of recrystallizing after having been softened by heat. The copper amalgams which have been used as filling-materials are probably, without exception, solutions of the atomic combination CuHg in an excess of mercury. This statement is borne out by the fact that the dental copper amalgams on the market vary considerably as to the amounts of mercury which they contain, and differ also as to the degree of heat required for their fusion. A

further evidence of this feature of their structure is their behaviour when heated. The gradual application of heat to dental copper amalgam causes at first an exudation of numbers of minute globules of a more fusible amalgam containing a large excess of mercury, which is followed by a softening of the whole mass. Again, when the mass has been made plastic by heat and the kneading process, and after a few minutes have been allowed to elapse to allow crystallisation to commence, the excess of mercury may be squeezed out through chamois with the pliers. These phenomena in the behavior of copper amalgam furnish striking evidence that the amalgam is essentially a true chemical compound in definite atomic proportions, and that within very narrow limits any excess of mercury is an element of weakness, not only because such excess is left in a free, uncombined state, which renders it more easily acted upon by the oral fluids, but because the excess impairs the integrity of the filling itself, rendering it less capable of withstanding physical wear and tear.

Knowing the chemical valence and atomic weights of the metals concerned in the formation of amalgams, it becomes a simple matter of calculation to determine the percentage amounts required in each instance to effect a combination in atomic ratios. This is especially true of the binary amalgams, but when several metals are used as constituents of an amalgam, the problem becomes exceedingly complex. I am well aware that attempts have been frequently made to accomplish the synthesis of a complex metallic compound of this character, suitable for a filling-material. The effort has resulted in various devices for adding an accurately weighed or measured quantity of mercury to as definite amount of alloy filings, but I gravely question the accuracy of the result, so far as achieving a definite chemical compound is concerned.

I regard such a method of preparing an amalgam mass as inherently bad, both theoretically and practically. While the process alluded to is evidently based upon the expectation of securing an amalgam mass in which the constituents are united in atomic ratios, there is no evidence to show that the result is attained, and, on the contrary, there are very good grounds for believing that it is not. Admitting that the components of the alloy are so related to each other and to the mercury in number and amount that, when brought together under ideally favourable conditions, a perfect atomic

combination would result, we are met with practical difficulties not as yet overcome when we attempt to bring about the combination. The alloy in condition of shavings, filings, or coarse powder, is intimately mixed with the measured quantity of mercury, and, no matter how thoroughly the mass may be kneaded and worked, the selective affinity of the mercury will cause it to first seize upon that constituent of the alloy for which it has the strongest attraction, and thus satisfy itself before the mass is homogeneously amalgamated, or portions of the alloy will be amalgamated only superficially. The result of this will be a mass which, when set, will consist of a magma of amalgam, which is a true chemical compound, holding in its structure particles of unamalgamated alloy. Such a mass is not only lacking in homogeneity, but favours the development of local electrical action within its structure.

The desirable end of producing an amalgam in which an atomic combination of its components is secured may, I believe, be brought about in a much simpler and more practical manner by taking advantage of the selective affinity of the mercury and utilizing it for the purpose. A simple chemical illustration will perhaps make this point clearer. If to a considerable quantity of dilute hydrochloric acid we should add sodium carbonate solution in an amount not sufficient to neutralize the hydrochloric acid, we would have as the result a certain quantity of sodium chloride, formed by union of the two substances and dissolved in an excess of dilute hydrochloric acid. We could readily recover the sodium chloride from such a solution by removing the menstruum, which might be done by concentrating the liquid to the crystallizing point and separating the crystals from the mother liquor by filtration. In the process just noted, the sodium of the sodium carbonate added to the hydrochloric acid in excess has combined with only just so much of the chloride of the hydrochloric acid as was necessary to completely satisfy their mutual affinities in the formation of sodium chloride in accordance with the well-known chemical law that all combinations of elements take place in definite proportions by weight.

Now, we have seen that there is positive ground for the belief that amalgams, and especially those concerned in dental work, are essentially chemical compounds; it naturally follows that these combinations of mercury with the metals composing the amalgam alloy must take place in atomic ratios, and therefore in definite

proportions by weight. It matters not whether the alloy be in excess or whether the mercury be in excess, the definite mercurial chemical compound is formed and its properties are modified by the excess of whichever element or elements remain over and above the amount needed to form the definite compound. We have now to consider the two methods of manipulating amalgams which are commonly employed, and their relative values, in the light of the principle which I have just endeavoured to elucidate. Our objective point being to secure a definite chemical combination in atomic proportions, let us see to what extent the end is realized in each of these methods. If to a globule of mercury filings or shavings of alloy are added until a mass of proper working quality is produced, there is absolutely no guide whatever upon which the operator may invaribly depend to indicate to him the point at which the proper amount of filings has been added to exactly satisfy the chemical affinity of the quantity of mercury which has been employed. He uses his taste and judgment in producing a mass of proper working qualities. Now, taste and judgment are such extremely variable factors that they are worse than valueless as standards of scientific exactitude. Moreover, an amalgam mass of "proper working qualities" is not by any means the object for which the amalgam is being made. First, and beyond all other considerations, it is intended to produce a filling-material which shall possess the most desirable features belonging to its class. Its working quality is, or should be, a minor consideration. The method of adding filings to the mercury is subject to another feature of inaccuracy, —viz., that the filings are liable to be added in excess, so that the resulting mass is lacking in homogeneity and is liable to local electrical disturbance. It is, of course, clear that should the alloy filings be present in excess there is no possibility, from the nature of the compound, of directly getting rid of the excess of filings.

The method of weighing or otherwise measuring the amounts of mercury and filings employed, so as to secure uniformly related proportions of the constituents of an amalgam, is of course an improvement on the method just noted, but is still so lacking in accuracy as to have nothing to recommend it in comparison with the more common method of mixing amalgams, and which we will now consider,—viz., adding mercury in excess to comminuted alloy

and then removing the excess. By adding mercury in excess we have, of course, supplied all the mercury to the elements of the alloy with which they can combine.

We have also seen that these combinations of mercury with the metals take place in definite atomic proportions. The first phenomenon which we perceive on bringing together the mercury and filings is that solution of the latter has taken place. If sufficient mercury has been employed, the mass will in a moment become of a soft, buttery, or paste-like consistency, which when rubbed between the fingers or in the palm of the hand will not show the slightest trace of solid particles, for the reason that complete solution of the solid alloy has occurred. After the elapse of another short interval crystallisation slowly commences, the mass thickens slightly, and when pressed carefully between the fingers emits a peculiar, softly-grating sound very much like that which may be produced by compressing a package of powdered starch. This sound is caused by the grating or rubbing of the crystals against each other, and is the analogue of what the Germans call the "zinn schrei" produced by bending a bar of pure tin in the hands. At this stage of the process we have a mixture of a definite chemical compound or compounds between mercury and the elements of the alloy in atomic proportions and crystallised, which is dissolved in its menstrum, the excess of mercury.

As it is our purpose to utilize only the chemical compound of mercury and the alloy as a filling material, the next step is to get rid of the excess of mercury. This up to a certain point is readily accomplished by straining out the crystals through chamois-skin by compression with heavy pliers. All of the excess of mercury, however, cannot be removed in this way and the mass left in suitable working condition. It has been proposed, and the plan is pursued by some, to use portions of the mass soft or plastic, and to add to this other portions from which more of the mercury has been removed by greater pressure. This method is open to the objection that it does not remove sufficient of the mercury,—*i.e.*, all that may safely be removed without endangering the integrity of the chemical compound of mercury and the alloy. The best method within my knowledge, and one which gives results superior to anything I have ever seen in the quality of the fillings produced by it, is to absorb the excess of mercury from the surface of the filling by

means of crystal or sponge gold. The amalgam mass, after crystallization has fully commenced, should be squeezed in chamois until an easily workable mass is produced. The amalgam is then introduced into the cavity of decay and the filling built more than flush or full contour. Pellets of freshly annealed sponge gold are then rubbed into close contact with the amalgam surface by suitably shaped instruments. This process is continued as long as any whitening of the gold will take place by contact with the filling. When no more mercury can be extracted in this way, the filling may be carefully burnished, and in a very short time—depending more or less upon the kind of alloy used—may be given a final polish.

A number of analogous processes have been advocated and are in use by various members of the profession for removing or extracting the excess of mercury from fillings. Dr. Bonwill has, I think, advocated the use of bibulous paper in packing the amalgam to "absorb" the excess of mercury. Bibulous paper will, of course, not absorb mercury, but, used as recommended by Dr. Bonwill, it compresses the mass of amalgam crystals in the filling and causes the mercury to exude upon the surface, where it may be wiped away or absorbed by sponge gold. Gutta-percha, chamois-skin leather, rubber dam, or a round soft rubber-point will produce precisely the same effect on compressing the mass of crystals and causing the mercury to exude from the surface. None of these expedients, however, remove it. Gold-foil in the thinner numbers, as advocated by Dr. Rhein and Dr. Ottolengui, will extract the excess of mercury from a filling almost completely, but the process is tedious and unsatisfactory in comparison with the use of annealed sponge gold. I should also consider the permanent attachment of the gold foil as a part of the filling an objectionable feature of this method. Tin-foil and shredded tin have been used for the same purpose with fairly good results, but preference should be given to gold in this connection on account of its superior affinity for mercury.

Reference was made in the early part of this paper to the empirical method of observation and its proper status in comparison with the scientific method. The various procedures which have been cited relating to the extraction of the excess of mercury from amalgam fillings furnish the concrete example referred to of the

inherent weaknes of the empirical method as a sole means of arriving at the truth. It has been a matter of common observation that fillings of amalgam made with a minimum amount of mercury gave better results than those in which mercury was in excessive amount. Hence various devices in removing or getting rid of the excess of mercury have been brought out. Both the observation and the devices are largely of the empirical order, and each of the latter has its advocates. It would seem, however, with the mass of data at our command, that we should have some better reason for the use of a given method of this character than that it gives good results. We should be able to say why it gives good results, and to know, for example, whether it is better to mix an amalgam by this or by that process, whether it is better to use bibulous paper, rubber dam, gutta-percha, chamois-skin, or sponge gold to get rid of the excess of mercury, and the reasons therefor.

I have presented for your consideration in a somewhat elementary way a subject upon which, I presume, every dentist has an opinion. It is this very multiplicity of opinions which, unless properly controlled and related by scientific method, will greatly inhibit the usefulness and proper application of the material under consideration. Our results, save a few notable exceptions, have been too much the product of guesswork and imperfect methods of investigation. We cannot secure the highest results in this, or, in fact, in any of our departments, until we conduct our observations and investigations and formulate our results in harmony with the only logical method of reasoning, the scientific method.—*International.*

Reviews.

Dental Microscopy. By A. Hopewell Smith, L.R.C.P.Lon., M.R.C.S., L.D.S.Eng., with eight lithographic plates from the author's original drawings. Published by The Dental Manufacturing Company, London, and the S. S. White Manufacturing Company, Philadelphia.

We feel that a criticism of this work, the majority of which has appeared in our pages, scarcely falls in our province. But we are glad to give publicity to the fact that it is now published in book form, because we feel that any worker in Dental Microscopy is bound

to find it of considerable use, whilst the plates cannot fail to be of service to a student preparing for an examination in Dental Histology. It is a handsome book, well bound, on good paper, with ample margins. The plates, which by-the-bye are mostly drawn from micro-photographs, gain immensely by the superior paper on which they are printed, and, as they were taken from the stones *before* these were used for the *Record*, they have the merit of first impressions. We know of no plates to equal these at the almost absurdly low price at which they are published.

General Surgery and Pathology for Dentists. By Edmund W. Roughton, B.S., M.D. (London), F.R.C.S. *Illustrated.* Published by J. P. Segg and Co., London, and The S. S. White Dental Manufacturing Company, Philadelphia.

This book will, we feel sure, meet with generous appreciation from dental students, for the requirements of whose examinations it is written. The object of the writer has been to produce a short and inexpensive manual, thus saving the student the need of purchasing a more costly work. It follows from this that much of the matter is treated in a brief way. Thus, in dealing with secondary syphilis, though the skin lesions are described at some length, the manner in which other tissues are affected is discussed in, what appears to us, an insufficient way to properly elucidate the subject. The same remark may perhaps apply to the chapter on tertiary lesions. As an instance of omissions we find in the chapter on carcinoma it is stated that "there are three chief varieties of carcinoma," yet we search in vain for mention of the third, and the pity of this is the greater seeing that one of the seats of origin of this third variety is the antrum. There is an excellent chapter on micro-organisms, in which we notice the following delightful "bull":—"Even such a *hard* substance as dentine is, *when decalcified*, readily devoured by many of the mouth bacteria." The italics are ours. Among the printer's errors we notice a good many instances of œ diphthong used instead of æ. These are, however, minor matters, and there is much reason to congratulate the author on the manner he has carried out his task, and the student on the acquisition of a useful manual. We look forward with interest to the appearance of the companion volume, by the same author, on the special surgery of the mouth.

World's History and Review of Dentistry. By Herman Lennmalm, D.D.S. (Chicago). W. B. Conkey and Co., Dearborn Street.

This is, as far as we are aware, the first attempt to bring together the laws affecting the practice of dentistry in the different countries of the world, and at the same time to enumerate the various dental schools, journals and societies. The use of such a book must be apparent, for it may be readily referred to by all who may contemplate practicing in another country, or who may be interested in the status of dentistry abroad. The section dealing with Great Britain is, we believe, correct, though in a work issued in November, 1894, the tables should have been copied from a later Register than that published the beginning of 1892.

Transactions of the Thirty-third and Thirty-fourth Annual Sessions of the American Dental Association.

These transactions are always interesting, not only for the papers they contain on dental matters, but also for the various reports of the subsections, such as that on Dental Education, which give us a delightful glimpse at the progress made during the year.

The Anatomy and Pathology of the Teeth. By C. F. W. Bödecker, L.D.S., M.D.S. *Illustrated.* Published by the S. S. White Dental Manufacturing Company, Philadelphia.

There is no more difficult task than to review a book of this kind. We may view it either from the standpoint of an elementary student seeking a text book from which to learn the accepted facts concerning dental anatomy and pathology, or from that of the advanced worker, anxious to learn the author's views on debated points, to enter into his arguments, and to learn the facts on which these are based. But we are bound to confess that we turn from a study of this work with a feeling akin to disappointment: disappointed with it as a student's text book, disappointed that though the views of the school to which the author belongs find ample expression, yet we are not given the material on which to form an opinion on these new theories, and which alone would justify and repay the labour of the writer. We regret this opinion, because we most cordially recognise the immense labour this work must have

entailed, and are sure that though we are unable to follow the conclusions to which the writer has come, yet they have not been lightly formed, but are based on facts to him convincing. We can scarcely imagine that a true worker in the field of science —and such we believe Dr. Bödecker to be—would willingly withhold these data, we think, rather, that the very earnestness of his conviction has blinded him to the doubts of others, and the need of proofs sufficient to overcome these. Dr. Bödecker is a pupil of Carl Heitzmann, to whom he dedicates this book, and of course shares his views on the structure and development of tissues, and the changes which occur in these during inflammatory processes. It is impossible in the space permitted to give these views at length, but they are peculiar in giving a larger physiological function to what is usually called intercellular tissue, and in looking upon the changes which occur during inflammation as being chiefly, if not entirely, due to a return of the tissue to its embryonic condition, its breaking up into primitive cell elements. Whether these views may or may not be correct, we can scarcely believe that it is possible to apply the same idea to an explanation of caries of the teeth. The chapter on caries consists of two long abstracts, one giving Abbott's views, and the other those of Miller, but the author makes no attempt to confirm one or the other, and merely gives a weak opinion that "the full truth . . . . can be established only by a combination of both Abbott's and Miller's assertions." But why on earth are we not told what this "combination" is? This is but a poor response to Miller's opinion that these authors "owe it to us to place their preparations before us in order finally to dispose of a subject of controversy which has already taken up enough of the time of the profession." We venture to think that this must be the opinion of any candid reader of this book, the assertions as they stand hold together well enough, but they are at variance with the observations of every other school. One is mentally crying all through the book "Give us the proofs," for, though illustrations are numerous, they frequently bear a very suggestive appearance of freely interpreting appearances. The views of others antagonistic to those of the author are ignored. The views of Ebner—amplified by Mummery—on the calcification of dentine, are not mentioned. We are told that dentine is formed from the odontoblast which at the inner end grows by the fusion of

medullary cells, and at the other break up into medullary cells which then fuse, forming the matrix of the dentine. That rounded bodies do exist between the odontoblast and the formed dentine we may regard as proved, but there is another explanation current with regard to these. Why is no notice taken of this? Enamel is permeated, we are told, by a meshwork of living protoplasm, yet chemists tell us it contains only about 3 per cent. of organic matter. How can we harmonise these? "Heitzmann's attempt," says Miller, "to explain the inability of others to see things under the microscope just as he sees them, on the ground that they work with inferior lenses, or that their eyes have not been properly educated, can scarcely be said to meet all the requirements of a final argument. Anyone disposed to make use of the same sort of argument might be led to inquire whether Heitzmann and some of his followers have not sometimes seen just a bit too well!" We are afraid that is exactly our feeling with regard to much in this book, and therefore we regret the more the inadequate proportion that proof bears to description. But apart from those chapters dealing with these debateable matters, we notice many which but inadequately treat the subject under discussion. The development of the jaws is short and imperfect, the lower jaw, we are told, is developed principally in cartilage, though many observers say this plays only a small part in the formation of the bone, but early disappears, and they enumerate other ossific centres, these are not mentioned. The diagram showing the occlusion of a perfect set of teeth makes upper molars 2 and 3 articulate with the lowers each to each, though, as is well known, only upper molar 3 articulates with a single tooth, the others biting on two teeth. Röse's views on the development of the primitive dental band are ignored, and the permanent molars are still described as arising from the enamel organs of the second temporary, molars. In the chapter dealing with odontomata it would have been wiser to have noticed the well known classifications of Broca or Bland Sutton; and the chapter on carcinoma of the jaws but inadequately deals with these, and we certainly prefer a classification of these tumours based on the shape of the cells rather than that adopted in this book. But though we have felt compelled to adversely criticise a great deal of this work, we at the same time recognise that it is one that will and must attract a great deal of attention, and deservedly so.

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Original Communications.

LUXATION, OR THE IMMEDIATE METHOD IN THE TREATMENT OF IRREGULAR TEETH.

By GEORGE CUNNINGHAM, M.A. (Cantab.), D.M.D. (Harv.), L.D.S., Eng.

(*Continued from page* 246).

HAVING after a reasonable lapse of time arrived at a conclusion as to the probable success of such treatment, I determined to extend it to several teeth in the next case, to which I would invite your special attention. The patient was a very intelligent undergraduate, aged 20, whose teeth were fairly regular on the right, but quite irregular on the left side; especially the left upper incisor, which was so twisted and projected forwards that both speech and appearance was very materially affected. The left upper first molar was very badly decayed, and was extracted, as thereby more than sufficient space could be obtained for the rearrangement of the anterior teeth. The patient having been anæsthetised (nitrous oxide and ether), the molar was extracted, and after fracture of the alveolus between the teeth both bicuspids were luxated backwards by means of Physick's forceps. The cuspid and lateral incisor were similarly treated with the additional help of guarded ordinary forceps. On endeavouring to luxate the central incisor, owing to a curved and distorted root, it slipped down between the beaks of the forceps and thus became completely dislocated from its socket and all its normal attachments. Although not removed from the bleeding socket, to all intents and purposes it was extracted. Considerable force had to be exerted to thrust it into its new position. The teeth were ligated with thin platinum binding wire, and the parts painted with Richardson's styptic colloid. The mouth was washed freely with an alcoholic

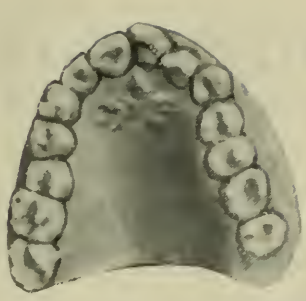

FIG. V.

FIG. VI.

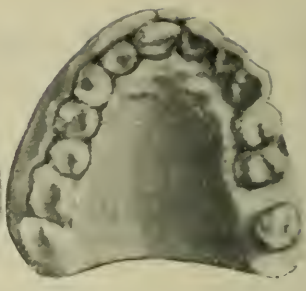

FIG. VII.

FIG. VIII.

FIG. IX.

FIG. X.

solution of saccharin, etc. (Miller), both before, and at least hourly after the operation (7, v. 92, inclusive time of same, one and a quarter hours). Dressings or ligatures, etc., were renewed on the 12, 14, 16 and 20 v. 92 on the 30th, twenty-three days after the operation, the ligatures were removed. When last seen, towards the end of July, 1893, the case was completely satisfactory. I had anticipated being obliged at a later date to trephine the central incisor for removal of the pulp, but that has not been necessary as there is not the very slightest trace of discoloration. The illustrations show the palatal aspects of the case before the operation (Figs. V. and VIII.), five and one-half months (Figs. VI. and IX.), and fourteen and one-half months after it (Figs. VII. and X.).

The next case was somewhat similar, except that the teeth were much more decayed, and some modifications in the mode of treatment were adopted. (Figs. XI. and XII.) The extraction of the left

Fig. XI.

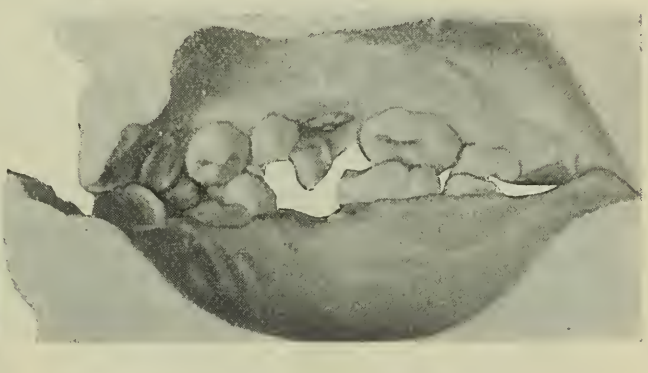

Fig. XII.

upper molar and the left lower molar roots was done four days before the operation for luxation, which was performed on the 19th of November, 1892, and without an anæsthetic. The teeth luxated were the two upper bicuspids, cuspid and lateral incisor on the left side, the latter being raised quite half a crown length out of the socket, and thus was practically extracted and replanted. A binding wire splint was applied, and the mouth well washed with the saccharin wash, with hydrogen peroxide added to intensify the action. The patient wrote in his notes of the case that the operation "was not so painful as having the teeth extracted, though of course it took a much longer time." On his return from the Christmas vacation,

fifty-six days after the operation, the ligatures were removed. In June last, seven months after, the case was examined and found to be doing well. (Figs. XIII. and XIV.)

FIG. XIII.

FIG. XIV.

The next case is merely an illustration of what may be regarded as a preliminary study for a similar operation. (Fig. XV.) I would

FIG. XV.

FIG. XVI.

take this opportunity of showing how valuable is the Davenport split model in demonstrating the functional value of the denture, which after all is surely the cardinal factor underlying all successful regulation. On the left side of the mouth, after the extraction of both the first molars at the age of fifteen years or thereabouts, the arch is regular and the result viewed from the outside seemingly excellent. But the functional value is evidently greatly impaired as shown in this view from the inside. (Fig. XVII.) On the right side only the superior second bicuspid was extracted, and the result is still worse, as there is so much crowding in and out of the upper teeth that they do not articulate at all with their lower antagonists. (Fig. XVI.) The patient was recommended to me for treatment on

the usual methods on the assumption that he would submit in his undergraduate days to the necessarily long and tedious process which he had persistently refused in his school-boy life. I was convinced that he would never submit to the ordinary methods, and finding that the third upper molar would shortly erupt, I proposed to extract that, to divide the alveolus into sections each containing a tooth, and to rearrange them as shown in the next illustration.

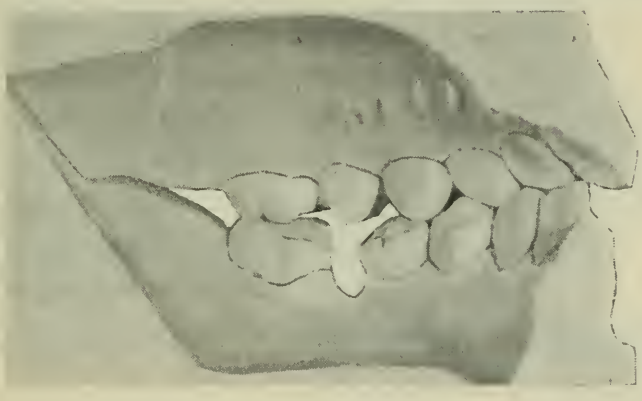

FIG. XVII.

FIG. XVIII.

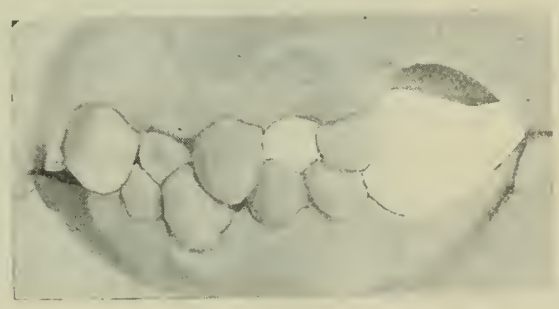

FIG. XIX.

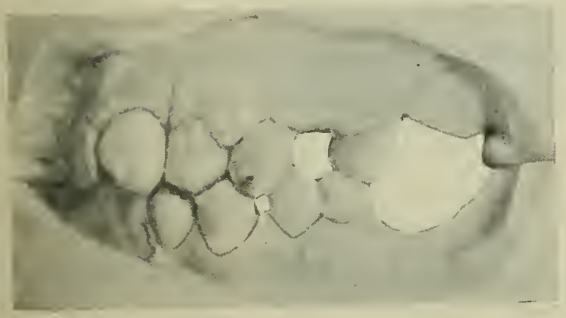

FIG. XXI.

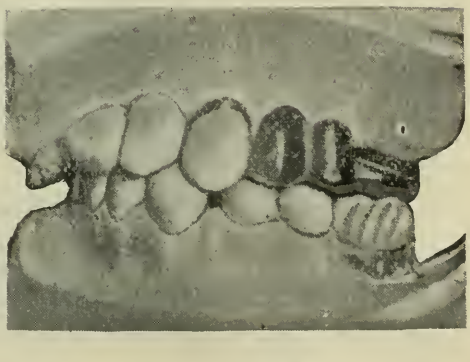

FIG. XXIII.

FIG. XX.

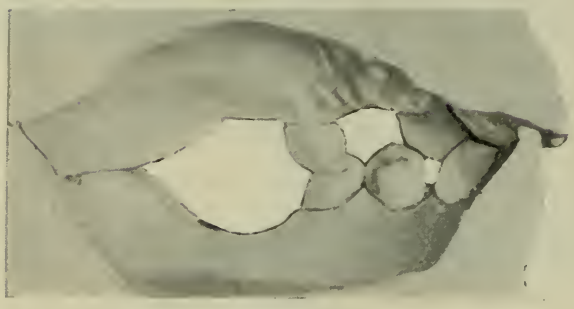

FIG. XXII.

FIG. XXIV.

(Fig. XXIV.) After consultation with my first patient he consented, but said he must first consult his father *and* his dentist, with the result which I foresaw. The case remains as it was, the teeth are entirely functionless and quite disfiguring.

The next case is typical of a not uncommon irregularity found in adult life. The patient was aged 36, and required bridge work or artificial teeth. The utility of any such appliance or appliances is manifestly and seriously diminished should some one tooth so interlock that the natural motions of the jaw are materially restrained—in this case the left upper lateral incisor. (Figs. XVIII. to XXIII., inclusive.) Two incisions with a circular saw revolved in the dental engine were made on each side of the tooth, which was then luxated into position and ligatured as before. No anæsthetic was administered and the whole operation did not last more than a quarter of an hour. Similar treatment followed and the ligatures were removed in thirty-five days.

My last case was very similar in every respect, except that the tooth was an upper right first bicuspid biting inside the lower arch. (Figs. XXV. to XXVI.) The treatment was similar in every respect except

that a splint consisting of a double ferrule of platinum was substituted for the wire ligature. (Fig. XXVII.) The pain of the operation was mitigated by internal administration of sixty drops of sal volatile, and one one-fourth grain cocaine tabloid was allowed to dissolve under the tongue, and a strong solution of cocaine applied to the gum. The patient reported that the operation was less painful than a very difficult extraction of a buried root of the right lower molar

FIG. XXV.

FIG. XXVI.

FIG. XXVII.

on the previous day. The actual operation took ten minutes, and the preparations and dressings one-half hour. This splint was much more comfortable than the wire ligatures, and was removed on the 22nd day. When last seen in June the case was doing well. (Figs. XXVIII. and XXIX.)

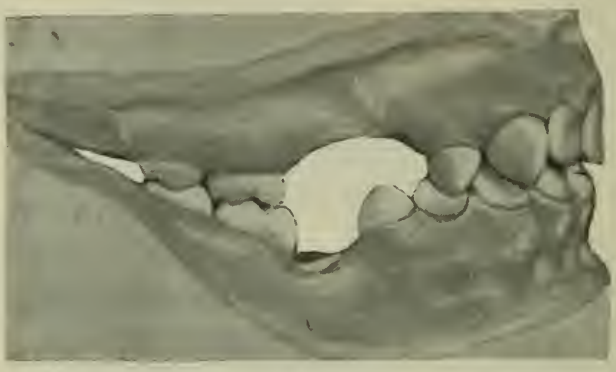

FIG. XXVIII

FIG. XXIX.

LUXATION, OR THE IMMEDIATE METHOD IN THE TREATMENT OF IRREGULAR TEETH.—MODUS OPERANDI.

(*a*) All the teeth should be thoroughly scaled, cavities filled and an alcoholic saccharin wash used several times a day before operation.

(*b*) On day of operation. Brushing the teeth and bathing them with saccharin wash—better with H_2O_2 than H_2O for dilution—same wash after the operation and frequently next few days.

(*c*) It is well except in the simplest cases to have studied a model, making the rearrangement of the teeth on a duplicate model. If a splint can be prepared from this ready for use immediately after the operation, so much the better.

(*d*) All being ready, cut the alveolus with a thin circular saw. $\frac{7}{8}$ inch to $1\frac{1}{4}$ inch in diameter, not thicker than thin note paper, into such sections as are necessary. This is quickly done, and can be borne quite frequently without any anæsthetic. Forceps, elevator or other instrument is used for pushing, pulling or rotating the tooth sections into place. Forceps should have the beaks guarded. I use copper sheaths moulded and soldered so as to fit the beaks fairly tightly. Rubber sheaths, soft or hard, will also do. Dr. Bryan's special forceps with curved support for bringing a tooth inside the arch into line seems well adapted for this purpose. In moving teeth backward or rotating teeth out of line into the arch is much facilitated when a badly carious neighbouring tooth must be extracted. This extraction may be done at the time, but possibly better two days or so previously, as the local post-operative inflammation facilitates the bending and movements of the alveolus. In such cases the sectionising of the tooth and its alveolus may be done with a pair of surgical bone cutters, or even with Physick's wisdom teeth forceps. The wedge-shaped beaks of the latter are extremely useful when it is necessary to push the teeth backwards. The movement of the tooth or teeth into the desired position may be very easy, but often requires great strength carefully applied. One to six teeth have been so moved. The chief point in the operation is to move each tooth with its socket entire as far as that may be possible.

(*e*) The teeth when in position should be ligated with silk or thin silvered steel wire, preferably the latter, or fixed in a splint. Thin German silver or platinum bands soldered together make a good splint.

(*f*) Care must be taken in closing the teeth, as the articulation is almost certain to require adjustment by disking, &c. Carborundum wheels work quickest.

(*g*) When finished, syringe thoroughly with peroxide, saccharin wash, especially any pockets or spaces marking the previous position of the moved teeth. Paint all the bleeding or cut surfaces with Richardson's styptic colloid. To a saturated solution of tannic acid in alcohol and ether (equal parts) pryoxylin (gun cotton) is added as

the liquid will disolve (tannin collodion preparation). The pain has usually subsided by this time and the patient feels fairly comfortable. The patient should be seen next day in case the teeth have moved —syringing, styptic and cleansing, as before. If possible, continue this treatment for next few days, the patient always using the wash after meals. In a few cases new ligatures may be unnecessary, ligatures should be renewed or dispensed with as required by the indications. A period of three or four weeks is usually ample time for retention by ligatures or splints.

DEAD TEETH.*

By John G. Ranken, L.D.S., Eng.

I have adopted the following classification of dead teeth :

1. After heroic extirpation of a live pulp ;
2. After removing a devitalized pulp ;
3. After removing a putrescent pulp ;
4. When there is abscess with fistulous opening ;
5. When there is abscess without fistulous opening, a blind abscess.

1. This classification includes all teeth requiring root treatment and filling.

2. The first step in the treatment of all dead teeth is to so shape the cavity in the tooth that easy access to the canals may be assured. In some cases it is advisable that an entirely new opening should be drilled, especially in the case of front teeth, and sometimes in that of back teeth with small interstitial cavities leading to an exposure.

The second step is the removal of the contents of the pulp chamber and canal, having special regard to the risks of forcing septic material through the apex of the canal and thus infecting or irritating apical tissues. A fine watchmaker's broach, a barbed Donaldson, an orange wood point forced up the canal—the pulp thus ejected whole—or some other kind of nerve extractor passed well to the apex and quickly rotated will often effect the removal of the pulp in an entire state ; or by means of a Moray or a Gates-Glidden drill, taking special care to avoid the perforation or making of a false

* A Paper read before the North of England Odontological Society.

opening through the root, the canal may be thoroughly cleared of *débris*. Enlarge the orifice of the canal, inject absolute alcohol, and dry with a hot air-syringe or by passing a fine wire heated in the spirit lamp flame several times up and down. The canals will now be in a fit state to receive whatever kind of root-filling material may be most favoured by the operator.

3. The first two divisions of my classification "after heroic extirpation of a live pulp" and "after removal of a devitalized pulp," are so nearly akin that we may generally fix upon the same treatment in either case. At no time, after careful removal of every fragment of the pulp out of each canal, and the thorough drying out of the canals by means of the injection of alcohol and the use of the hot air-syringe, will the roots be in a more aseptic condition and in a more fit state for the practice of immediate root-filling, the means by which this class of teeth are most often filled. It is as well to remember that the removal of all pulp tissue—so necessary an adjunct in the case of immediate root-filling—is, as regards the buccal roots of upper molars, the small roots of bicuspids and the anterior roots of lower molars a matter of no great certainty, and thus in such teeth immediate root-filling is not the infallible treatment it is claimed by many to be. Again, the objections to immediate root-filling after extirpation relates to the difficulties experienced of thoroughly drying the canals after hæmorrhage or any exudation which may have occurred during the operation ; to the severe pain experienced by a patient during the forcing a filling to the apex of the canals, as is absolutely necessary for the root-filling to be a success ; and again the great soreness and discomfort experienced in some cases for many days after the immediate root-filling has been performed. Often these objections do not exist, or may be easily overcome or endured if it is desirable or necessary to take time into consideration.

4. The third class, or those dead teeth as they exist after the removal of a putrescent pulp, are often difficult to distinguish from teeth having blind abscess, and the avoidance of a tightly closed in dressing is, during the first stage of treatment, a desideratum, as, on account of the stimulation of treatment, the active formation of pus, when not present, is often instigated. Having cleared out the canals, the walls of which, in this class of tooth, are often soft and moist, and especially favourable to the careful usage of a Gates-Glidden,

the method generally followed is to place loosely in each canal some strong antiseptic dressing on cotton wool, leave it for week, and a state of quiesence having existed for that time, a permanent root-filling may be introduced with safety in nearly every case.

The antiseptics used for this kind of dressing are: Perchloride of Mercury, 1-250, Carbolic Acid, Eucalyptus, Oil of Cassia, Iodoform, and others specially favoured by individual operators.

Although the immediate root-filler maintains that as the contents of the pulp chamber and canals are the immediate cause of an abscess, should it exist in such cases, and that owing to the minuteness of the apical foramen in many teeth it is impossible to secure proper drainage, therefore, if the apices of canals are filled with a permanent filling, the pent up pus will somehow cease to exist; the primary cause being removed, all careful operators will favour the slower method of treatment, with, in the vast majority of cases, a greater percentage of successes.

5. In the fourth class we have teeth abscessed and having a fistulous opening in connection with the so-called abscess sac. This fistulous opening is generally a suppurating tract, in many cases opening on the gums in the immediate vicinity of the offending tooth; in some cases the tract is of considerable length, and opens at a point some distance from its origin. The patient generally complains of a gumboil making its appearance periodically, enlarging, bursting, and subsiding after discharging its noxious contents into the mouth, no pain being felt, as a rule. This class of dead tooth, provided the abscess is not of very long standing, and absorption of the apices of the roots has not occurred to any very considerable extent, is amenable to immediate root-filling.

The best method of treatment is to clean out the canals as well as possible, pass a fine broach or Donaldson through the apex of the root, and then to place as far down the cleaned out canal as one can, without exerting any great pressure, the needle of a hypodermic syringe, pack around the needle gutta-percha, fill the syringe with carbolic acid, screw it on to the needle, and gentle pressure will almost immediately force a certain amount of the acid along the suppurating fistulous tract and produce a white eschar upon that surface of tissue where the gumboil has been in the habit of forming. Having accomplished this, healthy granulation is stimulated, throughout the tract, the canal may, after the withdrawal of the

hypodermic needle and gutta-percha, be dehydrated with alcohol, dried with the hot air-syringe, and immediately filled, the main filling also may be inserted on the same occasion with almost perfect safety.

Another method, where the hypodermic syringe is not at hand, is to wrap around a fine broach cotton wool soaked in a strong antiseptic, and by a pumping motion force the antiseptic along the whole tract.

The objections to the immediate root-filling of this class of teeth, are: First, it is better to find out whether our treatment is likely to be successful before inserting a permanent filling and secondly, the teeth are sometimes in such a septic condition that the surrounding dentinal tubuli are filled with the products of putrefaction, as is evidenced from the great change in colour. This state many operators affirm it is desirable to get rid of as far as possible by the continual changing of strong antiseptics in the canals, after dehydrating with alcohol and the use of the hot air-syringe. I believe that little result any kind is gained by the last mentioned method.

6. My last sub-division treats of that class of dead teeth which are generally the least amenable to conservative treatment. I speak of teeth having blind abscess. They are primarily difficult of diagnosis; we get them sometimes pointing, when the diagnosis is easy, and the treatment simplified by making an opening over the spot indicated by the pointing pus, and treating the tooth as one having a fistulous opening; at other times it is impossible even after passing a broach through the apex of the root canals to get a discharge of pus following the withdrawal of the broach, and yet circumstances in the history of the tooth may seem to indicate the presence of a blind abscess; yet it is urged upon us by many distinguished and successful practitioners that even this class of tooth is amenable to immediate root-filling. This class of tooth is the one in which immediate root-filling is most dangerous and unjustifiable. It must be remembered that, although we may find the canal or canals entirely free from obstructive material, yet the apical tissues are very often inflamed, although quiescent, and it is necessary that, for a successful issue to be obtained, these tissues should be got into such a state that, after the permanent closure of the root apex, no inflammation or collection of pus should be allowed

to exist amongst the apical tissues as this might afterwards necessitate the removal of the tooth itself. In all cases of blind or suspected blind abscess, careful clearing of the canals—some operators even forcing a hole through the apical foramina until blood or pus drain down the canal—is of the utmost importance ; leave the canals entirely free for a few days, and then loose antiseptic dressings on cotton wool should be inserted, and changed daily until they are withdrawn from the canals in a sweet and clean state.

If time is an object, the performance of rhizodontrophy is better by far than immediate root-filling, and in any case it is as well after filling the canals to paint over the roots of the tooth, using a camel-hair pencil, a mixture of double strength tincture of Iodine and Fleming's Tincture of Aconite.

In all cases the apical end of the root canals of the dead tooth should be permanently closed as soon as the canal is free from putrescent material, having of course allowed a sufficiency of time and correct course of treatment to have assured ourselves that the canals will remain clean.

The question arises, what is the best material with which to permanently close the root foramina so that no septic material may gain entrance into the root canal ? That it should be antiseptic, easy of introduction—so as to be adaptable to the shape of the canal—and of such a nature as to reach the apex and yet be easy of removal should the necessity arise are the essentials of a root-filling.

Nearly every operator has his own pet root-filling, which he thinks is undoubtedly the best; some few of these I will very slightly touch upon. Gutta-percha points stand first in the field in answering most effectually the demands on a permanent root-filling. Three distinct methods of inserting them are employed in practice :—

I. The canal is thoroughly dried, mopped out with chloroform, and a suitable sized point driven carefully, with the aid of a root-filler, to the apex of the canal.

II. The canal being dried, a chloro-percha solution, which when thin seems as susceptible to capillary attraction as water, is forced into the canal about to be filled, then a suitable point is chosen and driven home, great care being exercised that none of the solution is forced through the apex, as disastrous results are likely to follow such a mishap.

III. A saturated solution of aristol in chloroform being worked up the canal in the same way as the chloro-percha solution and a G.P. point driven home ; it is asserted by some operators that if any of the solution passes, as a result of pressure, through the apical foramen, no unfortunate result will follow, the aristol solution not being of an irritating nature.

Gold and copper wire of a length and tapering fineness suitable to the canal to be filled, in conjunction with chloro-percha, seems the next nearest to the ideal root-filling.

Gramme's copper canal points, in conjunction with bees'-wax, which by the aid of a hot bristle is first inserted into the canal, and, it is claimed, the dental fibrils also, seems to afford a large amount of satisfaction. The copper canal point having been slightly heated is forced into the wax, containing canal in much the same way as the G.P. points are forced into the canals containing chloro-percha solution.

Wood points soaked in a carbolized resin may be used in the same way as the metal points.

Celluloid strips having collodion as a conductor have recently been introduced by Mr. Tomes, and he claims that they make a most effective root-filling.

Bee's-wax passed into the canal in threads and a heated bristle passed up to melt the wax until the canal is filled, oxy-phosphate, and oxy-chloride of zinc, plaster of Paris, and amalgam, of which Sullivan's, on account of its antiseptic, preservative and strengthening action, is stated to be the best, all have their adherents.

Lastly, we have various dressings of wool, and such drugs as Iodoform, Eucalyptus, Oil of Cassia, Perchloride of Mercury (1-1000), Carbolic and Creosote, which as dressings possess a large amount of merit, yet are not admissible as permanent root-fillings, although they are sometimes used as such.

I thank you gentlemen for your kind attention to what must have been, on acconnt of its antiquity, somewhat dry matter to you, and hope that a severe criticism may be meted out upon my effort, in order that I may benefit by your matured experience.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ANNUAL MEETING was held on the 10th June, the President, Mr. Frederick Canton, L.R.C.P., M.R.C.S., L.S.A., L.D.S., in the Chair.

The minutes of the previous ordinary monthly meeting were read and confirmed.

The ballot for the election of officers was proceeded with, Mr. George Hern and Mr. G. O. Richards being appointed Scrutineers.

In the course of the evening the President announced that all the officers recommended by the Council had been unanimously elected the result being as follows :—

President : David Hepburn. Vice-Presidents : (resident) : Ashley Gibbings, John Fairbank, C. J. Boyd Wallis; (non-resident) W. E. Harding (Shrewsbury), George Henry (Hastings), and J. F. Cole (Ipswich). Treasurer : S. J. Hutchinson. Librarian : W. A. Maggs. Curator : Storer Bennett. Editor of Transactions : Edward Lloyd Williams. Honorary Secretaries : J. H. Mummery (foreign), J. F. Colyer (council), and Clayton Woodhouse (society). Councillors (resident) : C. E. Truman, W. R. Humby, W. B. Paterson, Harry Baldwin, John Gartley, Cornelius Robbins, Sidney Spokes, Alfred Smith, G. D. Curnoch ; (non-resident) G. G. Campion (Manchester) J. McKno Ackland (Exeter), J. H. McCall (Leicester), T. Arkövy (Budapest) A. W. W. Baker (Dublin), F. E. Huxley (Birmingham), Geo. Cunningham (Cambridge), C. B. Mason (Scarborough), and J. J. Andrew (Belfast).

The PRESIDENT stated that the obligation forms had been signed by Messrs. F. C. Porter, Robt. Peake, and Francis Flintan; and they had been duly admitted to membership.

Messrs. Wm. Jarvis, M.D.S., Brooklyn, New York, and Jno. Tomlinson, L.D.S.Eng., were elected members of the Society.

The TREASURER (Mr. S. J. HUTCHINSON) presented the annual financial report and statement, and, in the course of his remarks, said that the finances of the Society were in a flourishing condition. The total receipts had been £541 2s. 6d., and the total expenditure

£444 6s. 10d.; leaving a balance of receipts over expenditure of £96 15s. 8d. He was glad to be able to tell the Society that with the dividends which had accrued, and further small investments, the total of their invested capital at date was £4,026. Another point he should like to emphasise, viz., that out of a total of 377 members there were only 63 who had not paid their subscriptions for the current year. He thought that a very gratifying circumstance. Of the 377 members, 87 paid their subscriptions through the Bank, and he would like to take the opportunity of thanking them for doing so, as it it materially lessened the clerical work, and also ensured greater accuracy in the accounts. Those gentlemen who were present at the annual meeting when it was decided to alter the bye-laws so that the annual meeting should be moved from January to June, would remember that there was some little discussion as to how the financial year should be regulated. He thought it desirable to take this opportunity of reading a letter from the chartered accountants who audit the Society's accounts, giving an answer to the question which we asked them with regard to the financial year. It would seem anomalous, probably, to many of them that the financial year should terminate on the 31st October, and the annual meeting should be held on the first Monday in the following June. He would read the letter from the accountants, in order that it might be placed on record in the transactions: "Dear Sir,—In reply to the question of your letter, in our opinion it would cause great confusion if the date of the accounts to which they are now made up was altered, unless at the same time the date of the subscription was changed, and we think this can hardly be done without a large amount of explanation, which would require considerable correspondence; and, even then, we believe many of the members would be dissatisfied at the alteration and at the result." He thought it might be taken, therefore, on the authority of these gentlemen, that it was desirable to continue the present date of the financial year, terminating on the 31st October in the year previous to the annual meeting. Of course, it only made a difference of three or four months at the most. The annual meeting was formerly held in January; now it was held in June, and the financial year terminates in the October of the previous year. Probably it would be for the benefit of future treasurers that his remarks upon the subject should be placed on the records of the Society.

The Librarian (Mr. W. A. Maggs) announced that Mr. Henry Rose's book on "Vulcanite Work," and Mr. Hopewell Smith's book, "Dental Microscopy," have both been presented to the Society by the authors. The "Transactions of the American Dental Association," and the "Transactions of the Chicago Congress" had also been received. In the course of his Annual Report he stated that the number of books borrowed since the 1st of January, 1894, to date was 92. It would be remembered that during that period books had only been lent to *members* of the Society, and not to students as formerly. The list of exchanges has been increased. As was well known to members, the Library is opened on Mondays, Wednesdays, and Fridays, from 6.45 p.m. to 8.45 p.m. This arrangement been in force since the last Annual Meeting of January, had 1894, and the sub-Librarian was in attendance upon those evenings. He regretted to say that the attendance was rather meagre, so much so that unless the reading room was more frequented the Council might not feel justified in retaining the services of the assistant. Some volumes and numbers of the Transactions have been sold during the year, and there were still some copies that might be obtained. These sales had proved acceptable to some of the members, as they had been enabled to complete their series, and it had also increased the space at disposal in the Library—a matter of some importance. In conclusion, he would call attention to the fact that there was a Suggestion Book on the Library table, in which the name of any book required might be entered, and the Council was always glad to receive any such suggestions.

The Curator (Mr. Storer Bennett) said he had a somewhat lengthy list of specimens to present to the Society, it so happening that during the last month a very great number of specimens had been sent to the Museum by two or three different members. Mr. Gartley, in response to a request made some little time ago, had given some specimens of bone work in which the teeth have been carved out from a solid piece of ivory. He should be very glad indeed if any of the older practitioners who possess specimens of bone work with natural teeth mounted upon them, and did not specially value those sets of teeth, would present them to the Museum. From day to day these things must get rarer, and the time would come when they would not exist excepting in their Museums. Mr. Bridgman, of Norwich, had sent a model taken from

the mouth of a boy aged nine, in which there were two gemmated temporary teeth on the right side. Those teeth were extracted. On the left side of the mouth the two teeth were not gemmated. These also were extracted. Mr. Bridgman has sent the specimens up as well as the models. Mr. Mackley, one of the house surgeons of the Dental Hospital of London, had presented an extremely interesting specimen. It consisted of the left upper central and lateral incisors taken from a boy aged thirteen. When six years of age he received a blow on the front, on the mouth, which necessitated the extraction of two or three temporary teeth, and as some of the bone necrosed, some pieces of necrosed bone were subsequently removed. When the boy came under the observation of the hospital, at the age of thirteen, it was found that the left upper central and the lateral were perfectly loose. On the removal of the teeth the central was found to have no root, but merely a cup-shaped depression showing considerable absorption, and an extremely large pulp cavity. The lateral showed that the development of the root had gone on to a larger extent than in the case of the central, but there was a thin twig-like piece of dentine surrounding the pulp which had been dislocated. It was found that this was in point of fact an extremely good specimen of di-laceration, and what was not so common in these cases, they had in addition a history which they could follow out. It often happened that these specimens come into one's hands with absolutely no history whatever, but in this case they had a clear history of injury having taken place at the front of the mouth at the age of six years. Messrs. Ash & Sons had sent two ancient instruments received by them from a practitioner, instruments which he was happy to say had long since passed into the realms of the forgotten. They would be very sorry to have any such instruments used upon themselves or their patients, Mr. Merson, of South Moulton, had sent some specimens ; one, a skull of a cart horse seven years of age, showing perfect dentition. Another, a part of the upper jaw of a young ox, showing the three pre-molars and three molars. Also the skulls of a very old dog and of a vixen fox. The vixen fox had almost complete dentition, but one or two of the teeth were unfortunately loose. These were interesting specimens. The remaining specimens, five in number, had been sent to the Museum by Mr. Morton Smale, and they formed a most valuable contribution to their Museum. First he would mention the skull of a young lion, until now they had had absolutely no specimen of a lion's skull in

the Museum, but this, being a young one, was additionally interesting, for it deprived them of their usual means of deciding whether it was the skull of a lion or that of a tiger. It might be known to some of the members of the society, although he did not think it was commonly known, and he had never seen it noticed in any text book, that the way to tell the skull of a lion from that of a tiger is by an examination of the nasal bones. In the skull of the tiger the nasal bones are longer than the bones of the superior maxilla, and are more pointed, but in the lion they are shorter than the superior maxillary bone and are rounded. Of course, the characteristics of all animals were most marked in adult life. For this reason the distinctive peculiarites of the lion were so little prominent as to make it difficult to say whether it was the skull of a lion or a tiger, though even now it could be quite well be differentiated. He would next refer to the skull of a bear, the *ursus maritimus*, or polar bear. This was an exceedingly interesting specimen, because it showed the two small pre-molars situated immediately behind the canines, and in the left side of the mandible a little supernumerary pre-molar deeply imbedded in the substance of the jaw. How it came to be ever suspected that it was present in the jaw, unless it was simply the result of this fracture, Mr. Bennett quite failed to understand. However, anyone who would examine the specimen would be interested to see this little tiny tooth imbedded deeply in the substance of the bone. On the other side Mr. Smale had had a window cut in the jaw itself, and it was obvious there was no similar teeth to be seen. In the skull of an African sheep they had some extremely interesting irregularities. The three pre-molars in the upper jaw on both sides were very much crowded, indeed, they were overlapping one another in a way that was very unusual in the lower animals. This, however, was a domesticated creature, and therefore perhaps it was not so surprising as if it had been absolutely wild. He also had to bring to their notice two halves of the mandible of a red kangaroo, showing on the right side an enormous amount of swelling from periostitis. There had been alveolar abscess and it would be observed how much new bone has been thrown out on the line of the old molar. He now came to the skull of a young chimpanzee. Caries was present in several places, but it was more particularly interesting because the second permanent molar had developed in a very unusual position, it was lying on its lingual side.

Instead of being developed in the lower jaw with the crown upward, and the part which should form the roots downward more towards the base of the jaw, it was turned on its side, so that the part which should eventually form the root was turned outwards towards the outer alveolar plate. In looking over the exceedingly valuable collection of specimens that Mr. Smale had previously presented to the Museum, Mr. Bennett noticed that was the case in the specimen of a young chimpanzee, and he pointed it out to Mr. Morton Smale, who, when he came across this specimen, found that the appearance was identical with that in the other specimen. Whether that was always the case, or whether it was a mere coincidence he (the Curator) was not at present prepared to say. The next specimen he would draw attention to was part of the right upper maxilla, with the floor of the antrum enclosing the second bicuspid and first and second molars, from a man aged 45. He had received a kick on the jaw which broke this piece of bone off, and he came to the hospital bearing it in his hands. Curiously enough, no untoward symptoms presented themselves afterwards, the parts healed up readily, and the man was discharged without any difficulty whatever, no suppuration occurring from beginning to end. Finally, he would point to an upper molar which had an odontome the size of a small hazel nut on the back of it. This was hollow at the time of the removal of the tooth, and contained a cavity, evidently carious. Before he received it the caries was scraped away, but that was the description of the specimen given : that the cavity as you see it was quite carious. With regard to the work of the Museum during the year and three months since the last Annual Meeting : the Museum had been opened, as it was promised it would be, on three evenings a week from 6.30 to 8.30. During that time there have been 52 visitors, or rather, there have been 52 entries of names. He might say that that did not represent the interest of 52 different gentlemen. Some few gentlemen have been a good many times, but the number of names was unfortunately rather sparse, as in all these cases it was only a few who took an interest in such matters. Since the last Annual Report 45 specimens had been presented to the Museum. Following the precedent of the last year or two, they were all placed upon the table. He would remark that in the specimen presented by Mr. Morton Smale two or three months ago, of a pig, showing the termination of a root of the lower incisors, the bone had been

cut away so as to show the enlargement as fully as possible. In conclusion, he would urge any gentlemen who possessed any specimens of old methods of making artificial teeth, to present them to the Museum before they were lost.

Mr. GARTLEY presented an ancient form of key used for tooth extraction.

Mr. MATHESON said Mr. Thomas Jackson, Jnr., of Burnley, had given him permission to show a very interesting case of odontome, occurring in the right pre-maxillary region—an odontome which, according to Broca's classification, would be called an odontome odontoplastic, and by Mr. Bland Sutton a composite odontome. Some might doubtless prefer to call it a supernumerary tooth. It occurred in the incisor region in the mouth of a man from 19 to 20, who found no inconvenience or pain arising from it, but simply wished it to be removed as a matter of vanity. It was proposed that it should be removed and two incisors put in its place, and on its removal it was found that the right central incisor was present in a perfectly normal position at the bottom of the socket of the abnormal development. Mr. Jackson thereupon recommended his patient to wait and see whether the central tooth would come down into its proper position as it seemed likely to do. The case came into Mr. Jackson's hands early in March, but he had not been able to see its progress since. He noticed that just at the end of the root there was a considerable amount of absorption going on exactly in the position the cutting edge of the incisor found at the bottom of the socket would take.

Mr. GEO. THOMSON (Torquay) presented a specimen of so called bridge work, gold crowns being fixed to the plate or bridge. The patient has been coming to him for the last two or three years complaining of pain. From the first he had advised the removal of the whole thing, but she went on until her health quite broke down, and then her medical adviser urged its removal. It had been in the mouth about four years. He also showed a specimen of a tooth which he extracted last year. It appeared that in the year 1869 his patient was struck on the face by the jib-boom of a yacht. In the following year, thinking that he had recovered from the effects of the blow, he came to London, where he was married. During his honeymoon he had a swollen face, and on application to a dentist for relief the left upper lateral was removed. The swelling subsided,

and he thought it was all over. A few months afterwards the same thing occurred. The abscess was opened and afterwards the second bicuspid removed. About six months ago it became necessary to see the dentist again. He had been under medical treatment for a certain time and was again troubled with external swelling of the cheek. He, Mr. Thomson, advised the removal of the second molar, and on that being done it was found that one of the roots was fractured. This was removed, and it appeared that that fractured part of the root had been kept in position for about twenty-five years.

Mr. BRUNTON showed what he regarded as a cleverly contrived cervical clamp, the production of Mr. Woodward, of America. He said the object of the clamp was to screw in the bite so as to clamp to the higher or lower cervical cavity.

Mr. SIDNEY SPOKES said: Since giving notice of a casual communication "On some cases of immediate regulation," he found that another member was to read a paper that evening on the same subject. This made it easier for him to avoid alluding to historical and other details, which no doubt would be dealt with by Dr. Cunningham. His communication comprised cases in which certain permanent teeth in the upper jaw had erupted within the arch, being bitten over by the lower teeth, and in which, in each case, the corresponding temporary teeth were persisting. The usual method of treatment where permanent teeth were prevented from taking their proper place by their retained temporary predecessors was, of course, to extract the latter, but where the former had already become shut within the bite by the lower teeth, some further interference was necessary. The ordinary method adopted in such cases in this country was to insert a plate, which raised the bite and allowed the permanent tooth to be pushed out; and although no one had been successful in bringing permanent teeth over the cutting edges of the lower teeth without any such arrangement, yet he supposed there were cases where permanent teeth might be pushed or led up to the cutting edges of the lower teeth, but would refuse to come over. The slides he would show illustrated a simple and, he believed, a justifiable way of treating the cases first mentioned. The temporary teeth were extracted and their permanent successors were immediately afterwards grasped with the forceps and forcibly advanced over the edges of the lower teeth. Where there were neighbouring teeth a

silver wire interlaced was sufficient to hold the advanced tooth in its new position. The accidents which might happen were, first, the loss of the permanent tooth through injury to its pulp or by unintentional extraction; and, secondly, chipping of the enamel, but both of these he thought could be avoided. In the ten cases which he now brought forward, four centrals and six laterals were all comfortably in good position, and responded to the heat test. Of the three cases of canines, one only could be regarded as successful, although one other was now in good position. The forceps used were those generally employed for upper temporary molars, and might be conveniently guarded with india-rubber tubing on the blades. Photographs of models taken showing the progress of the thirteen cases referred to were then shown upon the screen, and details of the treatment employed in each case were given. The ages of the patients varied from eight to eighteen, and Mr. Spokes remarked that the treatment adopted was apparently painless, no complaint being made by the patients of pain. The cases of the canines were no doubt the least satisfactory.

The discussion upon this communication was adjouined until after the reading of Dr. Cunningham's paper, entitled "Luxation," which was then proceeded with. The paper, in its main lines, travelled over the ground of the original illustrated article, of which we publish the concluding portion in this issue, but it was amplified by additional cases, for which we hope to find space in a later issue.

At the close of the paper, the President questioned whether it would not be desirable, in view of the lateness of the hour, to postpone the discussion to a future meeting. The question was one entirely for the members to decide, but it seemed to him that the communication was a very interesting and important one, and that it would be impossible adequately to discuss it in the time remaining at their disposal. It was decided, on the vote being taken, to postpone the further consideratoin of the subject until the November or subsequent meeting, at the discretion of the Executive.

The PRESIDENT, rising, then said: His term of office having come to an end, it only remained for him to make a few valedictory remarks. He would only detain them a few minutes. Owing to the alteration of the date of the Annual Meeting, it had been his privilege to preside over the Society for a longer period than usual, namely, for a year and a half, instead of one year. During that

period they had had twelve meetings, at which some very interesting Casual Communications had been brought before them, and nine papers had been read. One evening had been given up to a microscopical display and conversation. The members had during his year of office dined together for the first time. The gathering, notwithstanding the inclemency of the weather, was fairly good, and he believed that the evening was appreciated by those present. Should it be thought well to continue the dinner as an annual affair, or to try it again experimentally, it would perhaps be better to make it later in the year, but this year they would be unable to secure the room for a later period. Owing to the exertions of their Secretaries, the Society had been able at the beginning of the Session to issue a complete programme for its coming meetings, a thing never before accomplished. The meetings had been well attended. It must be gratifying to know that fifty-five new members had joined the Society since the last Annual Meeting. Five were removed by death, five had resigned, and five had their names removed, making a total loss of fifteen, leaving a net gain of forty, and bringing the number of ordinary members up to four hundred and nine. In addition to that they had thirty-five honorary and corresponding members, a number which he thought very much in excess of what it should be for so small a Society. Much larger Societies limited their number to ten or twelve, and it would be well to reduce the number in this respect. In conclusion he wished to thank them for the support accorded to him during his term of office, and especially to thank his secretaries and colleagues on the Council.

Mr. Alfred Coleman said he was sure that the proposition he had to make would be heartily responded to, not only by those present, but by every member of the Society. It was that their best thanks be given to their retiring President for the excellent manner in which he had presided over the Society during the period of one and a half year. It was his (Mr. Coleman's) great privilege to have had their President as one of his pupils. He was happy to tell them, as they would naturally expect, that Mr. Canton was a very attentive and diligent student, and very successful in the work which he carried out. It afterwards became his still greater privilege to be associated with Mr. Canton as a colleague, and, as in his case, o he could say of all his colleagues, that they worked together

most harmoniously, in the most friendly manner, and, he might add without presumption, to the good of the Institution with which they were associated. There were many members who had had greater opportunities of knowing the work carried out by Mr. Canton during the past period of his presidency, but their Transactions so admirably represented the work carried out at the Society, that, reading them as he did very attentively, he could form some judgment at least of the excellent manner in which the duties of the President had been discharged, and for which he now asked the Society to accord a hearty vote of thanks.

Mr. MATHESON said it was a great privilege to be able to second the proposition made by his old teacher of twenty years ago, and for whom he had great regard. The presidency of the Society was looked upon, and rightly so, as one of the greatest honours which the dental profession could bestow upon one of its members ; but they must not forget that whilst it was an honour to be president of the Odontological Society, it also involved labours and duties both strenuous and hard. It was for fulfilling those difficult and strenuous duties so faithfully, so worthily, and with such grace and urbanity, that he now had pleasure in seconding this vote of thanks to their President.

The vote of thanks was carried by acclamation.

The PRESIDENT said he could assure Mr. Coleman and Mr. Matheson that he thoroughly appreciated the honour which was done to him by electing him to the office which he had filled. It had been most gratifying to him to see Mr. Coleman present amongst them, and to hear him propose this vote of thanks, for which he (the President) thanked them all most heartily.

Mr. BRUNTON proposed that a vote of thanks be given to the officers of the Society, including the Treasurer, the Secretaries, the Librarian, and the Curator. He could not say that they had all been pupils of his, but he knew them individually, he knew the work which they did, and he could testify to the thoroughness and the heartiness with which they did it. He had great pleasure in moving the resolution.

Mr. VANDERPANT seconded the resolution, which was carried by acclamation.

Mr. ROBBINS, on behalf of the officers, returned their best thanks for the kind manner in which the resolution had been proposed and

passed. He supposed he had been asked to do this on behalf of the other officers because a certain number of grey hairs had been noted prominently in his head. Those grey hairs had not been caused by any worry in connection with the work of the Society. He could say, safely and candidly, that the officers all worked together as one harmonious band.

(*The Meeting was then adjourned.*)

On May 30th, at the Doncaster County Court, before Judge Masterman, an action was brought by Frederick Pearson Wallis, dentist, to recover £33 12s. from Frederick W. Masters, architect, an ex-Mayor of Doncaster, for professional services. Mr. Banks, barrister, appeared for plaintiff, and Mr. Bairstow, barrister, for the defendant. The sum of £21 10s. was claimed for the regulation of Miss Masters' teeth during 1892, and the remainder was for operations for Miss Masters, Master Masters, and Mrs. Masters.—The defence was that the charge was excessive. In 1891 the plaintiff was engaged to regulate the teeth of Miss Masters, which protruded, and this was successfully performed. In cross-examination, plaintiff said that he considered half-a-guinea a fair charge for "filling in." Mr. Bairstow: Was it a difficult operation?—Plaintiff: Difficult things in the hands of one may become easy in the hands of another. (Laughter.) The teeth protruded a great deal more than they usually do in bad cases.—Mr. Bairstow: Do you ever make a less charge than twenty guineas for regulating teeth?—Plaintiff: Certainly; we begin at one guinea.—Dr. Catt, of Scarborough, and Mr. F. Harrison, of Sheffield, dentists, said the charges were reasonable, whilst Mr. Lodge, of Rotherham, for the defence, thought that ten or twelve guineas would be sufficient, but it was a matter of conscience. (Laughter.)—Defendant said plaintiff never told him it was a most difficult operation. He said it was a simple one. He did not ask plaintiff what his charge would be, and he was surprised and astonished to receive a bill for £33, including £20 for this particular operation.—Cross-examined, he said he was once entered in the County Court for a subscription towards the Tennis Club, but it was owing to a misunderstanding.—The judge said that the plaintiff was entitled to recover such charges as were fair and reasonable, and the jury after a brief consultation returned a verdict for plaintiff for the full amount with costs.

THE DENTAL RECORD, LONDON: JULY 1, 1895.

REGISTER! REGISTER!!

THE dental business of the last session of the General Medical Council was not of any great importance. A confession of previous ignorance, of which, it has been said, we should never be ashamed, since it also implies an increase in wisdom, led to an alteration of the resolution excluding dental students from registration on the commencement of pupilage. So in that matter we are as we were. But it is curious to notice how remiss students and practitioners are in regard to registration, and how oblivious they seem to be to the inconveniences of this neglect. The report on another page shows that quite a number of students applied for leave to antedate their registration; in one case, due to the most culpable neglect of a practitioner—qualified but not registered—taking a pupil. It is difficult to find an excuse for such action, which but for the leniency of the Council would have entailed great trouble and loss on the pupil. Indeed, the leniency of the Council is somewhat noteworthy, and suggests that its members are not very greatly impressed by the teaching of the parable of the "wise and foolish virgins," with which we presume them to be familiar. With this, however, we are not disposed to quarrel, being ourselves somewhat impressed by the greediness of the wise, and rather harmless folly of the foolish. Folly, however, it is that men do not register at the earliest possible moment. Surely it must be well known that a student is not legally a student till he is registered; and that a dental surgeon, however well qualified, has no standing as such till he also is registered. Over and over again this same fact is reiterated by speakers and writers, and yet it would seem to be unknown or ignored. We have little sympathy with ignorance on such vital questions, but far less with those

who knowing what to do, neglect to do it. The very expense of the proceedings of the Council make it necessary that its time should not be wasted on such matters as these; and though we do not regret its leniency on these occasion, we certainly hope it will not be troubled again by matters of this sort, or, if troubled, will teach a salutary lesson by refusing to entertain such applications.

News and Notes.

Mr. Frederick Rose, L.D.S.Eng., has been appointed Hon. Dental Surgeon to the Stanley Hospital, Liverpool.

It is with sincere regret that we record the death of Mr. Joseph Mills, on May 29th, at Andover. Mr. Mills was formerly Anæsthetist to St. Bartholomew's and the Dental Hospital of London, posts, on account of ill-health, he resigned a few years back. Mr. Mills is mourned by a large circle of personal and professional friends.

The results of the L.D.S. Examination held during 1894 showed that at those held in :—

	Number of Rejected.	Candidates Passed.
England	47	80
Edinburgh	1	14
Glasgow	10	10
Ireland (5 being *sine curriculo*) ...	1	6

Moral of above list : " How wonderfully clever are the candidates for the Glasgow Diploma ! ! "

It seems that the Home Secretary has now given his sanction to the alterations of Sections 4, 16, and 25 of the Bye-laws of the College of Surgeons of England. His objection was to the wording of the alteration of Section 16, and this having been altered, his assent is no longer withheld. The alteration of Section 25 is to give effect to the resolution of Council raising the fees for the Diploma in Dental Surgery from ten to twenty guineas.

At a meeting on June 5th of the Medico-Chirurgical Society of Edinburgh, Professor Fraser showed some rabbits, which, by repeated injections of small doses of the poison, he succeeded in rendering immune to the action of cobra venom. One of these had received sufficient poison to kill 320 rabbits of its own weight. The period elapsing in man between the bite and a fatal issue being longer than in rabbits Professor Fraser thought the indications for the use of antitoxin serum were much more favourable.

At the Grimsby Borough Police Court, on June 16th, James Rycroft, of 202, Victoria Street, was charged with a breach of the Dentists Act, 1878, that he, not being then registered under the Dentists Act, 1878, and not being then a legally qualified medical practitioner, did unlawfully take or use an addition or description, namely "Grimsby Dental Surgery," or some other title, addition or description, implying that he was registered under the said Act, or that he was specially qualified to practice dentistry. There was a similar summons against Arthur James Browning, of Hainton Villas, Hainton Street, that he did use the word "Surgery." Mr. R. M. Turner, instructed by Messrs. Bowman and Crawley Bœvey, prosecuted on behalf of the British Dental Association. Mr. Bloomer defended Mr. Rycroft, whilst Mr. Browning was defended by Mr. A. Mountain. Both defendants pleaded guilty. Mr. Turner said that these cases were taken under the Dentists Act of 1878, which provided that people not registered or qualified practitioners must not appear before the public as qualified, and get them to go to their surgeries believing that they would get the benefit of skilled advice and assistance. The penalty that could be imposed for a breach of the Act was not to exceed £20. The Statute was for the benefit of the public health, and it was their duty to see that it was stringently observed. When Mr. Brown, from the British Dental Association, called upon Mr. Rycroft, that gentleman admitted an advertisement in the railway time table calling his place the "Grimsby Dental Surgery." Upon his door he had "Manufacturer of Artificial Teeth," "Consultations Free," "Teeth Extracted Painlessly." This showed that artifices were used to see how close he could run to the Act. In the case of Mr. Browning, he carried on business in Hainton Square, Grimsby, and called the place a "Surgery." This shows that operations were performed, and he would point out the danger of operations being

performed by unskilled men. His advertisement showed that chloroform was administered, also freezing and ether. The Mayor said anyone could pull out a tooth. Mr. Turner said he quite agreed with the Mayor. Anyone could take off a leg, but they would have to take the consequences. Mr. Bloomer said that, on behalf of Mr. Rycroft, he had been in practice in the town for twelve or fifteen years. He had had a business of his own for six years, and before that time was assistant to Mr. Smith, a registered dentist. Mr. Rycroft had neglected to pass an examination and obtain a certificate, but regretted that he had not done so. He did not think that the case was a serious one ; it was not one of attempting to deceive the public, and he thought that the justice of the case would be met by a very small fine being inflicted. Mr. Mountain, on behalf of Mr. Browning, said he wished to point out that the only word used by his client was "surgery," and it was doubtful whether the Act applied there, but it was not thought advisable to fight the case. The Act only referred to the words "dentist" and "dental practitioner." With reference to the operations, they were performed by a duly registered medical man. He thought that a nominal fine would meet the case. The magistrates retired, and upon their return, in a few minutes, the Mayor (Alderman Palmer) said they took into consideration the fact that these were the first two cases that had come before them, and a fine of 21s., and costs, 11s., would be inflicted.

Mr. John Butterworth, L.D.S., Eng., House Dental Surgeon to Victoria Dental Hospital of Manchester, has been appointed Tutor to the Dental School of this Hospital.

At the meeting of the Council of the College of Surgeons of England, held on June 13th, the following gentlemen, having passed the necessary examinations, were admitted Licentiates in Dental Surgery :—Frederic George Atkinson, Julius Barthroppe Bateman, George Llewellyn Bates, John Henry Bennett, Albert Edward Bettridge, Stewart Ross Bowtell, Edward Kemp Cannell, Ernest Edward Cardwell, John Willie Dalton, Ernest Frank Day, Meyer Goschalk, William Johnston, John Hilditch Matthews, Edwin Henry Mountford, Cecil Gilbert Pearse, George Herbert Price, John Tindal, Charles Henry Hughes Williams, of the *Charing*

Cross Hospital and the *Dental Hospital of London* ; Percy Burton, Norman Henry Lean, Herbert Edwin Mackley, Walter Salmon Nowell, Alick Condell Strand, M.R.C.S., Eng., of the *Middlesex* and the *Dental Hospital of London* ; George Henry Bowden, Alfred Cahill, Albert James Collett, Horace Cook, Clarence Albert Harry Keall, Edwin Morgan, Fritz Heinrich Arthur Muhlenkamp, David Sydney Stevens, Harry Percy Taylor, Walter Henry Trick, Herbert Wallis, of *Guy's Hospital* ; Thomas George Jenkins, Edwin Clarence Platt Masters, Thomas Edward Sugden, William Henry Tice, of the *Middlesex* and *National Dental Hospitals* ; William Frederic Pedler, M.R.C.S., Eng., of *St. Bartholomew's* and the *National Dental Hospitals* ; Francis Montague Fitzwalter Bellaby, George Henry Booth, Joseph Theakstone, of the *Owen's College, Dental Department*, and *Victoria Hospital, Manchester* ; Henry Arthur Quinby and John Lewis Shields, of the *Liverpool Dental Hospital* and *Royal Infirmary School of Medicine* ; Frederic Little, of *University College* and *Royal Infirmary, Bristol* ; James Sims Wallace, B.Sc., M.D., C.M., Edin., *Glasgow Dental Hospital.* Fifteen gentlemen were referred back to their professional studies.

At the annual meeting of the British Medical Association, which will be held in London this year on July 30th and 31st, August 1st and 2nd, the sections will meet in the Examination Hall, Exeter Hall, and King's College, and the general meetings in Exeter Hall. On July 30th there will be a reception in the evening at the Imperial Institute, and the dinner will be held on August 1st, at the Queen's Hall. The reception room for the issue of tickets and information will be the Large Hall, King's College.

The following are some details of the annual general meeting of the British Dental Association, to be held in Edinburgh, August 28th to 31st, 1895. It will be held in the University of Edinburgh, on the ground floor of the buildings, forming the north side of the quadrangle. The various rooms are in proximity one to another. The Court Room will be set apart for the meetings of the Representative Board and the Benevolent Fund, and the Celtic and History Lecture Hall to the public business of the Association. The Public Law Class Room will be utilised by the Microscopical Section, and for lantern exhibitions. The Associate Societies' Hall has all conveniences

for reading and writing for members. The Examination Hall will contain exhibits by the various dental manufacturing firms. The secretaries' offices, cloak room, and post office will be near to the main entrance. The Demonstrations will be held in the Conservation Room of the new Dental Hospital, which is but a very short distance from the University. The Social Headquarters of the Association will be at the Waterloo Hotel. A special tariff has been arranged for, viz.: 7s. 6d. single and 14s. double, for bed, breakfast and attendance. Other hotels immediately adjoining the Waterloo are the two Temperance Hotels, viz., Old Waverley Hotel, opposite, in Waterloo Place, tariff 4s. 7d.; Darling's Hotel, next door, also in Waterloo Place (first class), tariff 6s.; The Balmoral and Palace and others in Princes Street. Rooms should be secured.

Special saloons, dining or otherwise, may be arranged for members from the South, *via* Great Northern Railway, third class fares going and returning.

On Wednesday evening, August 28th, at 9 p.m., there will be an informal gathering in the Victoria Hall of the Waterloo Hotel. Music, vocal and instrumental, and Highland dancing by professionals.

On Thursday, August 29th, at 9.30 a.m., Meeting of the Representative Board; and at 10.30 a.m., Annual General Meeting. Valedictory address by the President, Mr. C. S. Tomes, F.R.S. Installation of the new President, W. Bowman Macleod, F.R.C.S.E.; at 2 p.m., Reading and discussion of Papers; 4.50 p.m., Excursion to the Forth Bridge; in the evening, 8.30 or 9 p.m., Reception.

On Friday, August 30, at 9.30 a.m., Meeting of the Dental Benevolent Fund; at 10.30 a.m., Demonstrations at the Dental Hospital; 2 p.m., Reading and discussion of papers; in the evening at 7.30 p.m., Annual Dinner, Grand Hall, Waterloo Hotel.

On Saturday, August 31st, the Scottish Branch will entertain the members and ladies at an excursion and luncheon at Loch Lomond. Arrangements as follows:—9 or 9.30 a.m., special train from Waverley Station, reaches Balloch 11.15 a.m. Special steamer on loch, among the Islands up to Ardlui; return to Tarbet 1.30 p.m.

Lunch at Tarbet Hotel. The concluding business meeting of the Association to be held on the Lawn, weather permitting. Walk to Arrochar, Loch Long, for those who wish. At 5 p.m., steamer returns to Balloch, which is reached 6.15. Train to Edinburgh, Waverley Station, arrives 8.15 p.m.

GENERAL MEDICAL COUNCIL.

May 29.

Sir Richard Quain, President, in the Chair.

Registration of Dental Students.

Dr. Batty Tuke: It will be in the recollection of the Council that last year we took away the right to register on pupilage for Medical students. At the time, I confess, the fact escaped me that Dental students should have power of being registered on pupilage, inasmuch as pupilage is an acknowledged and necessary part of the curriculum for Dental Students. The Report, as now in the hands of the Council, simply contains the recommendation that "the registration of Dental students shall be carried on at the Medical Council Office, in London, in the same manner as the existing Registration of Medical students—as hereinbefore set forth—and subject to the same regulations as regards Preliminary Examinations; but in the case of Dental Students, professional study may commence by pupilage with a Registered Dental Practitioner." I move the reception of that Report.

Dr. McAlister seconded the motion, which was agreed to.

The Report is as follows:—

Representations having been made to the Registrar that No. 20 of the "Resolutions in regard to the Registration of Medical and Dental Students" does not now permit of Registration of Dental Students on entering upon pupilage with a Registered Dental Practitioner, the President has directed the matter to be laid before the Education Committee.

Resolution 20 directs that "the Registration of Dental Students shall be carried on at the Medical Council Office, in London, in the same manner as the existing Registration of Medical Students." A motion adopted by the Council on December 4, 1894 (*Minutes*,

vol. xxxi., p. 162), prescribes that Medical Students may be registered only upon entrance at "a University, School of Medicine, or recognised Teaching Institution." The usual practice for a Dental Student is to commence study as a pupil of a Dental Practitioner, a course quite in consonance with the Resolutions of the Council; but the Registrar holds that he is not warranted in registering students commencing Dental study in this way, inasmuch as pupilage is no longer accepted by this Council as a qualification for the Registration of Medical Students.

In order to remove all doubt on the subject, the Committee recommend that Resolution 20, regarding the Registration of Dental Students, be amended as follows :—

> "20. The Registration of Dental Students shall be carried on at the Medical Council Office, in London, in the same manner as the existing Registration of Medical Students—as hereinbefore set forth—and subject to the same regulations as regards Preliminary Examinations, but in the case of Dental Students professional study may commence by pupilage with a Registered Dental Practitioner."

JOHN BATTY TUKE.

Sir PHILLIPS SMYLY : May I ask why should the Branch Councils not register these students ?

Mr. MILLER : Dental Students are all registered at this office under the Dentists Act.

Dr. MCALISTER : The point was raised yesterday at the Committee and the answer was this. The registration of the Dental Practitioner is by the Act confined to the office in London, because the General Registrar has to carry it out. It is by the registration of Dental Practitioners and by the fee paid that the dental funds alone are provided. There are no fees for the registration of Dental Students, and therefore to throw the work upon local offices would be throwing work upon them for which we should have no return to the dental fund. I think that is the kind of reason which has made the rule what it is.

Dr. BATTY TUKE : I move the adoption of the Report, which has now been received.

Dr. MCALISTER seconded the motion, which was agreed to.

Other Business Referring to Applications for Registration.

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
Adams, Henry	Sept., '91	Oct. 5, '91	Jan. 11, '94	Oct. 5. '91
Apperson, Albert E. ..	June, '91	July 16, '88	Sept. 15, '91	June 1, '91
Carson, Thomas B. ..	Oct., '90	May 18, '89	July 6, '92	Oct. 1, '90
Carter, Charles, E. ..	Dec., '91	Dec. 4, '91	Jan 2, '92	Dec. 4. 91
Crombie, James, M. P.	Oct., '91	April 20, '91	April 22, '95	Oct. 1, '91
Day, Kendrein J. ..	Dec., '91	Aug. 8, '91	July 11, '92	Dec. 1, '91
Duncalf, William J. ..	June, '94	Sept. 1, '94	Jan. 7, '95	Sept. 1, '94
Giggs, John H.	Dec., '89	Feb. 10, '90	May 4, '95	Jan. 1, '91
Hansen, William ..	March, '89	April 14, '92	May 14, '95	April 14. '92
Hey, Stephen D. ..	June, '93	April 11, '92	Aug. 5, '93	June 1, '93
Homer, Samuel	June, '92	April 9, '87	Aug. 23, '92	June 1, '92
Lavan, Lloyd T. ..	June, '90	Oct. 15, '90	Sept. 25, '93	Oct. 15, '93
Mason, Edgar	Exempt	July 4, '77	Sept. 24, '94	April 1, '93
Naish, Godfray	Dec., '92	Jan. 18, '90	Dec. 31, '92	Dec. 1, '92
Prickett, George F. ..	June, '93	Oct. 1, '93.	Jan. 12, '95	Oct. 1, '93
Vaughan, John W. ..	Dec. '92	Aug. 6, '85	Feb. 2, '93	Dec. 1, '92

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

2. From the following student, who desired to antedate his preliminary examination, having been only 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.
Hinchliff, Chas. J.	June, '91 / Dec., '91	Oct. 19, '91	Jan. 6. '92	Mechanics	Oct. 19 '91

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

3. Applications to be registered without further preliminary examination :—

(*a*) From Mr. Athol Lambert, who had gained a Second Class, Second Division, Certificate from the College of Preceptors in June, 1892, which included all the subjects required by the Council except Euclid II. and III., requesting that, as he had passed the Entrance Examination of the Central Technical College, which included Euclid (Books I.—IV.), he might be registered forthwith.

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

(*b*) From Fred Billing, who was articled to a Dental Surgeon (L.D.S. England) on June 8th, 1891, after passing a College of Preceptors Examination, which he was informed by this dentist was sufficient, but who on applying for registration found that his master was not registered, though entitled to be so, and that his examination had been deficient in Euclid (II. and III.), and French, requesting that, having now passed in all subjects, he might be allowed to register as a student notwithstanding the remissness of his master in not placing his name on the *Dentists' Register*, and antedate.

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

4. An application from Charles L. Mackaness, who in December, 1893, while at school, passed the ordinary College of Preceptors Examination for a Second Class, Second Division Certificate, which included Euclid, Book I. only, requesting, through his father and master, that, as the omission of Euclid (a subject with which he was familiar) was an oversight, he might be allowed to register on passing in Euclid (II. and III.)

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

5. An application from Edgar E. Lacey, who only passed his Preliminary Examination in March, 1895, and desired to antedate to October 1st, 1893, on the ground of having been engaged in Mechanical Dentistry for eight and a half years, the first three as a pupil, the remainder as an assistant.

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

6. From Mr. Alexander Crerar, L.R.C.P.Edin., &c., who passed his Preliminary Examination in April, 1890, and was registered as a dental student on May 29th, 1895, requesting to be allowed to antedate to May 8th, 1890, the date on which he commenced medical study.

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

Read :—The following communication from the British Dental Association—

"British Dental Association,
"40, Leicester Square, London, W.C.
"*February, 25th*, 1895.

"GENTLEMEN.—On behalf of the British Dental Association, we beg to call your attention to the Draft Bill for the amendment of the *Medical Acts*, prepared by counsel for the British Medical Association, which will probably

be laid before you for your approval, and to urge that it would be desirable if some more specific reference could be made to Dentistry in the said Bill; and we are instructed that this can be done by slight verbal alterations.

"We are, gentlemen,
"Your obedient servants,
"S. J. HUTCHINSON,
"*President of the Representative Board.*
"W. B. PATERSON,
"*Hon. Secretary of the Association.*
"*To the* PRESIDENT *and* MEMBERS *of the*
"GENERAL MEDICAL COUNCIL."

Resolved:—"That the British Dental Association be referred to the *Resolution* passed by the Executive Committee on May 27th, 1895, on the subject of proposed amendments in the *Medical Acts*."

The following is the resolution referred to:—

"The Executive Committee recommend that the Council should intimate to the Parliamentary Bills Committee of the British Medical Association their readiness to consider the provisions of any Bill for amending the *Medical Act* (1858), or any subsequent Acts which may be submitted to this Council by the Government.

EXECUTIVE COMMITTEE.

Minutes of Meeting, Monday, May 26th, 1895.

DENTAL BUSINESS.

1. 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 comformity with the provisions of Section 12 of the *Dentists Act* (1878):—

Moxon, Henry James.	Selvey, Robert Joseph.
Roberts, Stephen Charles.	Smith, John.

Read:—Applications from Mr. H. T. Osborne, and Mr. C. D. Cassidy, who both held the Diploma of D.D.S. University, Michigan, and who applied in November last to be registered as Dentists on that qualification; forwarding further information in regard to the course of study at that University, with the view of complying with the following *Resolution*, passed by the Executive Committee on November 26, 1894:—

Resolved:—"That Mr. Osborne and Mr. Cassidy be informed that they cannot be admitted to registration unless they can

prove that they have passed through a curriculum equivalent to that demanded by the Medical Council from the Licensing Bodies of the United Kingdom." (*Minutes*, Vol. xxxi., p. 222).

Resolved :—"That in the absence of any evidence to show that Mr. H. T. Osborne and Mr. C. D. Cassidy have passed through a curriculum equivalent to that demanded by the Medical Council from the Licensing Bodies of the United Kingdom, they be informed that they cannot be registered on the Diploma of D.D.S. University, Michigan."

Read :—The following communication from the Royal College of Surgeons of Edinburgh—

"Edinburgh, 11, Wemyss Place,

"*May 18th*, 1895.

"DEAR SIR,—At Dr. Batty Tuke's request, I forward to you, as Registrar of the General Medical Council, a copy of the last issue of Regulations for the Dental Diploma of the Royal College of Surgeons of Edinburgh, which you will now find to correspond with the laws laid down by the General Medical Council ; and I shall be pleased to know that such is found to be the case.

"I would, however, at the same time direct attention to some alterations which suggest themselves as necessary in the existing Regulations of the Council, as codified in the draft report of the Education Committee of November, 1894.

"*First.*—At page 6 Students are required to have passed the Preliminary Examination, previous to commencing *Professional* studies. But these (p. 7) include Chemistry and Practical Chemistry, and these in the case of *Medical* Students may now be taken out along with Physics and Biology—*previous* to Registration. Ought not this privilege to be extended to *Dental* Students also ?

"On the same page (7) the *duration* of the courses of Materia Medica and Practical Chemistry might be specified with advantage. In the special subjects there seems to be a tendency *sometimes* to give the lectures or instructions in an arbitrary way, until the number is complete; and it might be well to rule that such lectures should be delivered in a systematic *sequence* during a *definite* time in each Winter or Summer Session, as in general subjects.

"In the Appendix containing the Regulations of the different British Dental Licensing Bodies, certain departures from the prescribed Curriculum of the General Council present themselves, and to which attention might be directed.

"Thus, on p. 9, the Royal College of Surgeons of England only requires a certificate of having '*received instruction* in Chemistry,' instead of one showing a course of lectures having been attended for six months, and a course of Practical Chemistry having been attended in a similar manner, as enjoined on p. 7. And again at *(a)* on p. 9, only *one* course of six months' Anatomy—assuming a '*Winter Session*' to mean this—is required instead of one course and *another* of the Anatomy of the Head and Neck—or a *second* course of Anatomy.

"On p. 10 again, not only Chemistry, but so important and practical a subject as *Materia Medica* is allowed to be attended along with Physics, *under the course of* '*instruction*' in this branch, and without any separate lectures upon it bejng mentioned at all. While in the *subjects of* '*Examination for the L.D.S.*' on the same page, Chemistry, *Materia Medica* and Medicine are omitted altogether.

"The Royal College of Surgeons of Edinburgh Regulations have been corrected, as will be seen. A course of 'demonstrations,' as they are called

but which are advanced Anatomy Lectures, is substituted for the sytematic course, being *repeated* during a second six months—and the General Hospital Attendance is corrected to twelve months with Clinical Instruction.

"The Royal College of Surgeons of Ireland appears, in its Dental Curriculum, to omit *Medicine* and *Materia Medica* altogether, as no mention of them is made on pp. 14, 15 or 16 of their Regulations given in the Appendix.

"These I trouble you with, as they seem points which it would be advantageous to look into, so that a general uniformity in the Curriculum and Examinations of the different Licensing Bodies might be secured, while the Council has the matter under consideration, at any rate. And, apologising for the long letter I am submitting, believe me,

"Yours very truly,

"J. SMITH, M.D."

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

Resolved:—"That the letter of Dr. J. Smith in regard to the regulations in dentistry of the Royal College of Surgeons of Edinburgh be referred to the Education Committee for report at the next meeting of the General Council.

June 3rd.

SIR RICHARD QUAIN, Bart., President, in the Chair.

John Eustace Dennan, registered as in practice before July 22nd, 1878, was summoned to appear before the Council to answer the following charge, namely, "That he was convicted at the Central Criminal Court, on January 7th, 1895, of obtaining money by false pretences, and sentenced to ten years' penal servitude."

Mr. Muir Mackenzie attended as legal assessor. Mr. John Eustace Dennan was not present.

The REGISTRAR said the following Report had been sent in from the Dental Committee on the facts in regard to the case of John Eustace Dennan :—

REPORT ON THE CASE OF JOHN EUSTACE DENNAN.

The case of John Eustace Dennan 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 :—

(1) That John Eustace Dennan was registered in the *Dentists' Register* on July 31st, 1879, as having been in practice before July 22nd, 1878, and with the address 49, Talbot Road, Bayswater, London, W.

(2) That John Eustace Dennan was, at the Central Criminal Court on January 7th, 1895, convicted of unlawfully obtaining money by false pretences and sentenced to ten years' penal servitude as appears by the Certificate of his conviction now put in.

(3) The Committee recommend the Council to remove the name of John Eustace Dennan from the *Dentists' Register*.

CERTIFICATE OF CONVICTION.

Central Criminal Court (to wit). } These are to certify that at the General Session of the delivery of the Queen's Gaol of Newgate and other prisons, holden for the Jurisdiction of the Central Criminal Court at Justice Hall, in the Old Bailey, in the suburbs of the City of London, on Monday, the 7th day of January, in the year of our Lord 1895, before certain Justices of our said Lady the Queen, assigned to deliver the said Gaols of the prisoners therein, being John Eustace Dennan, otherwise known as John Eustace, was in due form of Law convicted on a certain Indictment against him for unlawfully obtaining by false pretences from Maud Easterbrook, the sum of two shillings and sixpence, and from Maud Annie Wood the sum of five shillings, in each case with intent to defraud against the Statute, &c., and against the peace, etc., and the said John Eustace Dennan, otherwise known as John Eustace, was thereupon ordered to be kept in penal servitude ten years.

Dated the 21st day of January, 1895.

H. K. AVORY,
Clerk of the said Court.

Mr. WHEELHOUSE moved that the name of John Eustace Dennan be removed from the Register.

Mr. BRYANT seconded the motion.

Dr. GLOVER: Before that is put I should like to ask Mr. Muir Mackenzie if he could give us any particulars of the case. I see he is charged with having defrauded persons of 7s. 6d. Do you know if there is anything in this man's previous history?

Mr. MUIR MACKENZIE: The only official knowledge that the Council has is the certificate of conviction, on which the Council usually acts under the Statute. Mr. Dennan himself has written a very long memorial complaining that his trial was an unfair one. As the trial, however, was before a judge of the High Court and a jury, and he was convicted, and sentenced to ten years' penal servitude, I apprehend, though I have not read through all the proceedings, that the small sum of money was simply taken as one indictment. It is usual to indict upon one charge, which may represent many others. When a man has embezzled several sums of money we indict him for only one.

Strangers having withdrawn, the Council deliberated on the case, and on the re-admission of strangers the PRESIDENT stated that the Council had resolved to direct the Registrar to erase the name of John Eustace Dennan from the *Dentists' Register*.

Abstracts and Selections.

CARVING OF BLOCK-TEETH.

By. F. A. Coney, D.D.S., Doylestown, Pa.

Hand-carved blocks have the merit of being the most natural-looking and at the same time, when well mounted, the strongest artificial teeth made. When the best results are desired, and neither time nor cost are objects, carved blocks are the best recourse of the dentist.

It is here that the carver has an opportunity to carry out his conception of a very difficult and peculiar case. The teeth can be placed in any position or inclined at any angle deemed desirable. The natural expression of a carved block is seen in the bolder curves and contours made by the skilful hand, which it is impossible to produce from brass moulds.

The following is a description, in detail, of the carving process in general use from about the year 1850 to date.

The first step is to get a perfect impression, and a bite for an upper or lower, whichever space the piece is intended for. The simplest and shortest method of getting a bite for small partial cases is the following :

Take a roll of beeswax—or modelling composition, which I prefer —from one to two inches long, according to the number of missing teeth, and about three-fourths of an inch thick. Soften in hot water, bend into a semi-circle, and press it against the teeth on each side of the space or spaces requiring substitutes. Then direct the patient to bite through the wax until the cutting-edge and cusps touch and occlude naturally. After pressing the wax or modelling composition against the labial or buccal surfaces of the teeth, carefully remove it from the mouth, and harden it in cold water.

Now, then, take water and plaster and mix it quite thin. First fill the imprints of the teeth in the wax or modelling composition, and work the plaster into said imprints. As the plaster stiffens build it up and extend it back over the palatine surface, and about one-half or two inches beyond said impression. That will give the upper part of the model. Trim it to the desired shape to handle conveniently. Now sandarach or shellac the plaster exposed to view, then oil the model and bite with sweet oil. The next step is

to run the lower part of the model with plaster. When plaster is set, put said model in hot water to soften the wax or modelling composition.

When soft take it apart, and you have the model of the mouth to carve your block by.

The next step is to enlarge the cast. If it is to be a block of two teeth, cut from the approximate surface of each tooth of both sides of space to be filled about one-half of a sixteenth of an inch. This will give the shrinkage for said block.

For a block of four teeth you proceed in the same manner as for a block of two teeth, with the exception that you take from the approximate surfaces one-sixteenth of an inch from each tooth, thus allowing a greater shrinkage for a block of four teeth than for a block of two teeth.

For a block of six teeth, you proceed in the same manner as you did for the block of two or four teeth, allowing, of course, for a greater shrinkage, according to the case you have in hand.

Now prepare in a small tin cup spermaceti, melting over a spirit lamp until it become liquid. Add enough Chinese or red vermilion to color it to a cherry red. Then take the liquid sper maceti and paint with a camel's-hair brush your impression model, the space between the canines. If it is to be a block of four, also paint the canines. For a block of six do the same as for a block of four, in the same manner for all models which are used for carving of teeth.

Apply with a camel's-hair brush sweet oil over the antagonising model or bite, so the bite will separate from the body without drawing it.

I use Luken's body, prepared by S. S. White. It is the strongest body known, and fuses at the highest heat. This body I mix in a porcelain bowl or wedge-wood mortar by adding water to it to make it the consistency of putty. It is now ready to be packed or worked into the model. When the model is full of body, dry out the body on a muslin cloth so as to absorb the moisture which arises on the surface; it also makes the body more solid and firm. It is then ready to begin carving.

The carving instruments are known as a string-bow, carving knives of different shapes, one bone spatula, pin tweezers, and camel's-hair pencils.

Before commencing this process the size and shape of the teeth must be decided upon, the perfect form of the ideal teeth must be in the mind's eye. The width of the teeth is then marked off on the block, beginning at the central or median line, the desired width and height. With the straight carving-knife, and by cutting an inverted V-shape between the teeth, the necks are carved in a semicircular groove, not deep ; have them to incline towards the centre equally on both sides.

The model is now reversed, and the points of the gum between the teeth are carved down, and then the body is added to each tooth to bring it up to the desired shape and size, and to look as natural as possible. The gum is then carved the desired thickness, and also to give shape to the block. The palatine surface of each tooth must be carved so as to antagonize with the opposing teeth. A recess must be made in the block for the pins. The pins are then inserted, and the body worked around them.

Now comes the difficult part. To take the block off the model, heat the block over the flame of an alcohol-lamp (a large one preferred) until the spermaceti is all melted from underneath the block. The greater part of the spermaceti will be absorbed in the body. It will then be loose on the model. Now drop the block on a piece of cotton, and be very careful not to let it have too great a fall. While the block is cooling, which takes about five minutes, take a slide and put a sufficient amount of kaolin, say about one inch in height and enough in width to lay the block upon. Pick up the block with the thumb and forefinger and place it with the palatine surface, or pin side, on the kaolin. Now make about half a dozen cone-shaped pieces with the body, about one inch high. These are to be used as trial pieces.

The block is now ready for biscuiting. Biscuiting is the hardening of the block in a red-hot muffle. The furnace used for biscuiting and baking is an ordinary two-muffled furnace, purchased at any of the dental depôts. First put wood in the furnace, then put the slide containing the block in the back part of the lower muffle, leaving the door open for the escape of the smoke which arises from the grease in the block, then start the wood to burning and put on about two or three bucketfuls of coal. Now, when looking at the block in the muffle, the teeth or block will be found to have turned black, caused by the grease in the block being burnt out.

As the fire increases, the muffle becomes red on the inside ; the teeth will then resume their former shade ; at this stage close the muffle door, and wait until the muffle comes to a bright-red heat ; then take out a trial piece and with a penknife cut to see if it is as hard as pipe-clay. If so, it is time to remove the slide containing the block from the muffle; check the fire by removing the stoppers on the sides and top of the furnace. When the block is cool, remove it from the slide, brush off the kaolin, and transfer the block to the model. It is now ready for enamelling. Enamels are technically called neck-, point-, stain-, and gum enamels.

The enamels are then applied to the block with camel's-hair pencils by holding the block-teeth upward. Enamels should be mixed with clean water in a small glass or porcelain cup, making a cream-like solution. The neck enamel is applied first at the neck of the tooth, extending half-way up the teeth towards the cutting-edge or point. The neck-enamels vary in colour from bright yellow to dark brown. Now apply the point enamel on the cutting edge of the tooth, and bring the point enamel down over the neck-enamel, so as to overlap or coalesce. The point-enamels vary from white to different tints of bluish grey and yellow. The gum enamel is applied to the points between the teeth with the carving-knife ; the rest of the gum enamel is put on the block with a camel's-hair pencil, care being taken to place the gum-enamel close to the necks of the teeth, but not to overlap the neck-enamel. It is not best to make the gum-enamel very smooth ; it fuses at a little lower heat than the point and neck enamels, and is apt to become glassy.

The festoons around the necks of the teeth should be ridged, so as to make them more natural-looking and give them a certain prominence and individuality of their own, so the teeth will look as if they had grown out of the gum naturally. Many blocks are ruined by not having the gum-enamel applied properly.

After the enamelling is all done, prepare a slide the same as was done for biscuiting, with this exception—instead of laying the block pin-side down on the kaolin, place the block perpendicular, the cutting-edge of the teeth upward ; enamel your trial pieces at the points with gum-enamel, and place them on the slide in front of the block. Now all is ready for the final baking.

Place in your furnace the side stoppers, add coal to the fire, and fill the furnace with fresh coal ; then put in the upper stopper, close

all openings around stoppers with fire-clay mixed with water. When the lower muffle is at a white heat the slide is then grasped with a pair of long tongs, the ends of which are flattened for this purpose. The slide is lifted and held before the muffle for about two or three minutes, or until the block is thoroughly dry, then put the slide into the fore part of the lower muffle and gradually move it towards the back part of the muffle. When you reach the baking part, which can be distinguished by the intense glow or white heat, close the muffle-door, and give the block about ten minutes' time; then take out a trial piece with the tongs, and examine to see if the trial piece is fused or glazed enough; if not, bake about three minutes longer, take out another trial piece, and if it is fused and glazed enough, the block is done.

Now take the stopper out of the upper muffle; draw the slide from the lower muffle and pass it quickly into the back part of the upper muffle; close up the muffle with the stopper and close all openings with fire-clay; draw the fire and let block remain in the annealing or cooling muffle until cold. When cold the block is ready for grinding, which all blocks require more or less, take a new impression and make a cast or model to grind the block to fit. To faciliate the grinding, the prominent parts of the cast are coated with a mixture of red vermilion and sweet oil which will spot the under side of the block and show the exact place to be ground off to make the block fit solidly on cast. After this is done it is ready to be mounted upon any base the operator may wish.—*International.*

MODERATION IN PRACTICE AND IN STATEMENT.

By S. G. Perry, D.D.S., N.Y. City.

In the strict sense of the term, the dentist, as a professional, is very inexact in practice, and also in the tabulation and report of experience, notwithstanding we are repeatedly told we are a very scientific body of men, and that our profession is a very exact one. Conflicting statements are often made in our discussions. Of course there are certain fundamental facts on which our practice rests. Our practice cannot be strictly scientific, as for instance certain filling materials, properly used, arrest the decay of the teeth, but the same materials, improperly used, do not save the teeth for any length of time. Our personality determines largely the character of our practice. To eliminate as far as possible what the astronomers call the "personal equation" is a requirement of the first importance, if we are to lead the scientific life. Science is concerned

with facts, not fancies, and he who can discover the facts, and not be influenced by the fancies, is the man whose influence will be felt most in the department of science in which he works ; and further, if after becoming certain of our facts, I propose we adopt the cold, careful, accurate language of science in describing them, then our literature would not be so full of wild statements of opinions hysterically expressed. Exaggeration of statement may be overlooked in the affairs of the world, but in science, looseness of thinking and speaking is not permitted, and yet in our profession it is common, because we have not yet adopted the accuracy expected of those who lead the scientific life. Words are the tools of the mind. If a man has the scientific training and spirit, his words will be few but to the point. The term "tooth carpenter" may be applied to some men who are extremely skilful, as well as to the botch dentist. They exaggerate the importance of their handicraft, and confine themselves within such a narrow range, that they lose the larger, wider view, and fail to comprehend the significance of proper dental care. In the human mouth natural laws that cannot be set aside are at work, and about all that can be done after all is to nurse, and help, and conserve, hence I would substitute the dental "nurse" for the tooth carpenter ; however, there can be no argument made against the nimble fingers that can produce perfect work when perfect is really required. There exists in our profession a certain kind of inattention on the part of many, and an unconscious intolerance of all ideas and modes of practice that are not in accordance with their own, so that any who venture to express an opinion must do so at the risk of being misunderstood. Opinions of those who have had long experience have great value, but a man's opinions must not be confounded with his facts—the facts that he reports speak for themselves, and are of value as they are clear and plain, but the value of his opinions will depend upon the combination of mental faculties that make up what we call a level head. I doubt if we ever yet saw a more perfect example of an unselfish man than the one who is a true follower of science in the fullest meaning of that term. His love of science will be so strong that his only concern will be to do the true thing, and this will be the right one, and in doing this, he will show that he has the level head before mentioned, and the chances are that the true and right thing will be the moderate one. In dental practice he will not use gold exclusively ; on the other hand he will not assert without a qualifying phrase that it is a true failure. He will not use the plastics without regard to the age of the patient, and the condition of the teeth, and as he grows old himself, he will be on his guard against them because they are easy to use. A young dentist must guard

against the over-confidence of youth. He must also be careful about the extraction of the sixth-year molars, because some one else has said they must come out, and he will be slow in undertaking the regulation of teeth that in a few years will regulate themselves. Neither will he condemn as bad practice that which does not conform to his own opinions, or say that a certain piece of work was done badly, when he knows little or nothing of the conditions under which it was done. By the time a man has seen a set of teeth develop from early childhood to adult life, and has noted all the changes that occur during that time, he may be ready to practice dentistry wisely in its widest sense, though by that time he may be too old to perform the different operations. He must always exercise moderation in practice—not being led away by the vagaries of bridge-work, which is only a modified and greatly improved form of applying an old-fashioned skeleton-plate fastened with clasps. The natural teeth rest in a cushioned socket that allows a little play, and when this immovable bridge is cemented fast, the teeth are held in an immovable manner, and the bridge may not be removed for cleaning. The bridge may eventually come out, but when it does, the teeth may come with it. The dentist should be pleasant and sympathetic in the operating room, kind to all who need gentle treatment, particularly the little children. In fact, he should be an all-round man. He should have many sides, and *moderation* ought to be stamped on every one of them.—*Dental Digest.*

It is well known that when the Act for the Registration of Dentists was passed, a large number of quacks, herbalists, and other unqualified persons obtained registration as dentists, simply to acquire the right to hang out a red lamp and to sport a brass plate. One of the most notorious venereal quacks in London, whose disgusting advertisements had, for years previously, appeared in provincial newspapers, was among the first to be placed on the *Register*. He at once put up a red lamp on which were the words, well separated from each other, "surgeon," "dentist," but I venture to say that during the whole period he has never attended a single dental case. I am glad to see that the Pharmaceutical Society is giving some attention to those who, being registered dentists only, dabble in drugs as well. At the Bloomsbury County Court, a few weeks ago, the above Society recovered two penalties of five pounds each from a registered dentist named Armitage, for carrying on the business of a chemist. There are scores of registered dentists who could be prosecuted successfully for illegally practising as doctors or acting as pharmaceutical chemists, if their proceedings were properly investigated.—*The Hospital.*

THE DENTAL RECORD.

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Original Communications.

CHIEFLY ON ATTRITION AND SECONDARY DENTINE.

By W. H. DOLAMORE, L.R.C.P., M.R.C.S., L.D.S.

WE are not always prepared, perhaps, to contribute monographs to current literature; nor to carry out the investigations which should precede these, still, from time to time, we meet with cases sufficiently interesting to repeat to our friends. A few, impressed on my memory, I propose, at the risk of writing a somewhat rambling article, to detail.

Extreme attrition of teeth, the result of the wear and tear coincident to the mastication of food is, I fancy, sufficiently rare always to attract attention. I take it that this rarity is not only the result of the extreme softness of the ordinary food of civilised man, but is largely due to the prevalence of caries resulting in the loss of the teeth before sufficient time has elapsed to permit of any great wear taking place. At all events the few cases I have seen of old men with fairly good, if not perfect, dentitions, confirm the idea that if the teeth remain in use long enough, even the mastication of cooked food is sufficient to wear the teeth away. So that, although writers on prehistoric crania and on the condition of man in his primitive barbaric state tell us of the exceptional rate of wear which the teeth of such show, and explain it by reference to the coarse and gritty nature of the food these had been called upon to triturate, yet it is only an accentuation of a normal process, and one which even the nature of civilized cookery does not altogether obviate.

I fear this worn appearance, which the teeth of a person past middle life should naturally have, is a point we lose sight of too often when replacing such as are lost by people of this age. We have, however, a difficulty to meet in the apparent lapse of memory these people suffer in regard to their own age, and in their strong

desire to avail themselves to the full of the "resources of civilization" to retain intact for an indefinte period the outward form and semblance of youth.

As far as I am aware, no manufacturer has attempted to supply us with teeth which can be said at all to resemble those of an aged person ; and although we can ourselves do much to grind and shape such out of the patterns we are able to obtain, yet the result hardly appears to me so satisfactory as it might be were such teeth moulded to a proper form previous to firing. However, in thus trying to shift the burden of responsibility, I am quite conscious that manufacturers must view this matter from a commercial aspect, and that there is a consensus of opinion that such exceptional shapes neither meet with a ready sale, nor are we any too willing to pay the extra price which the making of a small number necessarily imposes. But I must candidly confess that the grounds of this assertion appear to rest on the somewhat uncertain basis of pre-conceived notions rather than on the results of an actual trial.

The amount of attrition which teeth show is largely influenced by the nature of the articulation, and is probably more largely marked in what is called an " edge to edge bite." This, when all the teeth are *in situ*, may readily be distinguished as natural to the individual. It forms a very efficient biting arrangement, giving the mouth a certain dogged, firm look, which, in a man, has its advantages and is not altogether unpleasing, though it may not coincide with our notions on the ideal proportions of the human face. In replacing such teeth, when lost, it appears to me desirable to reproduce, what, perhaps, strictly speaking, is a deformity, for we gain nothing in masticating power by forming a normal articulation and probably fail to fill out the lips to their former curve, giving an unsupported look to these which considerably weakens the character of the face.

Far otherwise is it with what may be called an acquired edge to edge bite. Acquired because the back teeth have been lost, and the front ones made to do duty for all. To do any amount of grinding with the front teeth, protrusion of the lower jaw and an edge to edge bite are needed. This, however, is not the position of rest, and if we notice the mouth in repose, the lower jaw will be seen to have glided back again and the teeth to overlap in the usual way. As was pointed out to me by Mr. David Hepburn, this condition is one we must recognise when called upon to replace the lost back teeth if

we wish to meet with any success, and to give the patient the full measure of comfort. So fixed does this idea of bringing the front teeth edge to edge, when actively biting, become in the mind of the patients that they almost invariably assume this position when asked to close the teeth for the purpose of obtaining a proper articulation. We are liable to be led into error on this point, and must be on our guard against it, for to permanently perpetuate it by setting up the teeth to this false occlusion is to alter the look of the patient in an unfavourable direction, to oblige the condyles of the lower jaw to remain in an abnormally forward position, and to keep the masticatory muscles and the ligaments around in such a state of tension that the patient speedily experiences a sense of weariness which causes many a grumble at their "false teeth," even if it does not produce actual pain.

"Underhung bites" are usually by no means so "underhung" as to reproduce in an inverted form the scissor-like action of the normal six lower with the six upper front teeth. But often, considerable pressure is exerted by the lower on the labial surfaces of the upper teeth. The mutual rubbing together of these latter and their consequent decay is "another story," but I have often noticed how worn away the labial surfaces of these upper teeth become, and what sharp, irregular, unsightly cutting edges are formed. Often, although the patient suffers no inconvenience, these edges seem so sharp and dangerous to the finger that I have been led to wonder at the peculiarly happy knack our "unruly member" has of taking care of itself when its own comfort is concerned.

The smokers' notch, common to those who woo "my Lady Nicotine" in the homely pipe, is of course well known, but I have also met with a similar condition in one case, though in only one, the result of a trade habit. The patient attended at the Dental Hospital, and the following short note was taken for me by the dresser, Mr. Ham. This I find amongst my papers, but I regret that the model which he took, and to which he refers, is lost.

"Michael I——, aged 31, a boot laster, presented himself with the two upper centrals very much worn down, and the two lower centrals worn and polished to a certain extent also. He complained of pain in the upper ones and wished something to be treated as he depended for his means of livelihood on them, and in this way. In the boot lasting business the mouth is filled with the small tacks.

The laster holds the boot in one hand, and the pinchers, which also serve as a hammer, in the other. As each tack is required, it is worked up by the tongue into position between the teeth with the head outwards. It is then seized by the pinchers, inserted into the boot and driven home. The constant work of the tacks and pinchers against the teeth for twenty years had worn them away in the peculiar manner shown by the model. On examination secondary dentine was seen to have formed to a very great extent, filling up the pulp chamber as the teeth were worn down, but in the left upper central a minute canal into the pulp was discovered, and on opening this up the pulp was found to be dead."

Treatment.—The root was cleaned out and filled.

The development of secondary dentine in such cases is remarkable, but equally curious is the fact that the formation of this—nature's filling material—after keeping pace with the wear of the tooth for years, seems, after a time, either to be imperfect, leaving, as in the above case, a narrow open tract, or to slow off leading to actual exposure of the pulp, or to such a thin piece of tissue remaining that the result is practically the same. I remember, in the practice of a friend of mine, attending a well-known man, who was remarkable, not only for his age—he had long passed the biblical limit of three score years and ten—but also for his vigour, which enabled him to take part in rural athletic sports in which he often proved victor over much younger men. His dentition was such as I have already mentioned, not perfect, but sufficiently good to serve all the purposes of good mastication, but his front teeth were much worn. This must have been a very gradual process, and the pulp had been well protected by the development of secondary dentine ; apparently, after a time, the formation of this had ceased, or had proved insufficient in amount to protect the pulp. At the time I saw him, he suffered from extreme sensitiveness of the teeth, so much so that, with some difficulty, I succeeded in killing the pulp, and by filling completed the treatment. Now it would be easy to explain this gradual cessation in the development of secondary dentine by assuming that fibroid degeneration of the tissues of the pulp—such as occurs in old age—had led to destruction of the odontoblasts, or whatever the dentine-forming elements may be. But a difficulty in accepting this explanation is undoubtedly the fact that it fails to explain the extreme sensitiveness which was a prominent feature in the teeth of both

the cases I have mentioned. I suppose we might assume that the nerve fibrils of the pulp remain alive and thoroughly active after the vascular supply to this tissue has so decreased in amount that its cells have either disintegrated, or undergone fibroid degeneration. But the delicate nature of nervous tissue and its proneness to degenerate readily when deprived of the usual blood supply, seem to be against the idea. And an explanation starting with postulates, which are, at best, suppositions, is rather a poor sort of thing. Indeed, one is, perhaps, too prone "to suppose," and the ease with which one can reduce the whole thing to an absurdity by riding such a method of reasoning to death should be a check on our too frequently mounting the grey mare of fancy.

I am perfectly well aware that the microscope can and does tell us a great deal regarding the pathology of such conditions, but considering our almost absolute ignorance regarding actual processes of the development of normal dentine, in spite of the enormous amount of work that has been done in this direction, he is a rash man who would attempt to offer explanations of the formation of morbid dentine from purely microscopical work. Clinical observation must not be neglected, and should be used as a sort of corrective to laboratory work. For clinical observation shows the workings of physiological and pathological processes. These are the real problems waiting solution; these it is which we too often solve of our own fancy in order to find a connecting link between two distinct observations. Is it possible that in studying the formation of pathological dentine, we may find a solution to our difficulties in the development of normal dentine?

Secondary dentine may, as is well known, either form as isolated pieces in the pulp of the tooth, unconnected with the walls of the pulp cavity; secondly, as irregular protusions from the wall of the cavity, usually forming at a point opposite an invading carious cavity; and, lastly, as a gradual but regular growth of the dentine inwards, leading to partial or complete obliteration of the cavity.

Certainly the first of these groups of cases is by no means the least interesting of the three; either from a clinical standpoint, having regard chiefly to the difficulties in making our diagnosis, or as an etiological conundrum of the severest kind. Occurring as tiny globules isolated masses are by no means rare, but occasionally one meets with masses of more definite shape. I well remember one

molar tooth out of which a student removed a mass of secondary dentine which distinctly mimicked the shape of the pulp cavity, even extending slightly up the roots, but was apparently unattached, since it bore no trace of fracture and because removal of the mass was effected whilst the tooth was in the mouth, it being subsequently filled. Now, without any knowledge of the structure of the formation in this particular case, it seems to me to suggest that the term odontoblast, as applied to a special layer of cells around the periphery of the pulp, is a misnomer. Placed in juxtaposition to the walls of the pulp cavity I cannot conceive how these could have influenced the formation of this mass, which must certainly have been formed from within outwards, have been built up, in fact, around some central point. I take it that whatever may be the relative arrangement of hard and soft tissue in the various forms of dentine, the matrix is one and the same tissue. Differing in minor points, perhaps, as in the relative proportion of organic to inorganic matter, but essentially the same in structure and development. If, then, we have the same tissue built up at a distance, relatively speaking, quite remote from the odontoblasts, certainly grave doubt is thrown on the usual views of the part these cells play in the formation of the tissues to which they are adjacent.

The difficulties which masses of secondary dentine add to the treatment of the root canals are obvious, but I have also been much impressed by the impediment they appear to offer to the action of devitalizing agents and with the increased amount of pain which such often cause in these cases. It is not always an easy matter to diagnose their presence, since even when unattached they are by no means always freely movable, and the ingrowths which belong to the second group I have often hesitated about cutting away for fear I might be dealing with an abnormally shaped tooth, and that too much grinding might perforate its side. On the whole I prefer to abandon a drill in such cases, and to take refuge in a sharp enamel chisel, feeling sure that what I can chip away by using this and a reasonable amount of force, ought to be removed. For I am sure that the sooner we can remove these pathological formations the sooner we shall be able to devitalize what remains of the pulp, and the less pain the patient will suffer.

The last variety of secondary dentine often fills up the smaller root canals, and when with a reasonable amount of care and

patience a stiff bristle cannot be made to enter, then any further drilling must be classed as meddlesome surgery, and as such be bad. Not unfrequently, however, when attempting to devitalize what remains of the pulp in such cases, these diminutive filaments do not seem to readily yield. Indeed, in several cases when I have filled up the teeth because after doing my best to kill all that remained, and believing I had done so, the patient has sent me the tooth in an envelope, with the story that the "neuralgia" had begun again, and had been so intense that one of my brother professionals, living in the patient's neighbourhood, had been disturbed during his after-dinner nap to relieve the poor sufferer from his pain. Splitting open such teeth usually discloses some minute tortuous root-canal, the finding, to say nothing of the cleansing of which, would seem to be an impossibility; except, I suppose, to those who always *are perfectly sure* they plug the apical foramen.

THE following picture of Napoleon's dental toilet is interesting. "Having washed his face and hands, he picked his teeth very carefully with a boxwood toothpick, and then brushed them for some time with a brush dipped in opiate; went over them again with fine tooth powder, and rinsed his mouth with a mixture of brandy and fresh water. Lastly he scraped his tongue with a scraper of silver, of silver-gilt, or of tortoise shell. It was to these minute precautions that he attributed that perfect preservation of all his teeth, which were beautiful, strong, and regular. During the whole of his reign he never appears to have had recourse, except for scaling, to Dubois, his surgeon-dentist, borne on the list for 6,000 francs, and the recipient of a gold travelling case, the instruments in which were for the exclusive use of the Emperor."

THE British Medical Association is to be congratulated on the strength of its financial position. The report of Council for the year 1895 states that there is a balance this year of £4,528, and that the balance of assets over liabilities is £60,434. It seems, however, that the larger portion of its capital will be soon required, either to renew the present lease of the premises in the Strand, or else to build new quarters elsewhere.

THE DENTAL RECORD, LONDON: AUG. 1, 1895.

Sir John Tomes.

SIR JOHN TOMES is dead! At the moment of going to press the sad news that he died on July 29th reaches us. Few of the younger generation probably realize to the full the loss the dental profession has thus suffered, for though Sir John's life work was done, and ably done, his influence was still potent in guiding the affairs of our Profession. Sir John Tomes was born at Weston-on-Avon in 1815, and studied at King's College and the Middlesex Hospitals. He commenced practice in 1840 and from that time to the present laboured for the Profession of his adoption. Glancing back one is in doubt whether we are indebted to him most for his work as a teacher—which earned for him the life-long gratitude of his pupils—or for his scientific research—which gained for him his "F.R.S.," and, at a later date, an honorary "F.R.C.S."; or for his work in dental movements, political and social, the success of which was acknowledged in 1886 by his receiving the honour of knighthood in recognition of "eminent services rendered to his profession." His services cannot be over-estimated. He gave us a text-book which was so in advance of those previously published that it remains a standard work to this day. He first recognized the true nature of the dentinal fibril, and so gave us a true idea of the structure of dentine. He modelled and adapted a set of forceps, based on proper anatomical considerations, which have replaced and rendered obsolete those instruments of torture the key, the pelican, and others of like kind. These are but a few of the results of his labours in the science of dentistry, yet, surely even these entitle him to lasting fame? Already, early in 1843, we find his name recorded as a member of

a committee which met to consider the expediency of obtaining parliamentary sanction to the claims of dentists, and from that time onwards whenever a movement was in progress for the furtherance of the dental profession, then John Tomes was in the fore rank of fighters. It is a long and curious story, the evolution of dentistry; full of disappointments, full of mistakes, perhaps, and not unmixed with personal bickerings, but who, comparing our position to-day with that we find pictured as obtaining, say, in 1840, when Sir John commenced practice, cannot appreciate the enormous advance that has been made? This progress is not one man's work but that of many. Still the enormous energy and the excellent judgment which Sir John applied to the task is, perhaps, most forcibly proved by the testimony of his compeers. Thus, early in 1862, we find him the recipient of a handsome testimonial, "Presented to J. Tomes, Esq., F.R.S., by several of his brother practitioners, in acknowledgment of the many valuable services he has rendered to his profession." This seems about the end of the first period of the work of dental reform. As a result of twenty years' work, instead of a lot of unconnected units, some good but many bad, we find, in 1862, a body of men bound together in societies, with journals and schools, and affiliated to the College of Surgeons, under whose jurisdiction a diploma was granted. And in the struggle for all these things Sir John took a leading part. The events of the next twenty years are recent history. Education, diplomas, registration, these in a measure existed in 1862, but they were voluntary, and the history of this period is that of the parliamentary warfare for the Act of 1878, which was to render them compulsory. It was a successful combat, but who does not know that the result was due solely to the devotion of the time, energy, and money of Sir John Tomes and his fellow workers. This and the foundation of the British Dental Association mark the crowning epoch of his life. Of late years, since his retirement from practice, he lived at Caterham, and there

it will be remembered he entertained the British Dental Association at a garden party during the annual meeting that was last held in town. Such honours as were theirs to give the Dental Profession gave him as his by right. To his knighthood we have already referred, to his F.R.S., and to his honorary F.R.C.S.; but it is noteworthy, in connection with the latter, that his fellow recipient in 1883 was Professor Huxley, who passed away but a few weeks ago. Pleasant it is to think that his dear partner, Lady Tomes, was spared to him through so long a life: they celebrated their golden wedding on February 14th, 1894. The address then presented him and the scholarship founded in his memory are within the recollection of all. To Lady Tomes, and to his only son, Mr. C. S. Tomes, we offer our sincerest sympathy.

News and Notes.

At the Meeting of the Council of the College of Surgeons of England, held on July 11th, Mr. Barrett was re-elected, and Mr. Frederick Canton was elected a member of the Dental Section of the Board of Examiners in Dental Surgery.

Mr. W. H. Goodman, L.D.S.Eng., has been appointed Dental Surgeon to the Devon and Exeter Dental Hospital.

To the already numerous medical societies must be added yet another, the Society of Medical Phonographers. Dr. Gowers is President, and Dr. Neal, Warneford Asylum, Oxford, is Honorary Secretary.

By a supplementary charter Durham University has recently acquired power to grant all their degrees to women as well as to men, excepting only degrees in divinity.

At a Meeting of the Edinburgh Dental Students' Society, held in the Hospital on Friday, 21st June, in the presence of the Dean and a number of the hospital staff, Mr. J. A. Biggs, L.D.S., of

Glasgow, gave a clinic on "Artificial vellum, acting Physiologically." By means of casts, models, etc., he explained the method of making his dentures for cleft palate cases, and then showed an excellent case in the mouth of a patient, which, by an ingenious method of moulding, was so constructed as to embrace the uvulæ, and thus remain in its place during the movements of deglutition. Mr. H. B. Ezard, L.D.S., at this meeting demonstrated the method of making the Morrison Seamless Crown, both in gold and platinum. Each of the crowns was made in about six minutes.

It has been decided to establish in connection with the Charing Cross Hospital Medical School a permanent memorial to one of its most distinguished students, the late Professor Huxley. To this end the following Committee has been formed :—Sir Joseph Fayrer, K.C.S.I., F.R.S. ; Sir Guyer Hunter, K.C.M.G. (both old friends and fellow students of Professor Huxley, at the Charing Cross School) ; Dr. Watt Black (Hon. Treasurer) ; Mr. J. H. Morgan ; Mr. Stanley Boyd ; Dr. Montague Murray and Mr. H. F. Waterhouse (Hon. Secretary). It is proposed that the Memorial shall take the form of an Annual Lecture and a Science Scholarship and Medal ; but the final decision will depend upon the wishes of a general meeting of the subscribers. Subscriptions will be received and acknowledged by Dr. Watt Black at the Charing Cross Hospital Medical School.

The *Pall Mall Gazette* says :—"A gentleman residing in the parish of Cley has just shot a pigeon which possesses a singular deformity. The lower mandible was a mere stump, while the upper one was curved downwards to a remarkable extent. Instances of curious malformation of this kind in rooks are not unfrequently met with ; and from time to time the columns of the *Field* have contained references to birds having been shot, whose upper and lower mandibles have been elongated and crossing each other in extended curves, so as apparently to exclude the possibility of their procuring food for themselves."

A Conversazione was given on Thursday, July 25th, at the Prince's Hall, Picadilly, by the Staff of the Dental Hospital of London, when the prizes where distributed to the successful students

of the year by Sir Wm. MacCormac. There was a large gathering, and Sir Wm. MacCormac, having distributed the prizes, delivered an able address. During the evening a concert was given by Mr. Herbert Schartau, assisted by Miss Pattie Hughes and Miss Carrie Curnow. Mr. Frederic Upton gave some humourous recitations, and Mr. A. Hopkins, the Royal Campanologist, performed on his silver bells. We give a list of the prize winners:—*Saunders Scholar*—Mr. W. H. Pidgeon; *Ashs' Prize*—Mr. F. J. Padgett. DENTAL MECHANICS — *1st Prize* — Mr. W. H. Pidgeon; *2nd Prize*—Mr. H. K. Jeffes, *Certificate of Honour*—Mr. S. Colyer. METALLURGY—*1st Prize*—Mr. G. Fisher; *2nd Prize*—Mr. H. K. Jeffes; *Certificates of Honour*—Mr. A. W. Turton and Mr. S. Colyer. OPERATIVE DENTAL SURGERY—*1st Prize*—Mr. W. H. Pidgeon; *2nd Prize*—Mr. W. Marston; *Certificates of Honour* — Mr. E. H. Mountford, Mr. H. K. Jeffes and Mr. A. W. Turton. DENTAL ANATOMY—*1st Prize*—Mr. H. Dunlop. (No second prize awarded.) *Certificates of Honour* — Mr. S. A. Knaggs, Mr. A. Heath and Mr. T. W. Thew. DENTAL SURGERY — *1st Prize* — Mr. F. J. Padgett; *2nd Prize* — Mr. H. Dunlop; *Certificates of Honour*—Mr. W. H. Pidgeon and Mr. W. H. Baker. *Students' Society Prize*—Mr. F. J. Padgett and Mr. H. W. Turner.

ON Thursday, July 18th, Sir Edward Lawson, Bart., presented the prizes to the students of the Charing Cross Hospital Medical School.

A GATHERING of the staff of the National Dental Hospital and friends took place at Pagani's Restaurant, on July 25th, Mr. S. Spokes in the Chair. The guest of the evening was Mr. W. R. Humby, who was presented with a testimonial by his late colleagues and old students on the occasion of his retirement from his connection with the National Dental Hospital. The testimonial took the form of an illuminated address on vellum, and a charming water colour sketch by Haiti. A selection of music, &c., by members of the staff brought the most enjoyable evening to a close.

The annual presentation of prizes in connection with the Edinburgh Incorporated Dental School and Hospital took place on July 19th, at the Institution, 31, Chambers Street—Professor Chiene presiding. The report on the past session, which was submitted by the Dean (Mr. Bowman Macleod), referred to the continued success of the school. During the session seventeen students were enrolled ; and of the 14 who completed their curriculum, 12 received the L.D.S. of the Royal College of Surgeons. At present there were 37 students on the working roll. During the twelve months ended June 30th, 1895, over 13,000 cases had been treated ; and it was noted that more than one-half of the operations were for the preservation of the teeth, showing conclusively that the school was having a vast educative influence among the poorer classes. Having presented the prizes, Professor Chiene, addressing the students, commended to their notice the career of Robert Nasmyth, the father of Scottish dentistry—in the first place because he made anatomy the basis of his work as a dentist ; and, in the second place, because he was the man who brought to Edinburgh the great John Goodsir, the surgeon, son of his life-long friend, Dr. John Goodsir, of Anstruther. In the course of his address, the Professor exhibited a diary written by Goodsir, father of the surgeon, along with a sketch-book containing a series of interesting dental drawings made by the surgeon himself ; and he closed his address by presenting to the college, amid applause, a large number of letters written by Nasmyth to his friend Goodsir, the Anstruther practitioner. Mr. Bowman Macleod, on behalf of the institution, cordially thanked the professor for his gift. The following gentlemen received prizes :—*Senior Medal*—J. Morris Stewart ; *1st Class Certificate*—Alfred Lampman ; *Junior Medal*—T. R. D. Walkinshaw ; *1st Class Certificate*—C. L. Routledge ; *McGregor Medal* (Best All-round Senior Student), J. Morris Stewart ; *Ezard Medal for Gold Filling*—R. J. Sheach ; *Dental Anatomy*—J. A. Young, C. Wood, and Alfred Lampman ; *Dental Surgery*—Alfred Lampman, J. Morris Stewart and T. A. Mackintosh ; *Dental Mechanics* (Gold Medal)—Charles Wood.

Abstracts and Selections.

ON MALIGNANT DISEASE OF THE PERIDENTAL MEMBRANE.

By A. Hopewell Smith, L.R.C.P. Lond., M.R.C.S., L.D.S. Eng., Boston, Lincs.

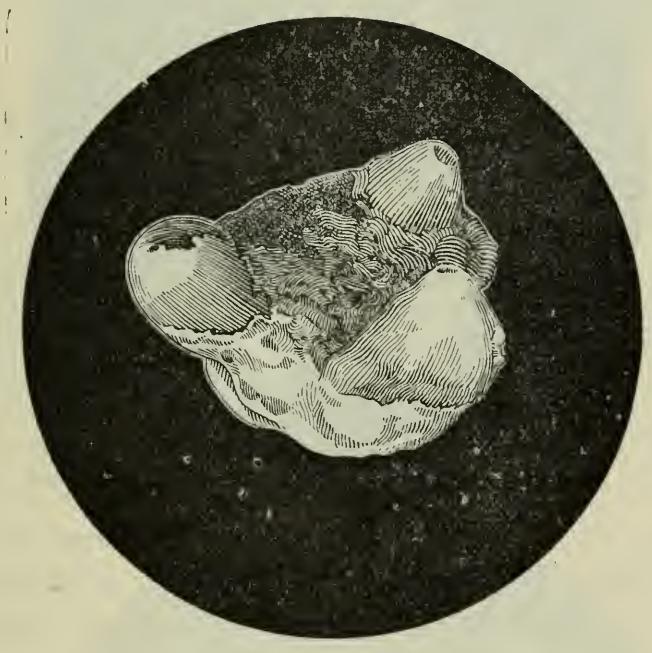
During the course of some recent investigations in the subject of the patho-histology of the perindental membrane, I found among my specimens several marked examples of a new growth intimately associated with and springing from the fibrous periosteum of the teeth—a condition which seems to have escaped the attention of the writers of surgical and dental text-books. These periosteal tumours present on examination appearances which warrant more than a passing notice, and afford a subject of great interest and importance to general and dental surgeons alike. The cases under consideration are not absolutely unique. For instance, Mr. Oakley Coles, at the annual meeting of the British Dental Association, held at Cambridge in 1885, mentioned that he had at a previous meeting of the Odontological Society of Great Britain, exhibited a specimen of round-celled sarcoma attached to a molar tooth, the microscopic examination of which had been made by Dr. Klein. As a result of the study of my morbid anatomy specimens, of which I possess more than half a dozen, I have been induced to place on record my observations on this particular and somewhat rare affection.

To those unfamiliar with the microscopical appearances of the peridental membrane a brief description of its histology is needful for a larger comprehension of the patho-histology of the disease. The alveolo-dental periosteum is a thin layer of connective tissue which surrounds the roots of teeth and occupies a position between them and their osseous sockets. It consists of bundles of large white connective-tissue fibres arranged chiefly in a transverse direction,

and is, in fact, "much like any ordinary fibrous membrane," * being freely supplied with bloodvessels and nerves. The cellular elements vary considerably, and include cementoblasts, osteoblasts, osteoclasts, and fibroblasts, together with cells and tissues of an "indifferent" nature.† In addition, there are occassionally found cementoclasts, calcospherite spherules, and the so-called "lymphatic spaces" described by Dr. G. V. Black. Of all these the fibrous tissues and fibroblasts predominate.

The chief points of interest in connection with these peridental tumours are that they are found in connection with the roots of

FIG. 1.



Maxillary molar (sound); viewed from above; enlarged $\frac{6}{1}$. It shows the growth in its early stage, springing from the peridental membrane of the region between the roots.

sound teeth, and that their characteristics are those of round-celled (alveolar) sarcomata.

1. *Seats of occurrence.*—The growth is confined, as its *locus principii*, to the periosteum of the molar teeth, the maxillary being much oftener affected than the mandibular series. It is generally

* Tomes: Dental Anatomy, p. 93. 1894.

† Black: A study of the Histology of the Periosteum and Peridental Membrane, p. 72. 1887.

seen to rise from a point situated at the junction of the roots with the body of the tooth (Fig. 1); but it may have its origin from the sides of one or even two roots (Fig. 2). Later, it generally fills up the whole of the inter-radicular region of the tooth (Fig. 3).

2. *Macroscopical appearances.*—The tumours vary in size from that of a split pea to a small nut, and have a smooth, convoluted,

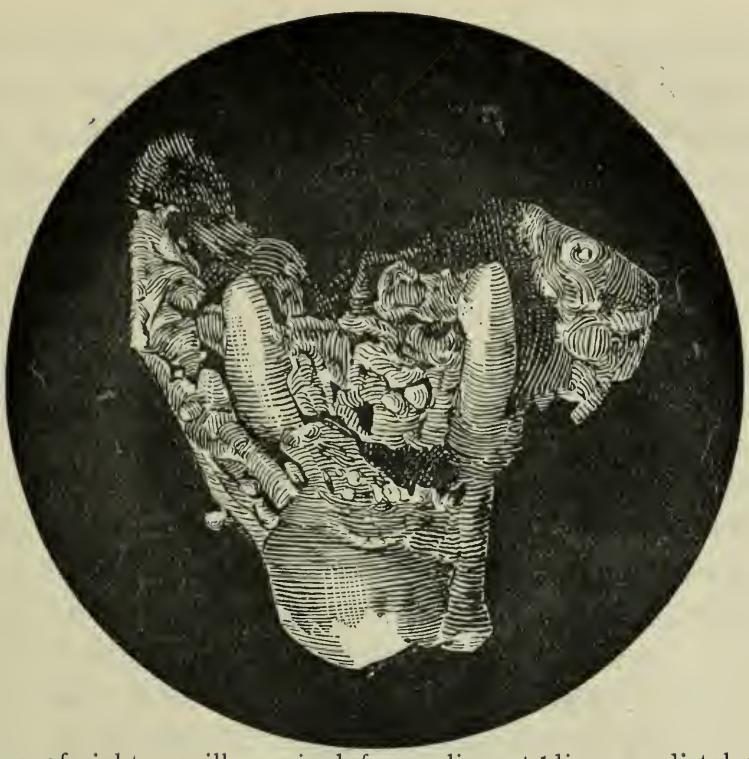
FIG. 2.

Maxillary molar (sound); side view; enlarged $\frac{6}{1}$. It shows the growth springing from the sides of the two buccal roots. A more advanced stage than Fig. 1. There is a slight deposition of tartar on the distal aspect of the tooth.

rarely ragged surface. They are firm to the touch and are of a deep-red colour. The teeth themselves are non-carious, and exhibit in their hard parts no traces of disease except slight attrition of their cusps and (in some cases) absorption of the apices of the roots. They are markedly loose, and signs of chronic inflammation of the phriosteum, accompanied by an accumulation of tartar, are often noticed.

3. The *etiology* of the disease is obscure; but there seems to be a predisposition on the part of the growths to attack the fibrous

FIG. 3.



Portion of right maxilla excised for malignant disease; distal view; enlarged ½. It shows the first maxillary molar *in situ*, with its peridental membrane greatly increased in size by the growth, and also the secondary infiltration of the neighbouring parts. The tooth is sound, but loosened to a considerable degree. The sound canine tooth is seen in position at the back of the figure, the roots of the two bicuspids occupying the interspace. From original photographs.

membranes of the teeth of females about the period of the menopause. Long-continued and powerful friction, as shown by the wearing down of the cusps, is probably the exciting cause.

FIG. 4.

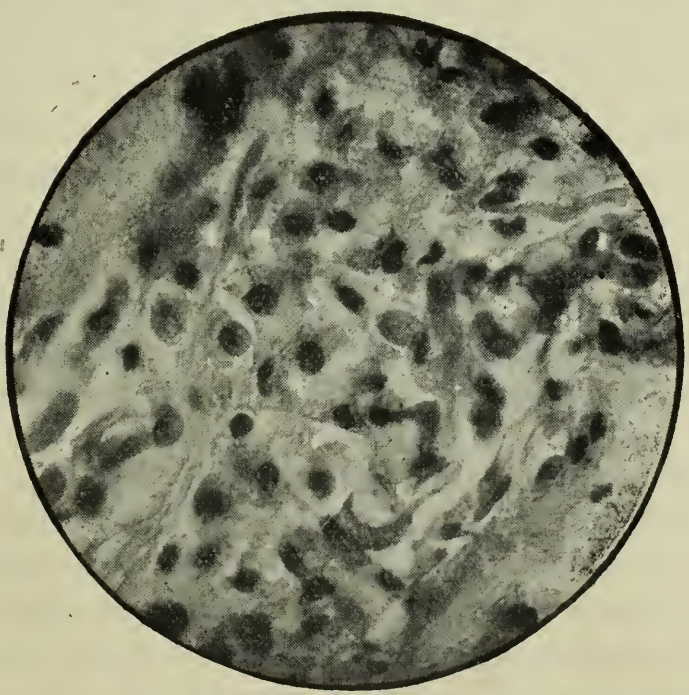


Photo-micrograph of a section (× 500 diam.) of a peridental sarcoma exhibited at a recent meeting of the Odontological Society of Great Britain.

4. The *subjective symptoms* point chiefly to long-continued sharp pain, increased on pressure, the course of the disease lasting sometimes several months. The pain is excruciating at times, and such as to render necessary immediate extraction of the loosened organ.

5. *Objective symptoms.*—On examining the mouth at first there is sometimes almost entire absence of swelling or of any usual inflammatory signs, and the tissues are not markedly indurated. There may be slight suppuration. If the disease is not far advanced diagnosis is only complete after removal of the tooth. Later, well-marked symptoms of malignancy appear.

6. *Microscopical appearances.*—The growths consist of masses of cells held together by a fine network of fibrous tissue, which is very dense here or very loose there, and is in some places apparently undergoing fibrication or chondrification. In the centre of the growth this network is scanty, but the intercellular tissue is conspicuous outside. Vessels are scanty in the centre and have extremely thin walls; they ramify among the cells. In the outer portion they are larger (but not dilated) and have normal walls. The cells themselves are for the most part rounded in shape and considerably larger than red blood-corpuscles (Fig. 4). They contain one or more nuclei and are devoid of any definite cell wall. Great numbers of spindle cells exist. There is little hæmorrhage into the tissues, probably because of the small size of the growth, and because it has not advanced sufficiently to allow large hæmorrhages to take place in its substance; but small extravasations of blood corpuscles are noticed here and there. Microscopically the growth is practically indistinguishable from granulation tissue, as has been pointed out by Mr. Knyvett Gordon; considered from a clinical aspect, however, there can be no doubt as to its malignant nature, as Fig. 3 shows. The jaw was excised for malignant disease of the antrum by Mr. W. J. Pilcher, of Boston, to whom I am indebted for the specimen. The photograph exhibits the first right maxillary molar *in situ*, with its peridental membrane greatly enlarged by the new growth. Infiltration of the surrounding parts has taken place, the gum, antral mucous membrane, and alveola process being alike affected, and the latter partially absorbed. There is also absorption of the apical regions of both the labial roots. The patho-histology of this growth is identical with that of the isolated cases already mentioned, and from the evidence at hand it seems to be clear that the latter are only earlier stages of the former.

To sum up, it may be said that sarcomatous disease of the peridental membrane is not rare in its earlier forms, but that it is very seldom met with in an advanced condition ; and that removal of the molar tooth fortunately cuts short its career if taken sufficiently early, but if it is allowed to continue it constitutes another starting-place for malignant disease of the maxillæ.—*Lancet.*

PHYSICAL CHARACTERS OF THE HUMAN TEETH.

By G. V. Black, M.D., D.D.S., &c.

Conclusions.

From the facts developed in this investigation, it seems that the following conclusions may be summarized.

The teeth are strongest in youth and early adult age, diminishing somewhat in strength and advancing age.

Teeth that have lost their pulps and have become discoloured, lose strength in a marked degree, apparently from a deterioration of the organic matrix.

Teeth that have become badly worn from mastication, and in which the pulps become so much calcified as to cut off the nutrition of the crown portions of the dentine, lose strength, apparently from deterioration of the organic matrix.

Teeth of old people, and especially those in which much calcification of the pulps occurs, deteriorate in strength.

There is no basis for the supposition that the teeth of children under the age of twelve years are *too soft to receive metallic fillings.*

Differences in density or in the percentage of lime-salts in the teeth is not the controlling factor in the strength of the teeth, nor other hardness, this seeming to depend upon the condition of the organic matrix.

Differences in the strength of the teeth have no influence as to their liability to caries. Differences in the density, or in the percentage of lime-salts in the teeth, have no influence as to their liability to caries.

The active cause of caries is a thing apart from the teeth themselves, acting upon them from without, and, from a consideration of the facts thus far developed, the logical inference is, that the cause of the differences in the liability of individuals to caries of the teeth is something in the constitution, operating through the oral fluids,

and acting upon the active cause of caries, hindering, or intensifying its effects.

Caries of the teeth is not dependent upon any condition of the tissues of the teeth, but on conditions of their environment.

Imperfections of the teeth, such as pits, fissures, rough or uneven surfaces, and bad forms of interproximate contact, are causes of caries *only in the sense of giving opportunity for the action of the causes that induce caries.*

The objects to be attained in filling teeth are the perfect exclusion of the causes of caries from the tissues by sealing the cavity, *and securing such form as will prevent lodgments of débris about the margins of the filling*, and thus prevent the further action of the cause of caries.

There is no basis for the supposition that some teeth are too soft, or too poorly calcified, to bear filling with gold or other metal in use for that purpose, since all are found to be abundantly strong.

There is no basis for the selection and adaptation of filling-materials to soft teeth, hard teeth, frail teeth (in structure), or poorly-calcified teeth. What basis there may be in the *conditions surrounding the teeth* for the selection and adaptation of filling-materials must be left to future developments to discover.

With our present knowlege, the only basis for the selection and adaptation of filling-materials to classes of cases is the individual operator's judgment as to which he can so manipulate as *to make the most perfect filling*, considering the circumstances, his own skill, and the durability of materials.

There is no basis for the supposition that calcic inflammation of the peridental membranes or phagedenic pericementitis (so-called pyorrhea) attacks persons who have dense teeth in preference to those whose teeth are less dense.

There is no basis for the treatment of pregnant women medicinally with the view of furnishing lime-salts to prevent the softening of their teeth, or with the view of producing better calcified teeth in their offspring.

Theories of the Cause of Caries.

The exciting cause of caries is now well known to be certain classes of micro-organisms. This has been investigated and explained by Dr. Miller, of Berlin, and his findings have been sufficiently verified. At the present time there are perhaps few persons who question the

correctness of this view. It may be stated briefly that certain of the micro-organisms that habitually grow in the oral fluids find lodgment in fissures, grooves, and other irregularities in the surfaces of the teeth and upon surfaces not cleaned by the friction of mastication, such as the proximate surfaces, buccal surfaces, etc., and continuing their growth in these positions for weeks and months, together produce an acid excretion which slowly acts upon the tooth-structure, causing a decalcification, first of the enamel, admitting the growth to the dentinal tubes which they enter, after which the decalcification of the dentine proceeds little by little, the growth following up as the decalcification prepares the way, until the crown of the tooth is destroyed.

As a predisposing cause, those faults in the forms of the teeth, or of their development, such as bad forms of interproximate contract, unevenness of surface, fissures, etc., all of which give *opportunity for lodgment and continual growth of micro-organisms*, has generally been acknowledged, and by most recent writers has been insisted upon as important. It follows from this that those persons whose teeth are best formed as to outward configuration and are most complete in the closure of their grooves, *i.e.*, presenting no fissures or deep pits, are least liable to caries. In an important sense this is correct, but it is insufficient to explain the facts clinically observed, or the wide variations that are presented in the disposition of caries to attack the teeth of different individuals. The teeth of many children begin to decay within a year or two after presenting through the gums, even though the configuration and closure of the grooves do not seem to be at fault. The teeth of many other children do not decay so early; indeed, a considerable number escape decay of their teeth entirely, or it is limited to the occurrence of a very few cavities, though the configuration of their teeth may be no better.

It seems to be admitted by all who have examined the subject from the standpoint of the bacteriologist, that the caries-producing organisms are present in every mouth whether caries occurs or not. I have myself made cultures from the saliva of many people, those in whose teeth caries are making sad havoc, and those in whose teeth no caries whatever appeared, and must say that I have found no mouth that was free from the caries-producing organisms. Then, if these micro-organisms are present in every human mouth, why is it that they induce caries in the teeth of the one and not in the teeth of another? Why is it that the teeth of the one are

quickly destroyed, while there are only a few slowly progressive decays in the teeth of the other? Indeed, all possible shades of difference, from the rapid melting down of the teeth to complete immunity from caries. The popular answer to these questions, both by the profession and the laity, has been—*differences in the physical qualities of the teeth.* Teeth that contained but a small percentage of lime-salts, soft teeth, have been regarded as most susceptible to caries, while teeth that contained a large percentage of lime-salts, hard teeth, have been regarded as least susceptible to caries.

This is shown by the examination of the physical characters of the teeth to be a fallacy. Examination of the density of the percentage of lime salts, and of the strength of the teeth, that are certainly reasonably accurate, and include a sufficient number upon which to base trustworthy judgment, has shown that neither the density nor the percentage of lime-salts, nor the strength, is in any degree a factor in predisposing the teeth to caries, or in hindering its inception or progress.

The question now is—what is the cause of the differences observed in the disposition of the caries to attack the teeth of different individuals, other than those resulting from differences of form and of cleanliness? In the present state of science no satisfactory answer can be given. The best that can be done is to suggest the direction that seems most promising for future study. With this end in view, a few observations may not be uninteresting, and as the years go by may grow into importance.

One thing has struck me very forcibly since the admirable experimental work of Dr. Miller, of Berlin, in 1884-5 (see "American System of Dentistry," Vol. i., page 797). Here it is recited that caries of considerable depth occurred, the tubules became distended so that the walls disappeared and cavernous openings appeared which were crowded with micro-organisms, and that moderately thick sections of dentine were completely decalcified —all under artificial conditions in his test-tubes, *and within four weeks' time.* This observation I have myself verified, and the difference in the rapidity of progress of caries thus produced artificially in test-tubes, and that occurring under what may be called natural conditions within the human mouth contrasted. I have never seen caries in the mouth progress with such rapidity under any conditions whatever, either in teeth with living or dead

pulps. Perhaps some part of this difference may be explained by the absorption and removal of the acid formed by the micro-organisms through the continuous flow of the oral fluids, thus presenting the same degree of concentration of the acid products. But at best this can be but a very partial explanation of the phenomena observed, and is no explanation whatever of differences in the susceptibility of the teeth of different individuals.

It is known that micro-organisms do not grow so well in the concentration of the lactic acid which occurs in our culture-tubes, and that if this is allowed too great a concentration their growth ceases entirely. Yet they will penetrate dentine farther in the same length of time in the tubes than they will do in the mouth. If this proposition is correct, we must conclude that there is some deterrent action or force operating within the human mouth that is not present in the test-tubes—a force of some kind, or of some nature, that acts to hinder the destructive effects of the products of the micro-organisms, either by restraining the growth of the organisms, by hindering the production of their typical acid excretions, or by limiting the effects of the acid excreted by the organisms. Such an effect seems not to be produced by any condition of the teeth themselves connected with their vitality, since the observation applies with equal force to pulpless teeth, or dead dentine, as to living dentine. Then this power, or deterrent force, is extraneous to the teeth ; its action is from without. This hypothesis is further supported by the well confirmed observation that the opening of a carious cavity by accident, or intentionally by breakage of over-hanging walls, has a marked deterrent effect upon the rate of progress of the carious process. Such a condition does not appear to hinder the continued growth of micro-organisms, but it does not seem to dissipate the products formed by their growth, and in a marked degree prevent their action upon the teeth. This again may in some degree be explained by the simple absorption of these products by the flow of saliva. But this kind of dissipation of the products would be measurably the same for different individuals, while the observation is that the effect of the dissipation is greatly different in different individuals. These considerations seem to force the conclusion that the oral fluids contain some deterrent substance, or principal, that is more potent in its action in some persons than in others.

What could be such a substance? It is now well-known that the organic acids when taken into the blood are quickly decomposed by some principle existing in the blood itself, or furnished by the cellular elements with which the organic acid comes in contact. Therefore, such of the organic acids as have in them elements of a readily formed alkaline base tend, by their administration, to produce alkalinity of the excretions instead of acidity, which would be the case were they not broken up. From this point it is not difficult to arrive at the conception that the organic principle that breaks up these organic acids within the blood, or the tissues, may also appear in the saliva, and be much different in its potency in different individuals; or even in the same individual at different times of life; or, again, that variations may occur under differences of physical health or condition. *With this view of the case, a strong disposition to caries of the teeth becomes as truly a dyscrasia as gout or rheumatism.*

At this point we may turn to the developments derived by experimental experts in recent years, to see whether or not something has been found that gives plausibility to such a supposition. No examinations of human saliva, with this end in view, have been made, but in other fields results have been obtained.

It has been a long time now since the theory that immunity from micro-organisms might be due to the presence of a deterrent substance of the blood entered into the minds of scientific men, this substance being something that would prevent the growth of the invading bacteria, or prevent the development of their toxic poison; but it has been an exceedingly difficult matter to secure evidence upon this point. The first experimental researches were negative, but in 1884, Grohmann (my quotations are from "Reference Hand-Book of the Medical Sciences," 1884, Supplement, page 234) showed that fresh serum exerted an attenuating influence upon the bacilli of symptomatic anthrax. Todor found that fresh blood destroyed them, while Nuttall established the fact that organic fluids, blood-serum, pericardial fluid, &c., really possessed the power of destroying bacteria, and that this germicidal action was taken away by raising these fluids to a temperature of about 60° C. Buchner showed that this power rested solely in the serum, and that the breaking up or mixing it with the blood-corpuscles masked, or diminished its activity. He also showed that repeated freezing divided the serum

into layers, of which the lowest was the most active in destroying bacteria, and that this power of the serum is destroyed if it be diluted with distilled water.

After Buchner, the most important work has been done by Ogata and Iasuhara, and Behring and Kitasato, in showing the great influence of the fluid portion of the animal tissues in the acquisition of immunity. According to the work of these authors, immunity is due to the action of albuminoid substances, called by Hankin "defensive proteids," which have the power of destroying pathogenic bacteria, of attenuating them, and of destroying their toxic products.

It is necessary that one should have a clear idea of these defensive proteids, if one is to understand what extreme importance is to be attached to their discovery, and the prosecution of researches upon them.

These defensive proteids are divided into the classes. First, those that possess germicidal action. The strongest example of this class is found in the blood-serum of the white rat. This animal is refractory to inoculation with anthrax. Behring found by direct experiment that the blood-serum of the animal destroyed the anthrax bacilli. By comparative tests he shows that two and a half cubic centimeters of rat serum possessed the same germicidal power as would the same quantity of corrosive sublimate solution, one to one thousand. The most striking property of these defensive proteids is that, while they are so destructive to bacteria, they are in no degree poisonous to animals, and it thus becomes possible to employ them for the prevention or cure of infectious diseases.

The second class are those that, while permitting bacteria to grow, prevent the formation of, or modify, their toxic products, and are called attenuating proteids. Certain animals that are refractory to anthrax, but permit the growth of the bacilli, produce an attenuating influence upon the organisms, and Ogata and Iasuhara have shown that this attenuating influence resides in the serum of the animals experimented upon, and not elsewhere ; and further, that this attenuating influence continued to exist in the serum after removal from the animal, and that it could be made to serve as a retarding influence, or as a curative agent, in animals inoculated with anthrax.

The third class are known as antitoxic proteids. The first announcement of this class was by Behring and Kitasato in 1890. They had found "that the blood of rabbits protected against tetanus

had the power to destroy the alkaloid of tetanus (tentanine) in the lifetime of the animal attacked. They also found that it was not only possible to protect the animal against an inoculation of the tetanus bacilli, but also to cure it after the inoculation had taken place, and even after the appearance of the symptoms of the disease."

The importance of such results as these can be scarcely over estimated, especially since they have been verified by several independent observers. Almost immediately after this discovery came a similar announcement in regard to diphtheria by Fraenkel and Brieger. In this the blood-serum of animals rendered immune by inoculation proved sufficient in itself to protect other animals from the effects of inoculation, and even to cure them after the disease had appeared. At present this serum is being widely tried for the cure of diphtheria occuring in children, and the reported results are full of promise. One striking feature of this last class, the antetoxic proteids, is, that it is something acquired, that seems not to have existed before in the blood-serum, or, if it existed, was too small in quantity or too slight in efficacy to protect the animal. It seems to be a digestive ferment, agreeing in its principles of action and in the conditions of loss of power with other digestive bodies. Its formation seems to be stimulated in the time of need for the destruction of a poison present, and continues to exist in the serum for an indefinite time.

While all of this may be different in its detail from anything we may expect to find in the human mouth, it illustrates a principle of the formation and action of deterrent proteids in the serum of the blood and in the secretions, and taken together with the fact of the breaking up of the organic acids in the blood, which has been mentioned, and the immunity of certain persons from caries of the teeth in the presence of the organisms productive of the disease, gives strong plausibility to the suggestion.

But there are other observations that are possibly still stronger. It was shown by Sternberg years ago that micro-organisms habitually growing in human saliva have the power to destroy rabbits, but are not pathogenic for man, who is supposedly protected from their virulence by some defensive proteid. This seems to be the only principle discovered upon which the differences of the immunity of animals can be based. The principal of vaccination against smallpox must, for the present,

rest upon the immunity, partial as it seems, of the cow, and the influence exerted upon the potency of the smallpox virus in passing through that animal, together with the excitation of a similar protective proteid in man.

Again, every dentist of long and careful observation has not only seen persons immune from caries of the teeth, but has seen persons whose teeth decayed badly at one time, become apparently immune at some after-time. Such cases as this: a lady who has been my patient from childhood suffered much from caries during her teens, and a large number of fillings were necessary. At the age of twenty-two she became immune, and no signs of new decays occurred and no fillings failed for about fourteen years. Then suddenly, as it appeared, some half-dozen new decays occurred together, and two proximate fillings began to fail at the bucco-gingival angle. These were filled, and during the year two or three other decays appeared. Since then several years have passed without other decays occurring. Now, this class of observation in somewhat less pronounced form is not very uncommon. In large degree it has been this class of observation that has led to the widespread interpretation of soft teeth becoming hard, and of hard teeth becoming soft. But the conception that some power or influence is acting through the medium of the oral fluids to produce the differences is forced upon us by the consideration of the facts presented.

Still, it must not be forgotten that the degree of virulence of caries may be dependent in a measure upon still other influences.

It is now well known that the organisms producing caries become impotent in the complete absence of sugar, or other substances readily convertible into sugar. This cannot be supposed to occur in the human mouth. But vast differences in the supply of sugar, or sugar-forming substances, as starch, &c., occur, and the greater prevalence of caries in the teeth of millers, bakers, candy-makers, and persons who are habitually mincing sweetmeats, has been widely noted and generally attributed to this cause, that is, to the unusual supply of fermentable material. Differences in personal cleanliness and some other potent conditions must for the present bear the ignominy of being causative of extreme degrees of the carious processes. But how often do we witness cases of the worst type in persons in whom none of these are active.—*Dental Cosmos.*

THE HISTORY OF THE CUSPS OF THE HUMAN MOLAR TEETH.*

By Henry Fairfield Osborn,

Da Costa Professor of Biology, Columbia College, New York.

Mr. President and Gentlemen,—I wish to congratulate the members present upon the formation of this Institue of Stomatology. It seems to me to mark one of the stages in the remarkable specialization of human knowledge when, at the present time, it is proposed to devote the work of an entire society to the scientific study of the mouth parts, as I understand your object to be ; and I also gather from the fact that you have asked me, as a comparative anatomist, to deliver an address this evening, that you look at the subject in two ways—from the standpoint of applied or practical science and from the standpoint of theory. It is on the theoretical side that I should like to bring before you this evening the history or origin of the cusps of the human molar teeth.

We take up this skull of an Eskimo, and you will observe that the teeth are slightly worn, and that the molars have four cusps.† Half a century ago this would have been considered as something ultimate, simply as an adaptation to human diet ; but now that we have come to understand the doctrine of evolution, we ask ourselves, What is the meaning of these cusps ? what is their history ? what is their origin ? Now, these four cusps which are present on the four corners of the teeth might be explained by evolution in three ways. We might imagine that the crown of the tooth was originally a low rounded summit, and that on the summit these four cusps appeared at each angle ; no one has advocated this. Or we might imagine that they represent the coming together of a number of tips of pointed teeth, such as we see in the jaw of this member of the dolphin family ; this is the theory which has been recently advanced in Germany, and it has been called the cusp concrescence theory. Or, again, we might imagine that these cusps have originated by a gradual addition to the sides of a primitive single cone ; this we call

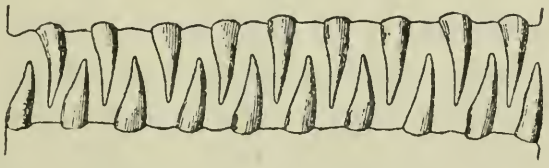
* Address before the New York Institute of Stomatology, April 19th, 1895.

† E. D. Cope, "On the Tritubercular Molar in Human Dentition." *Journ. of Morphology*, July, 1888, p. 7.

the "cusp differentiation" theory, orthe theory of cusp addition, in distinction from concrescence. The differentiation theory is supported by Cope, by myself, and others in this country.

Now, suppose an evolutionist were to trace back the history of the monkeys and of other animals among their fossil ancestors, he would find that the further back his researches extended the more simple the types of the teeth would be ; he would find that the teeth of the oldest types of ancestral mammals have a simple conical form, the form that is preserved in the teeth of the whales and the dolphins of the present day, or in the Edentates, as represented in the group to which the sloth and the armadillo of South America and South Africa belong. (Fig. A.)

FIG. A.



Section of the upper and lower jaws of a dolphin, showing the alternation of simple conical teeth of the reptilian type.

We have the same type of conical tooth preserved in the human canines, and if we turn from the teeth of man, in which the canine has almost entirely lost its original laniariform, or flesh tearing shape, to that of the lower monkeys, we see that the canine is really a pointed tooth ; so that we may draw a suggestion from this fact that all the teeth of the series at one time were pointed.

It is moreover true that wherever we find these pointed teeth they are present in the jaw in large numbers, sometimes sixty or seventy on one side, and usually running far back into the mouth, and it is this fact which led to the suggestion of the theory of "concrescence" in the formation of molar teeth.

THE CONCRESCENCE THEORY.

You might not at this stage be inclined to take this "concrescence" theory" seriously, but my address has been suggested largely by the fact that it has been taken very seriously by some well-known anatomists in Germany ; as seen in the position of Professor Schwalbe,* in a recent article, in which he reviews the entire literature in regard to the formation of teeth published during the

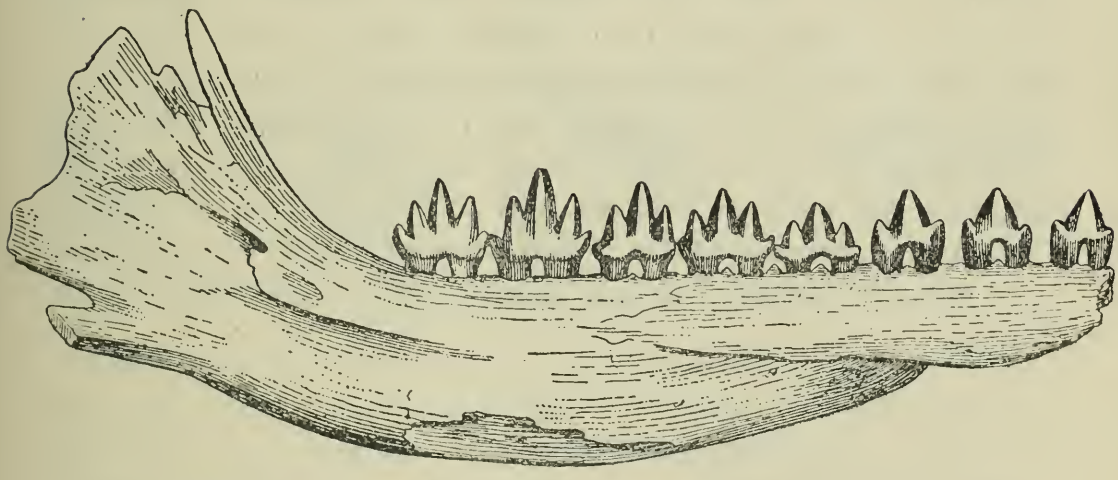
* "Ueber Theorien der Dentition." *Anatomischer Anzeiger Centralblatt*, 1894.

last fourteen or fifteen years, and concludes that in the concrescence theory and the differentiation or cusp addition theory the evidence is so evenly balanced that he cannot decide between them. It is, therefore, a question *sub judice*, and worthy of the attention of odontologists. As to the source of this theory, it was proposed simultaneously by two Germans, both of whom claim the credit of originating it. One is Dr. Carl Röse, a physician of Freiburg, a man of fine powers of research and great energy, since he has, during the past few years, issued in rapid succession a series of valuable papers on the embryological development of the teeth, which place him in the front rank of students of this subject in this decade. The other is Professor W. Kükenthal, of Jena, whose views sprang principally from the study of the teeth of whales. While these two writers are in doubt as to which should enjoy the precedence, I find, in correspondence with my friend, Dr. Ameghino, of the Argentine Republic, also originally a physician and now a distinguished palæontologist, that he promulgated this theory as far back as 1880. In a work which he published at that time, entitled "Filogenia," he says, "For the reasons we are about to give it is evident that all mammals which possess compound teeth have in past periods possessed a very much larger number of teeth, but of quite simple conical form, like those of the modern dolphin. The most primitive mammals must also have had a number of very elevated teeth, but it is difficult at the present time to determine how large this number was. Nevertheless, if we take as an example a mammal in which the dentition is complete, as in the *Macrauchenia** or in the horse, and if we reduce the number of its compound teeth, we find that the most remote ancestors of these forms must have possessed more than one hundred and fifty teeth. This number is certainly not exaggerated, because *Priodon*, the giant tatusia, a mammal in an already quite advanced stage of evolution, possesses nearly one hundred simple teeth, and in the dolphin this number rises from one hundred and fifty to one hundred and seventy." I read this to show that if there is any truth in the concrescence theory, Dr. Ameghino partly deserves the credit for it. Moreover, we learn from Schwalbe that the same theory was advanced by Professor Gaudry in 1878, and still earlier by Professor Magitot in 1877.

* This is one of the peculiar extinct South American hoofed animals.

Now let me illustrate, in a very simple manner, what is meant by the theory of concrescence and how we can imagine that the human molars have been built up by bringing together a number of isolated teeth. Placing a number of conical teeth in line, as they lie in the jaw of the whale, they would represent the primitive dentition. In the course of time a number of these teeth would become clustered together in such a manner as to form the four cusps of a human molar, each one of the whale-tooth points taking the place of one of the cusps of the mammalian tooth—in other words, by a concrescence, four teeth would be brought into one so as to constitute the four cusps of the molar crown. Vertically succeeding teeth might also be grouped.

Fig. B.



Fragmentary lower jaw of a Jurassic mammal, *Amphilestes*, showing five triconodont molars, with three cusps in line. Greatly enlarged.

Now, what evidence is there in favour of this theory, and what is there against it? First, there is this, that all primitive types of reptiles from which the mammalians have descended and many existing mammals, as we have noted, have a large number of isolated teeth of a conical form; secondly, we find that by a shortening of the jaw, the dental fold or embryonic fold, from which each of the numerous tooth-caps is budded off in the course of development, may be supposed to have been brought together in such a manner that cusps which were originally stretched out in a line would be brought together so as to form groups of a variable number of cusps according to the more or less complex pattern of the crown.

What may be advanced against this theory? This, and it is conclusive to my mind: we find at the present time that cusps, quite similar in all respects to each of the cusps which form the angles of the human molar, are even now being added to the teeth in certain types of animals, such as the elephant, whose molar teeth cusps are being complicated now or until very recent times. Then we find in the mesozoic period certain animals with tricuspid teeth. Now, according to the theory of concrescence, these teeth ought not to show any increase of cusps in later geological periods; but as we come through the ages nearer to the present time we find that the successors of those animals show a very much larger number of cusps. How is this increase of cusps to be accounted for? Has there been a reserve store of conical teeth to increase the cluster? No. Most obviously, to every student of the fossil history of cusps there is no reserve store, but new cusps are constantly rising up on the original crown itself by cusp addition.

However, do not let me give you the impression that these researches of Röse and Kükenthal are not of the greatest value and interest: we shall see later on how the very facts of embryology which are advanced by Dr. Carl Röse in support of his hypothesis can be turned against him and used to support the differentiation theory.

THE DIFFERENTIATION THEORY.

Now let us turn to the differentiation theory and see what evidence we have of that. Let us go back to a very remote period of time, through the geological ages of the Pliocene and the Miocene, through the Eocene, through the Cretaceous or chalk period, and even the Jurassic. Still further back we go to the Triassic, and the interval between this and the present period has been estimated at over ten million years. Now, in the Triassic, we find the mammalia, or the first animals which we can recognise as mammalia, possess conical, round, reptilian, or dolphin-like teeth. There are also some aberrant types which possess complex or multitubercular teeth.

These teeth begin to show the first traces of cusp addition, as shown in the plate.

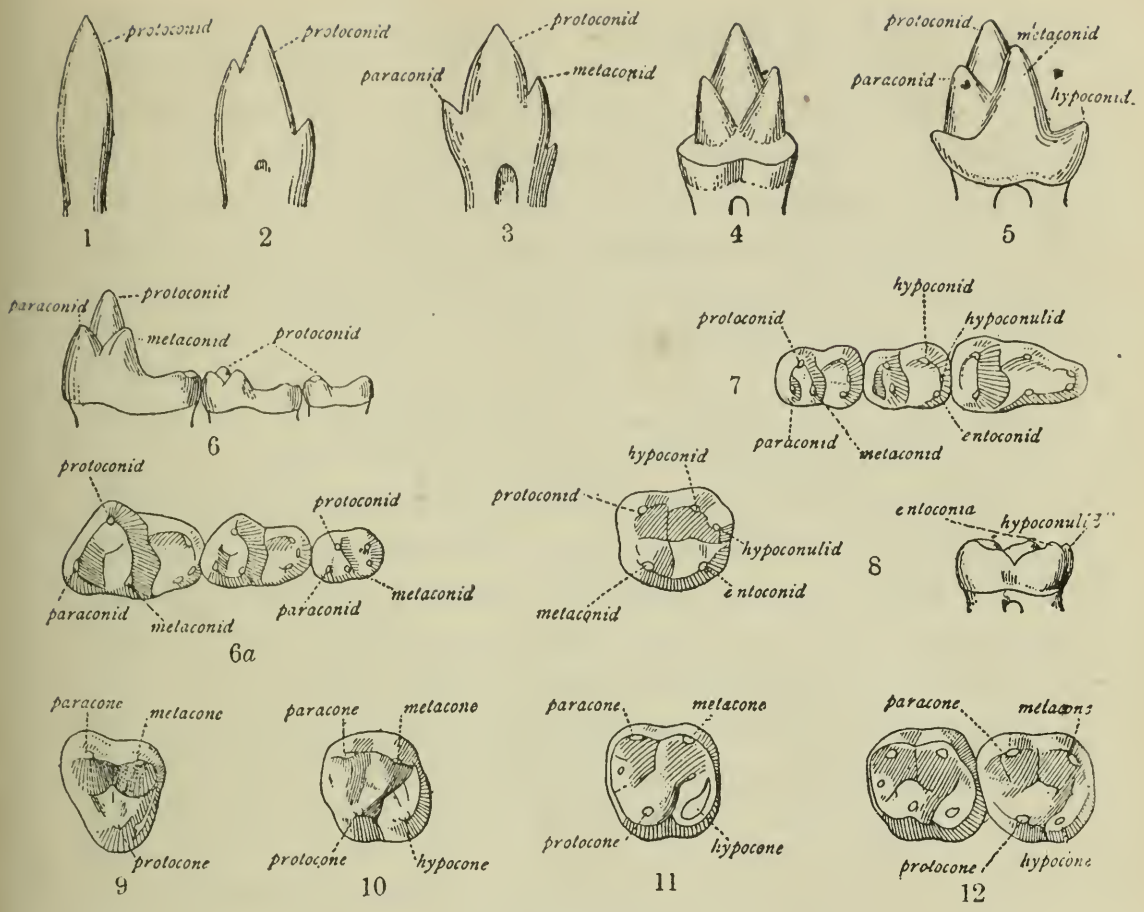


PLATE AA.

Here (Fig. 1) we have represented the teeth of the *Dromatherium*, an animal found in the coal-beds of North Carolina, and on the sides of the main cone are cusps or rudimentary capsules. In this enlarged model you see that on either side of the main cone are two cuspules. These teeth were found six hundred feet below the surface in a coal-mine, and in the same mine we find another animal, represented by a single tooth, here (Fig. 2), in which these cusps are slightly larger. These cusps have obviously been added to the side of the tooth, and are now growing. Then we pass to teeth of the Jurassic period, found in large numbers both in America and in England, but still of very minute size; and we observe the same three cusps, but these cusps have now taken two different positions; in one case they have the arrangement represented in Fig. B., page 365: the middle cusp is relatively lower, and the lateral cusps are relatively higher; in fact, these cones are almost equal in size; these teeth are termed *triconodont*, as having three nearly equal cones. But associated with this of *Triconodont* is another animal named *Spalacotherium*, the teeth

type of which are represented in Fig. 4. This is one of the most significant teeth which we have among all the fossil series, because this tooth illustrates the step that was taken in the transformation of a tooth (triconodont) with three cusps in line to a tooth with three cusps forming a triangle ; for the primitive cusp is now seen to be the apex of a triangle, of which the two lateral cusps are the base. Now this fact in itself is of great significance, because this tooth in this single genus is the key of comparison of the teeth of all mammalia of the great class to which man belongs. By this we are able, as you shall see, to determine that part of a human molar which corresponds with a conical reptilian tooth.

The stage shown you is the triangle stage ; the next stage is the development of a heel or spur upon this triangle, as you see in Fig. 5, *Amphitherium*. To sum up : we have a reptilian cone, two cusps added to it, and a heel—four cusps altogether, and we shall now see what relation these bear to the human molar.

First let us turn to some transitional forms. Examine a molar of the living oppossum, a marsupial, which still distinctly preserves the ancient triangle. Look at it in profile, in side, or in top view, and see that the anterior part of that tooth is unmodified. This triangle we also trace through a number of intermediate types.

In this figure (Fig. 6) of *Miacis*, a primitive carnivore, we observe a high triangle and a heel, and when we come to look at it from above (6a) we find that the heel has spread out broader, so that it is as broad as the triangle. Now, the three molars of this animal illustrate a most important principal—namely, that the anterior triangular portion of the crown has been simply levelled down to the posterior portion of the crown. Compare these three teeth, therefore, and you see illustrated a series of intermediate steps between a most ancient molar and the modern molar of the human type. The second tooth is half-way between the first and third. Look at the second molar from above and you see it has exactly the same cusps as the first, so it is not difficult to recognise that each cusp has been directly derived from its fellow. Now direct attention to the third tooth of the series (Fig. 7), for it is of equal significance with the others. This tooth has lost one of its cusps : it has lost a cusp of the triangle. It is now a tooth with only half the triangle left on the anterior side, and with a very long heel. That tooth has exactly the same pattern as the lower human molar tooth (Fig. 8) ; the only difference is that the heel is somewhat more

prolonged. These teeth belong to one of the oldest fossil monkeys, *Anaptomorphus*.

I have no doubt many of you have observed, in the examination of human lower molars, that occasionally, instead of having four cusps, they have five. The fifth cusp always appears in the middle of the heel, does it not, or between the posterior lingual and the posterior buccal? You find this in the monkeys and in many other mammals, but I know of no record of the ancient anterior lingual reappearing.

So we see that the human lower molar tooth with its low, quadritubercular crown has evolved by addition of cusps and by gradual modelling from a high-crowned, simple-pointed tooth. Now this, and I say it with great confidence, is what has actually taken place. It has not come about by bringing together single reptilian cones; it has been simply by the addition of one cusp after another to an original single reptilian cone until there were six cusps, and then, in the adaptation and fitting of the lower teeth to the upper, one of the cusps has disappeared. This cusp was the primitive anterior lingual, or, in comparative anatomy, the *paraconid*.

Now let us follow the history of the upper teeth and see why the "primitive anterior lingual," or paraconid, in the lower jaw has disappeared.

You are constantly, in your practice, observing that one tooth in the lower jaw gets into the way of another tooth and has to be pushed out of place in order to place its opponent in the upper jaw into its proper position. This is exactly what Nature has done; Nature has abandoned the lower cusp simply because, in the simultaneous transformation of the upper teeth from a three-cusp to a four-cusp type, there was no room for it.

MECHANICAL RELATIONS OF THE UPPER AND LOWER TEETH.

Let us examine the upper teeth. We must say, in the first place, that our evidence here is not nearly so complete, because a lower jaw, from its thin nature, is more apt to be preserved fossil than an upper jaw; so that in the older rocks we meet with ten lower jaws to one upper jaw, and we cannot get the same evidence as to the history of the upper jaw that we have of the lower; but although we are not able to trace the history of the upper teeth with the same accuracy or degree of certainty, we have every reason to think it was the same. We find the upper teeth shaped like a

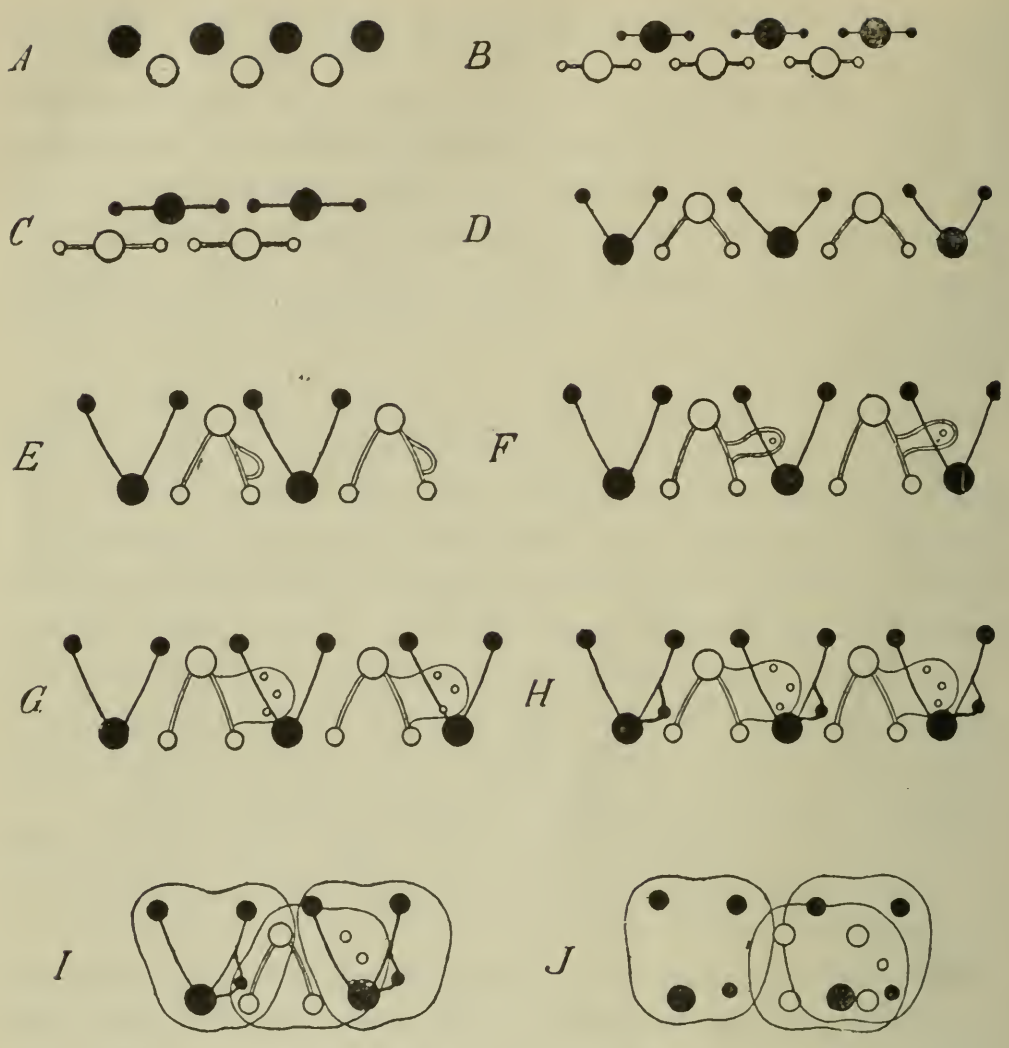


PLATE BB.

MECHANICS OF CUSP ADDITION (DIAGRAMMATIC).

Compare with shaded figures in Plate AA and Key.

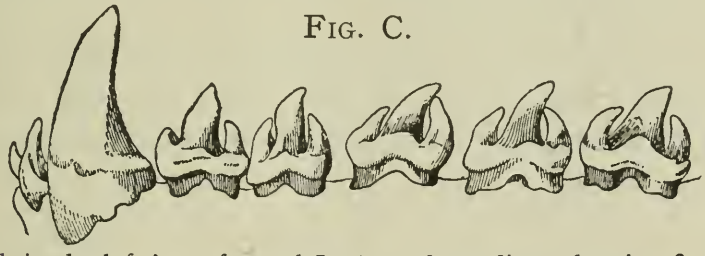
A, the conical stage (Fig. 1 ; *B*, *C*, the triconodont stages (Figs. 2, 3); *D*, the first triangular stage (Fig. 4) ; *E*, *F*, *G*, the triangular upper molar, the lower molars, with triangle and heel (Figs. 5, 6, 7, 9) ; *H*, *I*, upper and lower molars, with triangle and heel ; *J*, human type, upper molars, with four cusps, triangle, and heel (Figs. 10, 11, 12) ; lower molars, with five cusps, antero-internal cusp having disappeared (Fig. 8).

triangle, as in Fig. 9, so we may imagine that the same triangle which was formed in the lower jaw was formed in the upper jaw, with this important difference, that in the upper jaw the base of the triangle was turned outward, whereas in the lower jaw the base of the triangle was turned inward.

What I mean by this is illustrated in the accompanying Plate BB, Figs. *A—J*, which are an epitome of the whole history. The upper teeth are represented solid, the lower teeth as hollow circles.

In *A*, we see a row of single cusps, the lower somewhat inside of the upper. In *B* the lateral cusps are added. In *C* they are enlarged. In *D* the cusps are pushed outward and inward into triangles. In *E* a spur is added on the lower molar triangle, which in *F* and *G* grows out into a broad heel. In *H* and *I* a spur appears upon the upper molar triangle, and in *J* this causes the lower molar triangle to loose its anterior cusp. Nature has corrected any possible interference between these triangles in a simple manner by turning the base of the triangle of the upper molars outward towards what you call the buccal side. In the lower jaw, on the other hand, the base of the triangle is turned inward to the lingual side, so that finally we have the two triangles alternating, coming together as in *D* and making a beautiful cutting mechanism; because if any food gets in between these triangular shears the food tends to press these teeth forward and backward, therefore crowding the teeth more closely together and tending to tighten and improve the shear, whereas if the teeth were placed in line, as in *C*, and food were to get in between, the effect would be to crowd the two jaws part and lessen the exact cutting power of the shear.

FIG. C.



Lower teeth in the left jaw of a seal *Leptonyx leopardinus*, showing five triconodont premolars and molars, with three cusps in line.

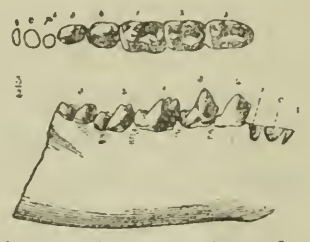
Now we see that we can compare the lower and upper triangles to each other. How about the heels or spurs, and why were they developed? They were developed because these animals required crushers as well as cutters; they required to break up their food and consequently a crushing surface was developed in each heel. In the course of time the animal gave up its cutting and tearing function, and in all the group of animals to which man belongs it acquired a purely crushing function, as seen in the teeth of the baboon. As that became necessary, the next step was to transform the entire upper tooth into a crusher as well as the lower, and to fill out all the spaces between them, so that a square lower tooth would abut against a square upper tooth, as in *J*, and this was done by simply adding a heel to this tooth. Now, what would that heel

come against in *I?* It would come against the anterior cusp of the lower triangle; therefore that cusp had to be removed and the lower molar, which had six cusps, presented only five; then the second lingual cusp was pushed forward, as in *J*, and the tooth was transformed into quadritubercular molar.

EVIDENCE THAT THE UPPER HUMAN MOLARS WERE TRIANGULAR.

How do we know that is so? We have some conclusive evidence of it in other animals of the group to which man belongs. Beginning with the lemurs, the lowest type of monkeys, and entirely separate in many respects from the higher types, we find almost without exception that the upper teeth are triangular, there being no posterior cusp, so that Fig. 9, Plate AA, accurately represents a

FIG. D.



External view of lower jaw and crown view of teeth of a lower Eocene monkey, *Anaptomorphus homunculus*. One and a half natural size. Collection Am. Mus. Nat. Hist.

tooth of the lemurs, and it also represents a tooth of the true monkeys which we find in the Eocene period; in other words, all monkeys or all primates of the group to which man belongs had at the outset this triangular upper molar. Then earlier or later in the Eocene or Miocene the spur began to be developed which transformed a three-cusp tooth or a triangular tooth into a quadritubercular tooth. That spur became enlarged and finally, in civilized races of men, we have a tooth of this form as the prevailing type of tooth. These stages are shown in Plate AA, Figs. 9, 10, 11, 12.

Now, we might say that the evidence is not perfectly satisfactory, because we have no positive reason for believing that the human teeth were derived from such a type as this; they may have come along another line of descent, and for that reason we have to show here, through the kindness of one of the members of the dental profession in this city, the teeth of an Eskimo, which, as Professor Cope has pointed out, differ from the teeth of all negroes, all Indians, and all the lower races of men, in presenting in a much clearer manner the primitive triangular arrangement of the cusps that characterize the lemurs. A friend has just been telling us what

very few of us knew—that the Eskimos do not chew their food: they simply swallow it whole or gulp it down; and their food consists largely of blubber. Blubber does not form much resistance to the teeth, and, whether as a mechanical or an inherited effect of the lack of resistance of soft food through many generations of blubber-eating Eskimos or not, the teeth of these Eskimos are exceptionally *tritubercular*. This fact was pointed out by Professor Cope in his article entitled, "Lemurine Reversion in Human Dentition."*

Up to a certain point in their evolution the molar teeth of all mammals followed exactly the same route. It follows that if we once grasp the principles of cusp addition upon this triangular ground plan we can compare the cusps of the molars of man with those of any other mammal. In the teeth of the bear, for example, the homology is very obvious indeed. But in the teeth of the cat the homologies can only be determined when we procure the ancestral forms of cats, for in the evolution of the large sectorials many cusps have degenerated. Some years ago, when I had fully demonstrated the truth of Cope's theory by my own studies, I saw the importance of using a set of standard terms for the cusps. These have since been almost universally adopted by comparative anatomists, but have not as yet, I believe, made much headway among human odontologists. They are as follows, as applied to the human teeth:

UPPER MOLARS.

Anterior palatal	Protocone	Primitive triangle, or "trigon."
Antertor buccal	Paracone	
Posterior buccal	Metacone	
Posterior palatal	Hypocone	Primitive heel, or "talon."
Anterior buccal	Protoconid	Primitive triangle, or "trigonid."
Anterior lingual	Metaconid	
Posterior buccal	Hypoconid	Primitive heel, or "talonid."
Posterior lingual	Entoconid	
Posterior mesial	Hypoconulid	

When we understand that all the teeth of all mammals have this key, this tritubercular key, we can unlock the comparisons through the series and point out the homologies.

There is further evidence in support of the theory of cusp addition which I will now briefly mention. It is that brought forth by the very investigations of Dr. Carl Röse, which he has used to support the concrescence theory. We should expect, in the

* *Journal of Morphology.*

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. The order of evolution is, to a certain extent, repeated in embryonic development. How is it with the teeth? Dr. Röse has given a most exact account of the mode of calcification of the tooth-germ within the jaw; this is also now to be had in the form of wax models, prepared by Professor Zeigler, of Frieburg.

To begin with the lower molars, the dental cap in the jaw forms a broad, saucer-like surface, and then at the corners of that cap calcified points appear. In what order do they appear? The order is shown in the following table :—

COMPARISON OF EVOLUTION AND EMBRYONIC DEVELOPMENT

	Order by "Cusp Addition Theory."	Order of Embryonic Development.
Upper Molars ...	1. Anterior palatal.	1. Anterior buccal.
	2. Anterior buccal.	2. Anterior palatal.
	3. Posterior buccal.	3. Posterior buccal.
	4. Posterior palatal.	4. Posterior palatal.
Lower Molars ...	1. Anterior buccal.	1. Anterior buccal.
	2. Anterior lingual.	2. Anterior lingual.
	3. Posterior buccal.	3. Posterior buccal.
	4. Posterior lingual.	4. Posterior lingual.
	5. Posterior mesial.	5. Posterior mesial.

In the lower molar teeth the order of calcification is precisely the order of evolution—in other words, the anterior buccal was the first to evolve, representing the reptilian cone; it is also the first to calcify. The anterior lingual is the second in age and also the second to calcify. The third and the fourth cusps calcify almost simultaneously. So we find that 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 which we have been discussing. But this you see is not exactly the case in the upper molars. Nevertheless, out of eight cusps in the upper and lower molars considered together, *six* cusps calcify in the order in which they were successively added to the single reptilian cone.

Gentlemen, I trust that I have not in this address taken you too far afield. I have reached a conclusion on this subject which could be elaborated in much greater detail. In closing I would like to refer to the work of Dr. J. L. Wortman, who is here this evening, and who was for some years a collaborator with Professor Cope in Philadelphia, and who in association with Professor Cope had quite

a share in the establishment of the "tritubercular or cusp addition" theory; This theory is now a rival to the "concrescence" theory; and, while it may not seem a matter of great importance, if the concrescence theory may not seem one we ought to take seriously, still, in view of the attention which it has gained in Germany, it is time that we produce and bring forward the unimpeachable evidence which we get of the history of these teeth from the rocks, the solid evidence from the geological formations, the evidence of comparative anatomy, which, as we have just seen, is so far supported by the evidence of embryonic development.

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—*The International Journal.*

PYORRHEA ALVEOLARIS.

By Dr. W. W. Dunbracco.

In looking over some dental journals one rainy afternoon not long since, I recorded in less than two hours' time more than a hundred remedies suggested and advocated by sundry writers and practitioners of dentistry in treatment of pyorrhea. I paused to reflect, and was amazed at so extravagant a mention of remedies, so dissimilar in properties, the like never known or heard of before in the practice of dentistry or medicine. One of the papers in question, enumerating no less than seventy-five remedies, is ably and well written, and valuable in some respects, but is far short of the mark in a practical point of view in reference to treatment of pyorrhea. The various theories (as to cause of the disease) set forth and advocated by sundry parties are almost as numerous as remedies proposed in treatment, varying from slivers of tooth-picks implanted between teeth, to gouty diathesis, diabetes, systemic debility, displacement of uterus, etc. The causes enumerated, except systemic predisposition, are almost universally consequent upon the disease, and when not, certainly not the cause. Pyorrhea, like most other well-defined diseases, has one cause and one only, not many, as

some seem to think. It is such unreasonable guesswork and wild theorizing as this, heralded by prominent men in the profession, that leads astray, and causes so much controversy.

Some contend that pyorrhea is a constitutional disease, and requires for its cure constitutional treatment ; others contend that it is only a local disease, and requires only local treatment ; and there are others, a small minority I am glad to say, who contend that it is constitutional, and that there is no cure short of removal of the teeth—weak theory and censurable practice. Some of the best men in the profession argue and insist that the disease commences at the apex of roots of teeth ; while others, equally able and experienced in the practice of dentistry, contend that it commences at the gingival border or margin around the necks of the teeth. Why should there be such difference of opinion on the subject? After all that has been said and written concerning the disease, the profession stands as far apart and non-agreed as to cause and treatment to-day as it did ten years ago. There has been too much said about a little matter, and discussions and controversy continue, and no one knows or can predict when or where it will end.

Pyorrhea alveolaris, as we term it for want of a more appropriate name (gingivitis, preferably), is a diseased condition of the gums originating in, and always, in its incipiency, confined to the gingival border, never at the apex of roots of teeth, or anywhere on roots from apex to margin of alveolar process. The disease is local, well defined, and easy to diagnose. I reiterate, without fear of successful contradiction, that it always, without exception, commences in the gingival border, therefore is misnamed when called pyorrhea alveolaris. The alveolar process is never involved until the disease, commencing at the border or margin of the gum, has considerably advanced. Pus does not originate in the alveolar process (no one can show it and prove it), nor is there any waste of the process only as the effect of pus generated in soft tissues. In the early stage of the disease there are neither pus nor granular deposits. The first deposits are granular, and always confined to the necks of the teeth ; then follows pus-formation and discharge, which more frequently than otherwise continues until the teeth loosen and drop out, or the disease is treated and cured. I have never known teeth to loosen until after cessation of granular formations around the necks of the teeth, and the formation of solid cake deposits on the roots. Always the consequence of a disturbed, abnormal state of soft tissues.

A patient, female, age sixty-eight, from whose mouth were extracted several months ago the five teeth here exhibited, had been troubled with the disease more than thirty years. When I first saw her, twenty-seven years ago, and detected an unhealthy state of the gums, there were granular deposits, more or less, around the necks of all of her teeth. The deposits were never removed by means of instruments, but, as you see, passed away, possibly through use of the brush. She assured me when I extracted the teeth that no dentist had ever advised her to have the deposits removed since I advised her to do so in 1867 ; said she had used mouth washes freely, recommended by dentists and physicians to cure the scurvy—as they termed it—and that possibly she had expended several hundred dollars for such remedies, and without any good result. My observation has confirmed the impression on my mind that the granular deposits formed around the necks of teeth will sooner or later waste away and the surface become smooth, as you see demonstrated on the specimens ; but the solid cake deposit, which is a second deposit later on in the disease (very much the character of deposits found on the apex of roots), and never till the granular formation ceases, but when formed is there to remain, never wastes or obliterates as the granular, but increases to the destruction of alveolar process and loss of teeth.

Sanguinary deposit at or near the apex of roots is more difficult to treat than the disease in question. In the case of sanguinary deposit (not the effect or result of pyorrhea) the pus is formed deep down in the socket and progresses for exit to the alveolar margin ; whereas in pyorrhea the pus-formation commences at the margin of the alveolus and by degrees invades the entire process, leading to loss of the same and loss of the teeth. Every case of gum-waste or recession of gum-tissue we meet with is not pyorrhea, far from it. In a genuine case of pyorrhea that has advanced beyond the incipient stage we find tumefaction of gum, discharge of blood or pus (often both) on application of pressure. In cases of recession of gum (not caused by pyorrhea) we find the reverse, almost universally. Instead of inflammation, tumefaction, and discharge of blood and pus from the gum, as in pyorrhea, the gum is often pale, contracted, and shrivelled. I have seen many such cases with loss of alveolar process and recession of the gum quite to the apex of the palatal roots of the superior molars, with freedom from tenderness under pressure, and no blood or pus visible. In such cases the teeth never loosen as

they do in pyorrhea, nor is there fœtid breath. In well developed cases of pyorrhea, far advanced, deposits are always to be found, and blood and pus freely flow. In gum-waste or recession of gum there is no deposit, or very little, ever to be found, nor is there discharge of blood or pus. Very unlike derangements of gum-tissues, pyorrhea, if neglected, becomes offensive and loathsome. Gum-waste progresses slowly, without painful, disagreeable, or offensive features, and never to the extent of loss of teeth. In case of sanguinary formations located at or near the apex of roots, extraction is the only sure remedy, and should not be delayed. It is impossible to effect cessation of pus-discharge in pyorrhea so long as a minute particle of cake deposit remains on any portion of the root in contact with soft tissues, yet the formation is consequent upon diseased tissue. When the deposit has advanced to the extent seen on the specimens here shown, nothing short of extraction will give relief. I contend, and have for many years, that, when from the effect of the disease, there has been destruction of two-thirds or three-fourths of the alveolus, teeth should be extracted, for there is no line of treatment by which the alveolar process can be restored and teeth made firm in their sockets, nor can the gum ever be made to adhere again to the teeth ; but if there is sufficient alveolar support and all deposit is removed, the gum, after proper treatment, will assume healthy action and contract closely and firmly around the teeth, and, if persistently manipulated with a tooth-brush of suitable size and shape and occasional finger pressure, will continue normal and perform a healthy function through life, unless weakened and rendered abnormal by some other disease than pyorrhea.

Some dentists do not recognise or acknowledge difference between genuine pyorrhea deposits and ordinary calcareous deposits. The specimens submitted demonstrate the difference. Pyorrhea deposits never attach to enamel and crowns of teeth, but always to the cementum, while the ordinary salivary calculus adheres to enamel and sometimes completely coats and covers crowns to the thickness of a sixteenth or eigth of an inch, and is easy of removal compared to pyorrhea deposits.

Pyorrhea, like any other disease, is amendable to treatment, and can be cured, and when cured, will remain so, if instructions as to care, cleanliness, free use of the brush, etc., are carefully observed. There is no justification for so much talk about the disease not being curable. Such ideas are extremely absurd, should and must

be discarded, and all must treat for cure, and the results will prove convincing and satisfactory. What one man in the profession can do, others can, on the same line of procedure, if they will. I have not, nor do I presume to say, that the line of treatment I pursue alone will always cure the disease, but I do say emphatically it will cure nineteen times in twenty. I have experimented considerably with various remedies recommended, but have never obtained as good results as with the remedies and treatment I will name and recommend in the interest of humanity.

The first step in treatment is to test the strength of the teeth in their sockets, and if any are to be extracted (all should be that cannot be made comparatively firm in the socket) extract before commencing to remove deposits. Thoroughness in the removal of deposits is all important in treatment, and to secure perfect success smooth-edge scalers must be used, such as I send for careful inspection, five of a set of ten I use, points varying in shape and size. Of the five with hose marked one, two and three, I remove at least nineteen-twentieths of all deposits. You perceive the edges are smooth, and can do no injury to surface of root, alveolar process, or soft tissues surrounding. To lacerate the gingival border (entire) and produce new action, if possible, is important for cure. The removal of deposits prevents continuation of the disease, but does not prevent return of it. Soft tissues below and away from gingival border should be preserved as free from injury as possible, also the alveolar process, which is never in fault and has no part in the disease but to suffer loss, and is often seriously affected as the effect of a cause always originating in the gum border, which increases by degrees and creates the cause of alveolar trouble. Remove the cause and the effect will abate, and the alveolus will speedily take on healthy action, always will, if deposits are thoroughly removed and sulphuric acid is generously applied. The practice advocated by some to chisel, scrape, and bur away the alveolar process (any portion of it) is absurd. Sulphuric acid properly applied is better for weakened and softened alveolus than chisel, burs, and scrapers.

I have never chiselled and scraped the process in treatment of the disease more than two or three times, and then it was not imperative for cure. When you think the last vestige of deposit has been removed, probe carefully again and again to make sure of completeness. In some extreme cases it requires from two to three hours' persistent effort for removal of deposits. When this has been accomplished,

then with a brush of proper size (small) and shaped to suit, brush heroically with diluted C. P. sulphuric acid and pulverized pumice (not finest), varying according to age and extent of disease, from one of acid to ten, fifteen, or twenty of water. Make it a point, universally, to fret and lacerate the margin of gum with brush and pumice, with a view to new and healthy action. Do not fear injury to surface of teeth from effect of the acid. No injury ever does or can result. As evidence of the slight effect upon enamel or cementum, I send for inspection a tooth which was kept in a mixture of one of acid to ten of water for twenty-four hours.

Much good and no harm can come of the free use of sulphuric acid in treatment of the disease. It is seldom necessary to apply more than one time for cure. After the use of brush, acid, and pumice, press the gums well with finger, then apply to the gums freely campho-phenique (full strength), and instruct the patient to use a brush, the same as was used in the treatment, forcibly and systematically, several times daily for a week or two, specially after meals and before retiring at night, and to follow the brushing with finger-pressure until the gums are healthy and firm. Advise the patient to return to the office the next day after treatment, or the day following, and for several days for careful inspection, probing and removal of any particles of deposit that may be detected, and to see if instructions as to brush and finger-pressure are respected.

Some patients will neglect to carry out instructions if not watched and encouraged to persevere. It is important in treatment and really essential to use the brush forcibly, and fret the gingival border to bleeding if possible, for several days after removal of deposits. Applications of campho-phenique (full strength) to the gums two or three times daily for several days will prove beneficial. In the incipient stage of the disease, before granular deposits are formed around the necks of the teeth, the free use of acid and pumice with brush is all that is requisite to check and obliterate the disease. It is at that stage as truly pyorrhea as in more advanced stages, when there are deep pus-pockets, cake deposits on roots, and teeth loosened to loss. It commences as pyorrhea, progresses and ends as pyorrhea, is pyorrhea all the way through from commencement to cure or final loss of teeth. One line of treatment is requisite for cure,—viz. that above stated. If faithfully tried and persevered in, good results will always be realized. In cases as we meet with them, cure can be effected in from five to ten or fifteen days.

Such are my convictions, based upon experience and careful observation of results during many years' practice. I have made a specialty of the treatment of this disease for some years, and only

state as to treatment and results what I know to be facts, facts that will be realized and appreciated as such by any unprejudiced, fair-minded practitioner of dentistry who will faithfully experiment for results on the line of treatment above indicated. The idea that various causes as above enumerated can and do produce the disease is erroneous, and is as ridiculously absurd as for physicians to say (some do) that this or that disease runs into typhoid fever, or that typhoid fever is the consequence of a broken or otherwise injured limb, or any other physical injury. Typhoid fever is a pointedly marked and distinct disease of well-defined features and characteristics, and never the result of other diseases or physical injury. So it is with pyorrhea. No man can produce it by any injury he may inflict upon gum-tissue or parts adjacent. It is spontaneous and truly an independent disease, having its well-defined marks and running its course if left alone. In its incipiency it is recognisable, and much more strongly marked and outlined than many other diseases, and if let alone will slowly advance to destruction of alveolus and loss of teeth. There is but one class of persons (the toothless) free from its ravages. It is of as frequent occurrence in early life, after the age of twelve or fourteen, as in later years ; but the cake, or sanguinary deposit (as termed by some) is never so well developed, and teeth but rarely loosen from effect of the disease before the age of thirty or thirty-five.

As to cause we are yet ignorant, and may grope in darkness on the subject a great while before the shadows are dispelled, and the true light of cause shines forth. Physiologists and pathologists must investigate and settle the question. I am inclined to the opinion that the saliva contains the cause of the trouble. It is more reasonable than any other theory I can venture. After treatment and cure, the daily use of a tooth-brush, corresponding to the sample exhibited, is requisite, and occasional finger-pressure will aid healthy preservation of the gums and serve as a safeguard against return of the disease. The size, shape, and quality of a brush for daily use is an important matter. To cleanse the teeth well and do no detriment to soft tissues, is to be considered in the selection and use of a brush. Large brushes with stiff bristles, closely set, are objectionable, and are always more hurtful than beneficial.

I am recently very definitively convinced on one fact in relation to pyorrhea. It is not contagious or transmissible from one person to another. I have watched carefully for results for more than a quarter of a century, and am now thoroughly convinced that there is no such thing as transmitting from parent to child, or from one person to another, under any circumstances. I have known several families residing in the country, embracing each, parents and five or six children, where one or both parents were subject to the disease, and all would use one copartnership tooth-brush (a disgusting practice) until worn out, then another, and so on as needed, and not a child after a lapse of ten or fifteen years ever evinced the slightest feature of the disease. In one case in point, the husband, very loving and affectionate, fond of kissing wife and children, was subject of the disease for more than thirty years (a typical case), losing by waste of process tooth after tooth, until but

few remained in his mouth, and never did wife nor any of the children show signs of the disease. He (the husband) enjoyed good health, and he assured me more than once he never suffered a moment from indigestion, and experienced no particular discomfort from the disease.

I will mention one more case which I watched carefully for results for eighteen years, anticipating evil results from a censurable practice, but was disappointed. Mrs. —— died, leaving a boy child about six or eight months old, who was taken charge of and cared for by its grandfather and an old aunt, both subjects of pyorrhea well advanced, many teeth very loose, gums inflamed and swollen, and blood and pus discharging freely under slightest pressure. The child was the pet of the family, and was tenderly cared for, first one, then the other, grandfather or aunt feeding it, and for months the process of feeding was as follows: One or the other would chew and pulp the food in their mouths, then put it in the mouth of the child; so the food was prepared and administered until the child was able to masticate for itself. I advised against such a course, and informed them of the chances and very great probability (as I then thought—do not now) of transmitting the disease to the child, but they heeded not. The child survived and grew up to manhood, years, and stature: a splendid specimen of physique, and blessed with as healthy gums and sound teeth as could be desired. Should the young man be troubled with pyorrhea (quite possible) after this, would any contend that the disease was transmitted through food pulped and administered by grandfather and aunt? I could cite other cases almost as extreme, and quite as convincing to unbiased minds that the disease is not transferable by any process of contact, or through any channel of conveyance of disease.

The disease has many peculiarities, and will ordinarily, if not treated, run its course, and in a large majority of cases will hold on during life, or until the teeth involved loosen and drop out. All persons troubled with the disease do not suffer alike. Some do not experience any discomfort or inconvenience from the disease, while others suffer greatly and fail in health. Dentists should not be overexercised concerning the cause of the disease. Physiologists and pathologists must and will settle that question, and possibly very soon, if they look to the saliva during incipient stages of the disease, and work on that line for facts that will be convincing. The important consideration for practitioners of dentistry is to learn how to diagnose correctly and treat for cure. If we will concern ourselves less about the cause, and direct our efforts in preparation to treat successfully pyorrhea, or any other type of disease that may present for treatment, it would be wiser and more in line with our province of action, and doubtless best for our patients. All this theorizing and discussing as to the cause and advocacy of innumerable remedies for treatment, is of no special benefit to dentists or patients, but is often mystifying and hurtful. To investigate cause of disease is one of science, and to treat for cure is another, quite apart, separate and distinct, and if we attempt to couple them we confuse and fail of best results. Cause known or not, let us treat to cure, and cure we can.—*Dental Cosmos.*

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Original Communications.

GLASS INLAY WORK.

By G. J. WARDILL, L.D.S.

IT can hardly be denied, I suppose, that—*given suitable cases*—a glass inlay is one of the most artistic and best methods of restoring anterior teeth we have; it is certainly less obstrusive than either osteo or gold, and can be applied in a great many cases either alone or in conjunction with amalgam. But there are various things glass inlays have an alacrity for—such as floating up and leaving a very visible and very unstable joint of cement, coming entirely out in a month or two, chipping at the edges, either in putting in or subsequently, &c., &c.

As I have used glass pretty extensively, and very successfully, for the last four years, I propose to transfer some of my methods to paper.

A great saving of time and disappointment is effected by having a good space between teeth in the case of approximal cavities, and by seeing the gum well clear of the cervical edge of cavity.

In preparing the cavity the walls should be made as square downwards as practicable, to allow of the inlay being plug-shaped, thus reducing the liability to chip the edges, and giving room for roughening. To effect this one has sometimes to line the cavity with osteo and cut to shape afterwards.

In making the matrix, the foil should be large enough to be held in position with the finger and thumb, and it should not be allowed to move until quite finished, unless there is necessity for annealing, which is seldom the case; push the foil into the cavity with a square of amadou, and, leaving the amadou in, burnish the foil round the

edges of the cavity with a ball-ended filler, after, of course, seeing there is no trace of mercury around, or the whole thing will collapse in firing.

One of the most aggravating tendencies of the whole process is the flying out, or lifting up, of the material in the first drying ; this is entirely obviated by mixing the first layer of glass powder with a solution of gum tragacanth. If, from too sudden heating up in the second or third firing—in large inlays—the glass cracks across the middle, throw it away, the matrix is distorted.

Always make some undercut in your inlay with a knife-edge corundum disc. They are supplied fine enough for this purpose. When cementing in, the inlay must be tied down, draw a piece of gilling twine, or ligature silk, once or twice across a stick of Model cement—obtainable at the Dental Manufacturing Company at the rate of twopence a stick—take a single turn round the tooth over the middle of inlay and pull tight ; if much contour on tooth melt a little of the cement on it before putting on the string, it will then stick easily. Finally the whole should be covered up. String, and inlay with the Model cement run off a warm spatula. (I always use the above cement for covering osteo fillings in preference to mastic or wax). With careful attention to detail I have found glass inlay work to be eminently satisfactory.

"TRUTH" says :—"Young men from the country, it seems, are still being victimised by London barbers who combine dentistry with hair-cutting, and the neighbourhood of Charing Cross Station is still the chief scene of these operations. A couple of gentlemen—and from Birmingham, of all places—went the other day to be shaved at a shop in the Strand, near the Tivoli, and were persuaded to have their teeth scraped. The operation lasted ten or fifteen minutes, and the bill for it was three pounds five shillings—£1 12s. 6d. each. The two gentlemen declined to pay this amount, but after a wrangle compromised for half-a-guinea apiece. I am sorry for them, but I cannot refrain from pointing out that had they made a practice of reading *Truth*, they would long since have been forewarned and forearmed against the tooth-scraping barber. I would also point out that a year's subscription to this journal is not very much more than the amount which these two gentlemen have dropped in one barber's shop."

THE DENTAL RECORD, LONDON: SEP. 2, 1895.

WHAT TO DO!

THE Students' Supplement, which, according to our custom, we again publish, serves to remind us of the advent of another academical year. To practitioners the event is of but little significance, serving only to remind them of student days buried in the dreamy past; to teachers it means only a return to labour, the repetition of which has somewhat spoilt the novelty; but to intending students it is of prime importance. Our feelings when "we joined" are, perhaps, forgotten, but were they recorded they would form no unfair test of the relative benefits we derived from this part of our training. There are many men who have looked forward to this day from the time they entered on their articles, and they have prepared themselves, by mastering the rudiments of scientific work, to appreciate the matters they will now be called upon to work at. But we are afraid there are others who have not only neglected so to prepare themselves, but have got it into their silly heads that with the ending of their pupilage work and restraint end, that thenceforward all they have to do is to sit out or dream out the minimum attendances on certain lectures, do the requisite number of fillings, and saunter into the out-patient department with their hands in their pockets; these details attended to, the balance of the two years, save a few weeks at the end reserved for cramming, will be spent in having a good time, for the opportunity may not recur, it being obvious that a large and lucrative practice will thenceforth occupy their whole time. Fortunately there are not many as bad as this, for it does happily happen that many, whose theoretical knowledge is chiefly remarkable for its limitation, take great interest in and render themselves efficient at practical things. It is not our purpose to argue on the need of book learning, suffice it that the object of the examination is to ensure this, and that

a man who does not recognise that fact when he joins the hospital, and do his best throughout the whole of his curriculum, will surely have cause for regret at the end. The standard of the examinations we are glad to say, is progressive, and the penalty of failure is more severe. We would particularly call the student's attention to the fact that if he be referred at his examination a further course of study is enforced, and a further fee has to be paid to his hospital. We can assure him that the misery of a failure does not sit lightly on a man; and that if it does not altogether mar his future, it leaves a nasty stain on his reputation which is not easily wiped out.

How then can he make certain of a pass? He is not good at book work! Then let him gain his knowledge by practical work. He will, of course, be good at mechanics; he will take every opportunity of working at operative dentistry; he will be careful to dissect thoroughly the head and neck, and he will not forget to find out which of the out-patient surgeons teaches best, and will make a point of attending regularly during his second year. But read he must, and this should be done regularly and methodically; let him make a point of reading a given time each day at a certain hour, and he cannot do better than read up the subject on which he will attend a lecture the following day, but he should avoid casual reading. It does not suffice to read so many hours and so many pages; if he read but one hour, and but one page, but actually understands and *learns* this he will have done better. The student when he joins should cousult his teachers on the choice of text books, and these, once selected, should be the books he reads during his regular hours. Others he may read with advantage, but at those odd times when he is not otherwise engaged. Such a scheme as this will not turn him into a fossilized book-worm, it leaves him time enough for all the amusements he may wish to indulge in. The hours spent in play are not those which are wasted, but those are which we spend simply loafing about.

News and Notes.

THE following are the office bearers of the Manchester Odontological Society for the Session 1895-6 : President, Mr. Wm. Simms ; Vice-Presidents, Messrs. W. Dougan, Ed. Houghton ; Treasurer, Mr. H. Planck ; Librarian, Mr. W. A. Hooton ; Secretaries, Mr. F. W. Minshell (Council), Mr. D. Headridge (Society). Members of the council : Messrs. P. A. Linnell, F. W. Masters, G. G. Campion, J. H. Jones, A. B. Wolfenden, G. O. Whittaker.

DURING the July Examinations of the Royal College of Surgeons of Edinburgh, the following gentlemen passed the First Professional Examination for the Licence in Dental Surgery :—Robert John Shiach, Elgin ; Ruby Grace Halliday, London ; Thomas Roger Dove Walkinshaw, Newcastle ; Herbert Percival Friend, Yorkshire ; Charles Linnæus Routledge, Exeter ; Richard Mason, Edinburgh, and Samuel Homer, Stourbridge ; and the following gentlemen passed the Final Examination and were admitted L. D. S. Edinburgh : Alexander Crerar, Edinburgh ; Thomas Alexander Mackintosh, Edinburgh ; George Paterson, Belfast ; William Forsyth, Tulloch, Elgin ; Alfred Lampman, Middlesbro'-on-Tees ; George Crichton, Perth ; Thomas Saunders Robertson, Kirkcaldy.

ON the initiative of the Odontological Society of Zurich, the formation of a dental section in connection with the College has been sanctioned. The director is Dr. J. Billeter, and the following form the staff :—Dr. Mackwurte and Dr. Stoppani, operative dentistry ; P. A. Kölliker and J. Föhner, mechanical dentistry ; Dr. Gysi, histology.

THE *Lancet* publishes the following note from its Dublin correspondent :—" The death of Mr. George Horan, which followed the extraction of some teeth by a dentist, has recently caused some interest and speculation in Dublin. The operation was followed by hæmorrhage of such a character that all efforts to control it proved unavailing, and the patient died on the second day. The absence of a coroner's inquest has been the subject of rather unwise comment in some of the local papers, but it would appear that all the usual measures, including intravenous saline injection, were

employed by a competent surgeon, though without avail. The patient was doubtless a victim to hæmophilia, and the catastrophe unavoidable."

The *Zentralblatt f. Gyn.* states that the best way to remove blood stains from towels, etc., is to soak these in warm water to which a teaspoonful of tartaric acid has been added. No soap is needed.

W. H. Steel, writing in the *Ohio Dental Journal*, says: "A quick and strong way to repair a broken engine cable is to bend a piece of brass in the shape of a tube of proper size to fit snugly over the broken ends of the cable. Thoroughly cleanse the broken ends of all grease and dirt, slip them into the tube, put on a little soldering acid, lay a piece of jewellers' soft solder along the open joint, of the tube hold the tube over a spirit lamp until the solder melts and flows into it and around the broken cable, trim off all surplus solder, round off all sharp corners, and, if the work has been properly done, this will be the strongest part of the cable."

Abstracts and Selections.

CROWN WORK.

By George Evans, New York.

In a central incisor we notice the apex of the root and the incisive edge of the tooth are almost on a direct line, and every tooth crown that is inserted should have its incisive edge, as nature intended, directly on the line of the centre of the root canal, and the apex of the root. Place it the least bit forward or inward and you throw it in an abnormal position.

It is also a guide to us in drilling or reaming the root-canal in a front or incisor tooth, and will prevent us from perforating the side of the root. All you have to do is to calculate where the incisive edge of the tooth was originally placed by the exposed end of the root, and the position of the adjoining or approximal teeth's incisive edges, and accordingly control the direction of your drill or reamer. I mention these points in connection with the method here illustrated

regarding the crowning of a front tooth. The objectionable features of collar crowns are the exposure of the collar at the cervico-labial section, which is difficult to avoid, and the irritation its presence there is apt to cause the peridental membrane, which it is more liable to do at this point than at the other sides of the root. The collar, to be invisible, has to be fitted well under the gum-margin. This requires extensive removal of the periphery of the cervico-labial section of the end of the root, rendering adaptation of the collar at this point an operation few practitioners succeed in accomplishing perfectly. The width of this section of the collar has also to be so reduced that it contributes but little strength to the crown.

As a matter of course, in bridge-work it is almost absolutely necessary in many cases that we should have the collar to entirely encircle the root of even a front tooth, but I tell you frequently patients will not endure the exhibition of the gold above the porcelain at the cervix. It is often impossible to avoid this in many cases, if it is placed there at all. Many of these patients who object are ladies who have visited and lived in Europe, and have got European ideas instilled into them in regard to metal, and they would rather have a plate inserted than a crown showing with the gold exposed above it. This is not so all over the country ; but in many sections it is the case, at least with the Society ladies of New York City ; and I don't think it is even confined to New York City. Another thing we will consider is what is the use of a collar on that portion of an upper incisor tooth ? I refer in my discussion here to day almost entirely to the upper front teeth. I am not attempting to bring before you an exhibition of the crowning method in all its details. I wish now only to bring to your attention a few points, and I must necessarily be brief. We all know that in the normal occlusion of the front teeth that the force comes as exhibited. (Referring to illustrations on paper in view of audience.) All the resistance is required at the palatal section of the root. The form of crown that I here illustrate is not new in principle, neither do I present it as a universal substitute for the ordinary collar crown, but as embodying features which are advantageous. The method I offer facilitates and simplifies the operation of construction so that it can be performed by those of only ordinary skill. In my intercourse with dentists I have had several prominent men in the profession privately candidly acknowledge to me that they never could—quite satisfactorily to themselves—fit a collar on a front incisor tooth ; in fact, on many

teeth. There is always something about it not quite satisfactory when the operation is completed. Now this method embodies the principle of the collar crown and you don't have to make a collar. Many contend that if you have a tight accurately-fitting post in the root and a close fitting cap on the end of the root, they don't want any collar at all that you obtain all the strength necessary without it. Dr. F. T. Van Woert, of Brooklyn, seldom, I understand, places a collar on the root of a front tooth; I have seen some very fine operations, and apparently durable ones come from his hands.

One trouble with the collar as ordinarily made is this: there is a section right here at the cervical-labial portion of the tooth that is very difficult for many to fit their collar accurately to. In trimming off that edge, as is illustrated in the form before you, there is a curve that requires considerable trimming and reduction to enable you to properly fit the collar, and when it is fitted, there is frequently an edge there that protrudes, and when the crown and the porcelain is fitted to endeavour to bring it in line with the other teeth, you have to protrude that porcelain a little further front. The cavity, or recess, is in many cases not filled in with metal unless in soldering you flow the solder around the cap and collar into the recess. In many cases I have examined where recession of the gum has taken place, it was due to that little recess more than to the collar. Now take a superior incisor, as here illustrated. The end of the root is trimmed at the approximal sides and sufficiently here at the palatal side to bring it on a line with the gum; the cervico-labial margin is left intact. In trimming I use these trimmers such as I will show you, as they may not before have been brought to your attention. Since they have been introduced I have tried many other forms that have been presented, and after all I have never found anything—and many gentlemen have endorsed that opinion to me—equal or superior to them for trimming the sides of an incisor root. By placing the trimmer in a dental engine, and resting the thumb on the incisive edge of the adjoining tooth you can trim off the sides of the root most easily. I also use in trimming the sides an instrument like this, which aids me very much. (Showing a double-ended scraper.) You will pardon me for introducing these instruments in the way I do. There are a good many questions asked me by gentlemen—how I do this and how I do that. After the shaping is done in the manner indicated, also aided by discs or corundum points, the root-canal is enlarged with an Ottolengui root-canal

reamer, which takes only a moment. The size and condition of the root and the judgment of the operator should determine the number or size of the reamer to be used and the depth to which the canal should be reamed. I usually commence with No. 1, the smallest size, and then increase. I generally use No. 1 for a lateral, 1 or 2 for a central and 2 or 3 for a cuspid. To the reamed canal is fitted a prepared iridio-platinum post, tapered and a thread cut on it corresponding in size to the reamer used. By reaming the tooth-canal and then introducing a post exactly the size, you instantly obtain a tight fitting post.

Next, take this prepared platinum disc, having a perforated concave depression as is shown.

The disc of platinum is about No. 35 gauge. In the depression of the disc, pure gold has been melted. The post, when fitted to the canal, is grasped at the line of the orifice of the canal with small pliers, about here, as you see, in that manner (illustrating). That gives about the line of the distance the post goes into the root canal and therefore it should go into the disc.

By twisting the post in the disc change of position is instantly effected. Sometimes when adjusted on root and nearly in position I give the post a press upwards, which brings the edges of the platinum of the disc down into the orifice of the canal, and the serrations on the post enable the post to hold the platinum in position. With this object in view I slightly enlarge the orifice of the canal with a round-headed bur. Both post and disc are next removed, and the post soldered in position to the disc by being held in a Bunsen flame, and heated to a point that fuses the pure gold in the depression around the post. No flux is necessary, as sufficient remains from the first fusing of the gold. The post with the disc is next inserted in the root, the platinum pressed with a large flat plugger, and malleted so that the line of the edge of the end of the root will be impressed upon it. The platinum is next removed, and slit at the two points between the palatal and approximal sides. The line of the end of the root is supposed to be represented here on the disc by the process I have just explained. Guided by the mark of the end of the root on the platinum, the approximal portions of the disc are bent over with small-pointed pliers to embrace the sides of the root. The post and cap are then placed on the root and the side flaps, with the aid of foot-shaped condensers and burnishers, are closely fitted. The palatal flap is next brought

down to position. Frequent removals and annealings are necessary during the process, which finally should include trimming the edge of the platinum, smoothing with a corundum point, and then an annealing and an all-round burnishing of the cap to the root. At the cervico-labial section the porcelain can rest on the platinum, or the platinum can be trimmed so that the front edge of the porcelain may be fitted against the root and cover it. The projecting end of the post should next be removed, leaving it a little flush at the palatal side. The porcelain front, which should be a cross-pin plate tooth, is ground and closely fitted to the surface of the root or metal, as may be, at the cervico labial section under the edge of the gum, but a slight space opening toward the palatal side should be left between it and the surface of the cap.

To so shape the porcelain simplifies the fitting of the cervical section. The space between the cap and the porcelain is also more easily filled in the soldering. To the base of the porcelain front a piece of very thin platinum foil is shaped, the porcelain heated, the part veneered with a mere film of gum shellac or resin and wax, and by pressure with a napkin or cotton the platinum foil is attached thereto. The rest of the porcelain is then backed with thin platinum plate (about No. 35 gauge). The platinum is left slightly extending over the incisor edge. The porcelain front is next waxed in position on the cap. Wax in full amount must be extended over the collar to its edge in the seams, and between the porcelain and the cap at every point solder is to flow. I generally use Parr's flux wax. In trimming the investment the material must not be removed from over the collar lower than the line of the surface of the cap, or in such a manner that the platinum turnover edges are exposed to the direct force of the flame. Even though the collar is not exposed, the solder will flow over the outer surface of the platinum just where wax has been applied and the solder is wanted, and all the parts will become united.

The investment must be slightly raised at one end, and headed up at the base with the full flame of a gas blow-pipe thrown in the direction indicated by arrow in the drawing. Heat thus applied will cause the solder to flow downward and fill the interstices in all parts of the investment as though it were an ingot. The best way is to apply a little solder at a time until the deeper parts are filled. The flame is then withdrawn for an instant, and with a small pointed flame and more solder the backing can be contoured. As platinum

forms the cap and backing, the soldering can be conducted without fear of accidentally fusing those parts.

I wish to explain a point with regard to the cementation of crowns ; this kind of crown, or any kind of a collar crown. Having the root and crown ready I warm the crown, and apply a thin coating of chloro-gutta-percha to the post. The chloroform, instantly evaporating, leaves a film of heated gutta-percha. Immediately the crown is adjusted to the root and removed. This shapes the gutta-percha on the post. The crown is then allowed to cool, and is cemented on as though no gutta-percha was used on post. A crown so cemented can be removed at any time by repeated applications of the thick part of a heated root-canal drier to the metallic portion of the crown, which communicates the heat to the post. In a short time the sheath of gutta-percha around the post is softened, and the crown can usually be removed without difficulty. I also attach ordinary bridge-work in this way, having abandoned the use of methods classed as "detachable," which only allow the bridge to be removed by the dentist. (Dr. Evans here passed among the audience a tooth which he had crowned in the manner described and has since extracted, which exhibited a sample of his work that was made without any idea that it would ever be exhibited.)

The question may be asked, as it was asked of me once by a gentleman, when I was describing this method, does that pin enveloped with a film of gutta-percha in that way, hold in ? You all know you can cement on a crown very firm, if you have a nice fitting post, with a little film of gutta-percha alone. Here is an ordinary root that has been capped in the usual way and the post alone is secured with gutta-percha and nothing put in the cap ; I will let you just try that and see if either of you gentlemen can move it. I question if I could move it with the pliers without I heated it. In that way I have found perfect satisfaction and security.

One other thing I would like to bring to your attention, which I have had remarkable success in—and that is in making hollow all-gold dummies. A great many gentlemen have told me that they preferred to use them on the lower jaw where they are not seen. We all know that in making gold dummies with a porcelain front they fill them in at the labial side with gold, which makes them very heavy. Where they make them entirely of gold, like the

dummies shown to you in the past by Dr. Knapp, of New Orleans, you remember there was great weight attached to them. My method is to form these dummies hollow. I prefer a seamless crown that is stamped out of one piece of gold. You can do it with one of those crowns you can purchase, or with a crown such as is made with one of the machines now used by many. The crown is shaped and fitted to the model as a dummy, either with self-cleansing space or to rest on the membranes, in the form the bridge was constructed yesterday and shown by Dr. Callahan. You can then remove the crown, and fill in the grinding surface with gold solder or gold plate—the crowns that I use are alloyed with platinum—you can melt gold plate right into them without fear of melting the crown. I then boil them out with acid. I never solder a crown *on the outside* till I *remove the flux from the inside;* that is a little point to remember. To enclose the aperture at the neck I adapt over it a piece of platinum plate about 28 gauge, and put a piece of solder inside in the centre, and heat the crown up to the melting point of the solder. When the solder melts it flows down and runs along the plate, and the moment it strikes the edges it firmly unites them. The point has been brought up, "Is it hermetically sealed up? Does it leak?" To an educated man I should think it is not necessary for me to say it is hermetically sealed up, because we all know when you heat to a certain point, a red heat, you almost entirely exhaust the air. When you heat it to a dull red heat, your solder melts, then you heat it up a little further and the solder flows over to those edges. As the crown cools, as a matter of course the solder cools, and the entrance is instantly stopped and hermetically sealed up—just as a house-wife, as you all know, takes a jar of preserves and at a boiling point seals down the top.

This illustration—pointing to one before audience—refers to the form to give the grinding surface of dummies in bridge-work. I see it in many men's work, and I practice it in my own work. It is all right to restore the labial form of the teeth; but I prefer to favour the grinding or occluding surface of a dummy from the palatal to the labial side. Consequently I always reduce the dimensions of it slightly, about in proportion as you see there. That is the normal average side of the tooth (illustrating) and that would be the proportional size, as a rule, I would form my dummy. There is something else in this. It lessens the curve of the self-cleansing surface. It is very desirable not to have too much inward curve.

If that was a short tooth it is very apparent that an immense slot would be formed by making the dummy as wide in proportion as the natural tooth.—*Ohio Journal.*

CALCIFICATION OF THE TEETH.

By R. R. Andrews, of Cambridge, Mass.

I have been somewhat in doubt whether I have enough new subject matter to warrant the presentation of a paper on this subject before the dental section ; nevertheless, a brief review, giving the results of my more recent investigations, and also questioning some of the published statements on this subject by recent writers, may justify its appearance. Calcification has always been a difficult subject, and authorities have been much at sea concerning the finer processes which Nature takes to fashion the fully-calcified substance. Calcification is a process by which organic tissues become hardened by a deposition of salts of lime within their substance. In the intercellular tissue and in the substance of the cells themselves these salts are deposited by the rich blood-supply always near. They are deposited in minute particles, and in such fine sub-divisions that it makes it difficult to demonstrate many of them, even with the higher powers of the microscope. The intercellular substance, either a protoplasmic or gelatinous fluid or semi-fluid, contains the lime particles. In it they change their chemical nature, uniting with the organic substance of the part, and form small globular bodies, which have been called calcospherites ; and these, blending or coalescing into a mass form a substance called calco-globulin. This calco-globulin which is a lifeless matter, has been deposited through the cells into a gelatinous substance, and in some cases into the substance of the cells themselves, where, by a further hardening process, it becomes the fully-calcified matrix.

Most of us are more or less familiar with the experiments of Mr. Rainey, and later of those of Professor Harting and Dr. Ord. But, as an essay on this subject would not be complete without a brief quotation, I introduce some of their experiments. "If a soluble salt of lime be slowly mixed with another solution capable of precipitating the lime, the resultant lime-salt will go down as an amorphous powder and sometimes as minute crystals. But when the lime-salts are precipitated in gelatin or albumen, the character of the lime-salts is materially altered. Instead of a powder, there were found various

curious but definite forms, quite unlike the character of crystals or powder, produced without the intervention of the organic substance. Mr. Rainey found that if carbonate of lime be slowly formed in a thick solution of albumen, the resultant salt has changed its character : it is now in the form of globules, laminated, like tiny onions. These globules, when brought in contact with one another, become agglomerated into a single laminated mass, it appearing as if the laminæ in immediate apposition had blended with one another. The globular masses, at one time of mulberry-like form, lose the individuality of their constituent smaller globules and become smoothed down into a single mass or layer, and Mr. Rainey suggests, as an explanation of the laminated structure, that the smaller masses have accumulated in concentric layers, which have subsequently coalesced ; and in the substitution of the globular for the amorphous or crystalline form in the salt of lime, when in contact with organic substances, Mr. Rainey claims to find the clue for the explanation of the development of shells, teeth, and bone.

At a more recent date, Professor Harting took up this line of investigation and found that other salts of lime would behave in a similar manner, and that by modifying the conditions of the experiment very various forms might be produced. The most important addition to our knowledge made by Professor Harting lay in the very peculiar constitution of the " calco-spherite," by which name he designated the globular forms seen and described by Rainey. That these are built up of concentric laminæ, like an onion, has already been stated, and Mr. Rainey was aware that albumen actually entered into the composition of the globule, since it retained its form even after the application of acid. But Professor Harting has shown that the albumen left behind after treatment of a calco-spherite with acid is no longer ordinary albumen ; it is profoundly modified, and is become exceedingly resistant to the action of acids, alkalies, and boiling water. For this modified albumen he proposes the name of calco-globulin, as it appears that the lime is held in some sort of chemical combination, for the last traces of lime are retained very obstinately when calco-globulin is submitted to the action of acids. Now, it is a very remarkable fact that microscopic glistening specks and globules are constantly seen at the edges of tissue where enamel, cementum, dentine, or bone are to be formed or are forming.

Robin and Magitot have described isolated spherules of lime-salts as occurring abundantly in the young pulps of human teeth, as

well as those of other animals, and Tomes suggested that perhaps all deposits of lime-salts commence in this way. These microscopic, globular bodies have been called calco-spherites, and it appears as though some such process as described by Professsr Harting is transpiring within the substance of the tissues where bone, dentine, or enamel is to be formed. It will be noticed that near this point of formation there is always to be found a rich capillary blood-supply, and from this the lime salts are given out. As I have said, near the forming matrix the tissue is seen to be full of these microscopic, glistening bodies—the minute atoms which are often spoken of as granules. The abundant appearance of these globules at the time of the formation of the enamel, and their entire absence at earlier stages, is to me an indication that the globules are an enamel substance, the matrix-forming calco-spherites ; and following up their future confirms this. Many of them are so small as to be scarcely measurable ; they are almost always spherical. The lower part of the cell towards the dentine contains the larger globules.

The growth of the enamel rod, once begun, takes place by additions of these globules. I am convinced that the larger ones are composed of hundreds of the smaller ones, which have coalesced into the main mass. When enamel is commencing its process of calcification, if we examine carefully with high powers a tissue that has been properly prepared, so that there shall be the smallest amount of shrinkage, we shall find, in that slight amount of the enamel-organ that is directly over the calcified point of dentine, in what remains of the stellate reticulum and in the stratum intermedium principally, a very large number of glistening points. Most of them are minute—microscopic in fact. They are the forming calco-spherites, or, rather, they are the minute particles of lime from the blood-supply, changing their chemical nature as they pass into the protoplasmic juices of the part. These appear to be passing into the formative cells, and these cells superintend their formation into enamel-rods, that is they are laid from the cell against the forming rod. Within the substance of the ameloblasts they are seen to be growing larger by the smaller ones coalescing with others. If at this point of their development the layer of enamel-cells is pulled away from the cap of formed dentine, we shall see that the cap of dentine is everywhere covered with quite regularly formed globular bodies. If, on the other hand, the layer of enamel-cells is against the formed cap of dentine, the masses are assuming block-like forms, as though taking the form of

the future enamel rod. They appear to be in a gelatinous substance, which is between the dentine and the enamel-cells, and here, by an unknown chemical hardening process, they become the hardened columns of the enamel, as I have formerly described in a paper read at Berlin, 1890.

In dentine the calcifying process goes on in much the same manner. The odontoblasts are merely masses of protoplasm, and appear to have no membrane; as is the case with the ameloblast, it has a nucleus at a point farthest from the calcifying matrix. In forming the dentine matrix, the odontoblast, or the pulp-tissue through the odontoblast, gives out a rich gelatinous substance about as wide as the layer of odontoblast-cells. Everywhere between the odontoblasts, as Mummery has demonstrated, is found a rich supply of connective-tissue cells, whose function appears to be the forming of a network of connective-tissue fibres into this gelatinous substance, this network seeming to be a scaffolding upon which the calcospherites, which are to form calco-globulin, are to be deposited. Into this layer the odontoblasts are also superintending the placing of the minute globules which are within them, and which have been given to them by the rich blood-supply found everywhere near their pulp ends. Into this gelatinous substance the globules form against the calcified matrix, where, fusing with others, they form a mass, entirely filling the gelatinous substance. This gelatinous substance, with its mass of globules, now becomes calco-globulin. By some natural hardening process it then becomes calcified matrix, and thus another layer of calcified matrix is formed.

We must remember that it takes a large number of sections to show these various stages of growth. Each section shows the picture at the point where death of the part has left it, another section will show another stage and so on. In one section we shall see the odontoblasts against the gelatinous layer, with the globules within it. Another section will show an entire absence of the gelatinous layer, with pear-shaped cells a little away from the calcified matrix and with portions of cells clinging to the calcified matrix, found here and there, that look like odontoblasts. Another section will show the globular masses filling up the gelatinous layer just before a new layer of calcified matrix is formed. It is only by studying these various stages of growth that we can come to any correct conclusions.

In the cementum (a tissue I have not studied as carefully as I

have the others) I am convinced that the calcifying process is much the same. The first cemental calcification takes place by the cementoblasts giving off these globular bodies near the neck of the tooth against the forming dentine of the root into a gelatinous substance, this also being given off by the cells. It assumes the form of plates or scales. Afterwards the cells themselves appear to fill with the globules, and lose their identity in the forming matrix. That peculiar tissue which we call "tissue on the borderland of calcification" is composed of globular, glistening bodies, which have coalesced and formed a layer within a gelatinous substance previously given out by the formative cells. In this condition it is a tissue indestructible both in acids and in caustic alkalies, and only in this condition is it true calco-globulin.

The conclusions here given on the subject of calcification are arrived at after many years of original investigation, made at such times as could be spared from a busy professional life. They are, I believe, with slight modification, accepted by most of the more recent authorities. It is my object to have presented my views in as clear and simple a manner as possible, that I might enable those of us who are not intimately familiar with the natural processes concerned in calcification to form a clear idea, that they might draw their own conclusions, as I shall review very briefly some of the, to me, erroneous views presented in a very recent work. I refer to a work entitled, *The Anatomy and Pathology of the Teeth.* The author and his associates, in a chapter describing "The Calcification of the Enamel," make these statements:

They observe, "The more we turn to the centre of the cup (enamel organ) the more shall we be struck by the presence of glistening, homogeneous lumps in the epithelia, until we have reached the centre of the cup, where we observe that epithelium has been transformed into a number of such lumps in a regular arrangement, which reminds us of their origin from previous epithelia. The original epithelia (enamel-cells) gradually become enlarged, and are at last split up into a number of medullary corpuscles." Again, "Medullary tissue develops into connective tissue of a decidedly fibrous character." Again, "There is good reason for the assumption that the medullary tissues sprung from the previous external epithelium (of enamel-organ) is the source for the completion of such enamel as we observe upon temporary teeth when they emerge from their sockets." And again, "If we

examine the lower edge of the cup of the enamel-organ at about the sixteenth week of embryonal life, we observe a peculiar change in the columnar bodies of the internal epithelium, which consists in the appearance, in a more or less row-like arrangement, of highly glistening globular bodies, replacing the previous columnar epithelia. These bodies are either solid or slightly vacuoled, and are formations of living matter such as we are accustomed to look upon as medullary, embryonal, or indifferent corpuscles, in their earliest stages of appearance. Obviously, these glistening globules have originated from the reticulum of living matter of the columnar epithelia (enamel-cells) themselves. We feel justified in this conclusion from the fact that we can trace step by step the growth of these glistening granules up to the formation of glistening lumps such as we have termed medullary corpuscles. . . . The lumps, I wish to repeat, are extremely glossy, with a high degree of refraction. They are arranged at first irregularly in a layer of considerable breadth, and higher up in rows, and by their coalescence and prolongation give rise to small columns, the ameloblasts. . . . These (medullary) corpuscles or the liquids contained in their reticulum become solidified into basis-substance and immediately infiltrated with lime-salts. . . . The enamel-rods are built up of such calcified or petrified medullary corpuscles."

These observations in regard to the calcification of the dentine endeavour to show that the odontoblasts are split up at their distal ends into these glistening bodies, which they call medullary corpuscles. "These medullary corpuscles are lumps of protoplasm, in which living matter is stored up in different shapes, the glistening globules of small size having arisen from protoplasm, and that these represent a juvenile condition of living matter in its most compact aggregation, which enter directly into the formation of the basis-substance of dentine, while at the same time, continually superadded to the proximal ends of the odontoblasts, are medullary corpuscles derived from the living matter of the papilla. Thus the continuity of the odontoblasts in dentine is established." They assert a similar proceeding from the ameloblasts, in a reverse direction. Thus, "the ameloblasts being broken up at their proximal (dentine) ends into medullary corpuscles, which are directly transformed into blocks of enamel-rods, are superadded to at their distal or peripheral ends by medullary corpuscles derived from the stratum intermedium." . . "The indifferent corpuscles,

serving to supply additions to the ameloblasts, exhibit all intermediate stages between small, globular, glossy, and compact nucleated, protoplasmic lumps." . . . . . "Nothing but a transmutation of solid, globular lumps of living matter in delicately reticulated medullary corpuscles seem to be required for the building up of the minute blocks of the enamel rods without the intermediate stage of ameloblasts. . . . The first appearing enamel is made up of irregular, angular, glistening lumps, greatly varying in size."

In these few selections from a chapter in this work on "Calcification" I have given some of the points which they present, and these I propose to briefly review. No one can be more clearly aware of the patient and persistent effort, and of the immense amount of labour and earnest research which the author has given to his work than myself, and great credit from his profession is due to Dr. Bödecker for this labor. I am not in accord with his views as to calcification of the dental tissues, or the views of his master, Professor Heitzmann, or of Dr. Abbott, on this subject. To some of us "the reticulum" and the "medullary corpuscles" are bugbears. We are familiar with, and have had many a conflict over, these peculiar theories. To the earnest investigator, who did not know the author, it would seem from their description of the calcifying processes as if a tissue had been built up to fit a theory. So far as I am aware photo-micrographs of these tissues, as described in this chapter on calcification, have never been shown. There is no absolute evidence to prove the correctness of their assertions. Heitzmann, as an illustrator of histological or pathological tissue, is an artist, but however beautiful these drawings may be, the photo-micrograph is the picture with the stamp of truth that is convincing. The charge of "personal equation" could not be made in such an illustration.

These peculiar theories on the calcifying processes cause a very considerable amount of doubt in the mind of any one who has given this subject attention in the way of original investigation. The theories advanced clash strangely with facts. The glistening bodies seen in the epithelial layers of the enamel-organ are but lifeless lime-globules, and do not have their origin in a reticulum of living matter in these epithelial layers. Their origin, as I have stated, is more probably from the blood-supply, which is everywhere abundant near these layers. It is speculating in a very lively manner to assert that the cells in the enamel-layers split up into a number of

medullary corpuscles of a fibrous character and then become formations of living matter, and it is wholly a hypothetical statement to make when they say that these glistening bodies, by coalescing and prolongation, give birth to the ameloblasts. Their lumps of living matter, which they call medullary corpuscles, are but glistening masses of lifeless matter, known to be calco-globulin. They are not medullary corpuscles; they do not arise from protoplasm; they are not "a juvenile condition of living matter in its most compact aggregation." I wish to repeat: These so-called glistening medullary corpuscles represented in their illustrations are nothing more or less than lifeless lime-globules.

Many years pave passed since these peculiar views have been given to the world, yet, so far as I have been informed, they have never been accepted by any authority of note. On the other hand, there are very many who reject their teachings, and who honestly regret that this work should have been adopted thus early as a text-book in any of our colleges. It has a very considerable value, and this value is solely as a work of reference and comparison in the library of the investigator. This whole chapter on "Calcification" is decidedly out of harmony with the teachings of modern investigation, and it seems to me to be unwise, at this early date, to place such a work before our students as a text-book.—*Cosmos.*

USE OF NERVE-BROACHES IN PULP-CHAMBERS.

By Benj. H. Douglass, D.D.S., Boston, Mass.

I have found such satisfaction in the use of "Donaldson's nerve-broaches," particularly in the treatment of pulp-canals, that I wish to mention some uses which I have found extremely valuable, and hope they will prove so to others.

The hooked broaches can be used, *by bending the hook straight*, to probe and find very small canals, both when their presence is doubtful and when a canal-drill has left the true canal and started a false one.

As follows: By giving a slight curve to the broach at or near the point—like this—and by observingly moving the point up and down the walls of the canal, rotating it, the fine point will discover the orifice, and indicate where to continue drilling.

If the broach is straightened and the point inserted in the true canal, the shank will show by touching in the pulp chamber, or in the coronal cavity, where these parts must be cut away to allow the drill free access in following the canal, whatever new direction the axis of the canal may take.

The same can be done in superior and inferior molars. First straighten the broach, then sharply bend it one-half to three-fourths inch from the point. The point now being recurved, as in the

picture, can, by recurving several times (in different directions), be made to reach all sides of the canal and discover its orifice, the direction of its axis, and the parts of coronal cavity, of the vestibule (pulp-chamber in crown), and even the side of the canal, necessary to remove for free and direct access of drill.

Another use I wish to mention is—by drawing these smooth broaches across a piece of beeswax they will hold a few filaments of absorbent cotton simply by twisting the broach between the fingers and against the cotton. In this way a canal can be tested for odours, moisture, and secretions, and even the diameter can in many cases be determined. It is also a convenient instrument, thus used, for washing and medicating canals, and for introducing thinly mixed cement (oxyphosphate) prior to filling, when crowning roots, or for bathing them with any application desirable, or for cleansing and dressing the sulci of pyorrhea. The easy removal of cotton from the broach saves much time and inconvenience.

By placing a small square of rubber-dam (about one-tenth inch square) on a fine, straight broach, and passing the latter within a pulp-canal to the apex of the root, the point will catch upon the internal shoulder of the foramen, and the rubber gauge can be adjusted at the level of the most prominent coronal point or cusp. Withdrawing the broach, with care not to disturb the gauge, the length from gauge to point can be transferred to a piece of orange-stick by notching, and the stick marked with patient's name, tooth, etc. This standard measure can be preserved for use in adjusting the gauge on pulp-extractors, drills, dressing-broaches, and pluggers, when operating in that particular canal.

If the apex of a root should present under examination a bell-shaped or an eroded mouth (thereby abridging the depth to which the canal should be filled), the exact length of normal canal, from the coronal prominence to the least prominent part of brim of apex, can be ascertained by passing a hooked broach to the apex and rotating it till hooked upon the least prominent part of brim, and then adjusting the gauge as described above.

The use of a rubber gauge—on drills when opening and cleansing pulp-canals, and when making a shoulder near the apex to build the filling against—on broaches for sounding and dressing, particularly where contact without pressure is necessary; on pluggers, particularly when filling at the apex, and preferably during the entire filling of a pulp-canal; in ascertaining what length of apical portion of root is diseased enough to require excision; and in finding the exact length which can be given the dowel of an artificial crown—is obvious. As a guide it insures precision, and, if constantly used, gives positive evidence that the mechanical part of an operation is perfectly executed.

The hooked broach is also useful in exploring for defects in teeth or fillings.

Varnish will hold cotton on a smooth broach where medicines are to be applied in abscesses, sinuses, or pus-pockets. It can be scraped off, or dissolved off in alcohol very easily.

These uses of this broach occurred to me in 1881, and have been employed ever since with excellent results.—*Cosmos.*

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 *bona 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 instruction shall be counted as one of the four years of professional study unless taken after registration.

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* 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.

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 Examining Bodies whose Examinations in General Education are Recognised by the Medical Council as Qualifying for Registration as Medical or Dental Student.

*** The Examinations in Divisions I., II., III. at present entitle to Registration on production of satisfactory evidence that the applicant has passed them.

I.—Universities in the United Kingdom.

University of Oxford.—(1) Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of these optional subjects (Greek, French, German). (2) Senior Local Examinations; Certificate to include Latin and Mathematics. (3) Responsions. (4) Moderations. (5) Examination for a Degree in Arts.

University of Cambridge.—(6) Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of these optional subjects (Greek, French, German). (7) Senior Local Examinations; Certificate to include Latin and Mathematics. (8) Higher Local Examinations. (9) Previous Examinations. (10) Examination for a Degree in Arts.

University of Durham.—(11) Examination for Certificate of Proficiency. (12) Examination for students at the end of their first year. (13) Examination for a Degree in Arts.

University of London.—(14) Matriculation Examination. (15) Preliminary Scientific (M.B.) Examination. (16) Examination for a Degree in Arts or Science.

Victoria University.—(17) Preliminary Examination; Latin to be one of the subjects. (18) Entrance Examination in Arts, to include all the subjects required.

University of Edinburgh.—(19) Local Examinations (Junior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (20) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (21) Preliminary Examination for Graduation in Science or Medicine and Surgery. (22) Examination for a Degree in Arts.

University of Aberdeen. — (23) Local Examinations (Junior Certificate); Certificate to include all the subjects required. (24) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geomety, Latin, and also one of these optional subjects (Greek, French, German). (25) Preliminary Examination for Graduation in Medicine and Surgery. (26) Examination for a Degree of Arts.

University of Glasgow. — (27) Local Examinations (Junior Certificate); Certificate to include all the subjects required. (28) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German.) (29) Preliminary Examination for Graduation in Medicine and Surgery. (30) Examination for a Degree in Arts.

University of St. Andrews.—(31) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic,

Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (32) Local Examinations (Junior Certificate), to include all the subjects required. (33) Preliminary Examination for Graduation in Medicine and Surgery. (34) Examination for a Degree in Arts.

University of Dublin.—(35) Public Entrance Examination. (36) General Examination at end of Senior Freshman year. (37) Examination for a Degree in Arts.

Royal University of Ireland.—(38) Martriculation Examination.

Oxford and Cambridge Schools Examination Board.—(39) Certificate to include the following subjects; an adequate knowledge of English Grammar and Orthography, as shown in the course of the Examination, to the satisfaction of the Examiners, being held as conforming to the requirements of the Medical Council in regard to those subjects. (*a*) Arithmetic, including Vulgar and Decimal Fractions; (*b*) Algebra, including Simple Equations; (*c*) Geometry, including the subjects of the first three books of Euclid; (*d*) Latin, including translation and Grammar; (*e*) also one of these optional subjects (Greek, or any Modern Language, or Logic).

II.—Other Bodies named in Schedule (a) to the *Medical Act.*

* *Apothecaries' Society of London.*—(40) Examination in Arts.

† *Royal College of Physicians and Surgeons of Edinburgh.*—(41) Preliminary (combined) Examination in General Education.

† *Faculty of Physicians and Surgeons of Glasgow.*—(42) Preliminary Examination in General Education.

* *Royal College of Physicians and Surgeons of Ireland.*—(43) Preliminary Examination; Certificate to include Mathematics.

III.—Examining Bodies in the United Kingdom not included in Schedule (a) to the *Medical Act* (1858.)

College of Preceptors—(44) Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and either a modern language, or Greek, or Logic, having been taken. (45) Preliminary Examination for Medical Students.

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* "The Council has recommended that these Examinations be discontinued."

† These Examinations are conducted by the Educational Institute of Scotland, (No. 49.)

Intermediate Education Board of Ireland.—(46) Junior Grade Examination ; (47) Middle Grade Examination ; (48) Senior Grade Examination ; Certificate in each case to include all the subjects required.

Educational Institute of Scotland.—(49) Preliminary Medical Examination.

Scotch Education Department.—(50) Leaving Certificates in each Grade and in Honours.

IV.—Indian, Colonial, and Foreign Universities and Colleges.

University of Calcutta.—(51) Entrance Examination.

University of Madras.—(52) First Examination in Arts.

University of Bombay.—(53) Entrance Examination.

Ceylon Medical College.—(54) Preliminary Examination (Primary Class).

University of M'Gill College, Montreal.—(55) Matriculation Examination.

University of Bishop's College, Montreal.—(56) Matriculation Examination.

University of Toronto.—(57) Matriculation Examination.

University of Trinity College, Toronto.—(58) Matriculation Examination.

University of Queen's College, Kingston.—(59) Matriculation Examination.

University of Victoria College, Upper Canada.—(60) Certificate of Full Matriculation in Arts ; or Second Class Provincial Certificate from Education Department.

College of Physicians and Surgeons of Ontario.—(61) Preliminary Examination.

Western University of Ontario.—(62) Entrance Examination in Medicine.

University of Manitoba.—(63) Previous Examination.

University of Fredericton, New Brunswick.—(64) Matriculation Examination.

University of Mount Allison College, New Brunswick, Canada.—(65) Examination for a Degree in Arts.

University of King's College, Nova Scotia.—(66) Matriculation Examination. (67) Responsions.

University of Halifax, Nova Scotia.—(68) Matriculation Examination.

Dalhousie College and University, Halifax, Nova Scotia.—(69) Matriculations and Sessional Examinations.

Provincial Medical Board of Nova Scotia.—(70) Matriculation Examination.

University of Melbourne.—(71) Matriculation Examination.

University of Sydney.—(72) Entrance Examination for Medical Students.

University of Adelaide.—(73) Senior Public Examination. (74) Junior Public Examination.

University of Tasmania.—(75) Senior Public Examination.

University of the Cape of Good Hope. — (76) Matriculation Examination. (77) Examination for a Degree in Arts.

University of Otago.—(78) Preliminary Examination.

University of New Zealand. — (79) Preliminary Medical Examination.

Christ's College, Canterbury, New Zealand.— (80) Voluntary Examinations ; Certificate to include all subjects required.

Codrington College, Barbadoes. — (81) English Certificate for Students of two years' standing, and Latin Certificate or "Testamur."

Germany and other Continental Countries.—(82) Gymnasial Abiturienten-Examen, and other corresponding Entrance Examinations to the Universities.

Egyptian Government.—(83) Secondary Education Certificate, Arabic being accepted as a classic Language in place of Latin.

*** (*a*) The Certificates from the Bodies in the foregoing Section (iv.) must contain evidence that the Examination passed included all the subjects required by the General Medical Council.

(*b*) In the case of Natives of India or other oriental countries, whose vernacular is other than English, an Examination in a classic oriental language may be accepted instead of an Examination in Latin.

(*c*) The list of Examinations at present received as fulfilling the conditions of the Council as regards Preliminary Education will be revised by the Education-Committee, on returns to be obtained by the Registrar by the end of the year 1893, so as to include only those the standard of Examination of which, in the specified subjects of Preliminary Examination, comes up to the standard considered desirable by the 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.
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.
Course of Lectures on Surgery	Six months, or one Winter Session.	One Course.		One Course.
One Course of Lectures on 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.	One Course.	Twenty-four Lectures.
Dental Surgery& Pathology	Two Courses.	One Course.	Two Courses.	Twenty Lectures.
Dental Mechanics	Two Courses. *** Attendance at class Examinations obligatory.	One Course.	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 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 will be required to prepare and fill cavities with gold or plastic filling or other material, or to do any 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.	I. *Primary* Examinations. Tuesday, May 5, 1896. „ July 21, 1896. II. *Final* Examinations. Following Thursday.	*Primary* Examinations. Second Monday in February, May & November. *Final* on the Tuesdays following.	Wednesday, Oct. 7th, 1895. ——— —— May 1896.
9—Modified Conditions of Admission to Examination. (2). (*a*) Conditions of eligibility.		N.B.—Students who commenced their professional education by apprenticeship, before July 22, 1878, are exempted from the Preliminary Examination	Candidates must be registered Dental Practitioners in practice before 1878.	The Second Examination takes place on the two days following these dates.

	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). (*b*) Certificates, &c., required.			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. 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. Particulars of Professional Education.	(8) 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...			£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.

SPECIAL (DENTAL) HOSPITALS.

London School of Dental Surgery, Leicester Square.

Dental and Medical Officers.

Consulting Physician.—Sir Richard Quain, Bart., F.R.S., M.D., F.R.C.P., L.L.D.

Consulting Surgeon.—Mr. Christopher Heath, F.R.C.S.

Consulting Dental Surgeons.—Mr. T. Arnold Rogers, M.R.C.S., L.D.S.

Dental Surgeons.— Mr. Storer Bennett, F.R.C.S., L.R.C.P., L.D.S. ; Mr. L. Matheson, L.D.S.; Mr. W. B. Paterson, F.R.C.S., L.D.S. ; Mr. C. E. Truman, M.A. Cantab., M.R.C.S., L.D.S. ; Mr. E. Lloyd Williams, M.R.C.S., L.R.C.P., L D.S., L.S.A. ; Mr. W. H. Woodruff, L.D.S.

Assistant Dental Surgeons.—Mr. H. Baldwin, M.R.C.S., L.D.S.; Mr. F. J. Bennett, M.R.C.S., L.D.S. ; Mr. Arthur Colyer, L.R.C.P., M.R.C.S., L.D.S.; Mr. J. F. Colyer, M.R.C.S., L.R.C.P., L.D.S. ; Mr. W. H. Dolamore, M.R.C.S., L.R.C.P., L.D.S. ; Mr. George Hern, L.R.C.P., M.R.C.S., L.D.S. ; Mr. C. F. Rilot, M.R.C.S., L.D.S. ; Mr. Percy J. Smith, M.R.C.S., L.R.C.P., L.D.S. ; Mr. J. G. Turner, F.R.C.S., L.D.S. ; Mr. H. Lloyd Williams, M.R.C.S., L.D.S. ; Mr. A. Clayton Woodhouse, M.R.C.S., L.D.S.

Anæsthetists.—Mr. G. H. Bailey, M.R.C.S. ; Mr. Carter Braine, F.R.C.S. ; Mr. W. Dudley Buxton, M.D., B.S. Lond., M.R.C.P. Lond. ; Mr. Frederic W. Hewitt, B.A., M.D. Cantab.

Assistant Anæsthetists.—Mr. E. A. Bridger, M.D. ; Mr. B. H. Comerford, M.R.C.S., L.R.C.P. ; Mr. Henry Davis, M.R.C.S., L.S.A., Mr. George Rowell, F.R.C.S.

Demonstrators of Gold and other methods of filling.—Mr. T. H Clarence, L.D.S. ; Mr. A. B. Densham, M.R.C.S., L.R.C.P., L.D.S., Mr. E. Gardner, L.D.S. ; Mr. W. H. May, L.D.S.

Medical Tutor.—Mr. W. H. Dolamore, M.R.C.S., L.R.C.P., L.D.S.

Curator of Mechanical Laboratory.—Mr. A. J. Watts, L.D.S.I..

Lecturers.—*Dental Surgery and Pathology.*—Mr. Storer Bennett.

Dental Anatomy and Pathology. (Human and Comparative).—Mr. Arthur Underwood.

Dental Mechanics.—Mr. David Hepburn.

Metallurgy in its application to Dental purposes.—Dr. Foster Morley.

Mechanical Laboratory.

A mechanical laboratory is fitted up, which is under the care and superintendence of the lecturer on dental mechanics and a skilled mechanic. Students will be required to take models manufacture and fit into the mouth dentures for those patients allotted to them by members of the staff. The actual manufacture to be under the superintendence of the mechanical assistant, while the adapting to the mouth will be supervised by Members of the Staff.

It is intended, in this manner, to supply a portion of the Student's education heretofore unprovided for, and to more perfectly equip him for the exigencies of dental practice. It will enable him to be in a better position to meet the requirements of the College of Surgeons of England with regard to mechanical dentistry, in which subjects the Board of Examiners for the L.D.S. may demand a practical examination from Candidates for that diploma.

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.

The Medical Committee reserve to themselves the right to refuse any such candidate's application.

Students who perform Operations for Filling Teeth must provide their own instruments for the same, the proximate cost of which is £25; a list can be had on application, but "The Kit" has been very carefully selected with a view to efficiency, and is well adapted for use in future practice.

Further particulars may be obtained on application 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 B. W. Richardson, M.A., M.D., F.R.S.; Sir W. H. Broadbent, Bart., M.D., F.R.C.P.

Consulting Surgeons.—Sir Spencer Wells, Bart., F.R.C.S.; Christopher Heath, F.R.C.S.

Consulting Dental Surgeon.—Sir Edwin Saunders, F.R.C.S.

Dental Surgeons.—Messrs. F. Henry Weiss; Alfred Smith; Marcus Davis; A. F. Canton; H. G. Read; C. W. Glassington.

Assistant Dental Surgeons.—Willoughby Weiss; Edgar Beverley; T. G. Read; W. Rushton; Sibley W. Read; W. H. Wheatley.

Anæsthetists.—Messrs. C. H. Cosens; Dr. Reid Holmes; C. J. Ogle; G. Everett Norton; Dr. Maughan; Dr. Harold Low.

LECTURERS.

Dental Anatomy and Physiology.—Dr. J. W. Pare.

Dental Surgery and Pathology.—Mr. Willoughby Weiss.

Dental Mechanics.—Mr. Harry Rose.

Dental Metallurgy.—Dr. W. Lapraik.

Operative Dental Surgery.—Mr. George Cunningham.

Dental Materia Medica.—C. W. Glassington.

Elements of Histology.—Dr. James Maughan.

FEES.

GENERAL FEES FOR SPECIAL LECTURES REQUIRED BY THE CURRICULUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Two Courses on Dental Anatomy and Physiology ,, ,, Dental Surgery and Pathology ,, ,, Dental Mechanics ... ... One Course on Dental Metallurgy	£15 15 0

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	

*These Lectures are free to Students of the College who have fully entered for the Special Lectures.

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.

The fees for the necessary General Hospital Practice and Lectures vary from about 55 to 65 Guineas, particulars of which are to be found in the Calendars of the several Schools.

SIDNEY SPOKES, *Dean.*

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.; H. Stoner, L.R.C.P., M.R.C.S., L.D.S.

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.

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.
Anæthetics.—Mr. T. Bird.
Dental Microscopy.—Mr. Baker.
Dental Mechanics.—Mr. Pillin.
Dean.—Dr. Shaw.

FEES.

A ticket, which gives admission to the special lectures and demonstrations, and dental practice only, may be obtained for £50 paid on entrance.

The Course of Dental Instruction and Practice extends over a

period of two years, and must be taken by the student continuously from the time of entering the School. Seven guineas is charged for any further period of Dental Practice not exceeding six months.

Arrangements cannot be made for short periods of instructions.

A ticket, which gives admission to the *general* Lectures, Demonstrations, and Hospital Practice required for the L.D.S., Eng., may be obtained for £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 in the case of students who produce, on joining the school, recognized certificates of instruction in Chemistry, Practical Chemistry, and Materia Medica.

A ticket, which gives admission to the *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. From these fees the reduction mentioned in paragraph B will be made.

The inclusive fee for students entering for the course of instruction for the M.R.C.S., L.R.C.P., and L.D.S., Eng., is 190 guineas, or 200 guineas if paid by instalments at the commencement of each academical year:—first year 60 guineas, second year 60 guineas, third year 40 guineas, fourth year 40 guineas. Students who pay this inclusive fee are allowed to pursue their Study of Dentistry during any period of their Medical Course most convenient to themselves, without further charge.

EDINBURGH.

Dental Hospital and School.

Consulting Physician.—Alex. Peddie, M.D.

Consulting Surgeons.—Joseph Bell, M.D., F.R.C.S.E.

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. W. Bowman Macleod; Andrew Wilson; Macolm Macgregor; George W. Watson,; J. Stewart Durward; James Macintosh; William Forrester.

Assistant Dental Surgeons. — John S. Amoore; J. Graham Munro; T. Gregory; John Turner; David Monroe; Frederick Page.

Extra Assistant Dental Surgeons. — Alex. Wilson, L.D.S.; Hume Purdie, L.D.S.; J. Malcolm, L.D.S.; D. Bailie Wilson, L.D.S.; S. Simmons, L.D.S.; R. N. Hannah, L.D.S.

Chloroformists.—J. M. Farquharson, M.B., C.M.; W. Lundie, M.D.; G. Matheson Cullen, M D.; Basil Orr, M.D.

Dental School (Lecturers).

Dental Anatomy and Physiology (Human and Comparative).—Mr. Andrew Wilson.

Dental Surgery and Pathology.—Mr. George W. Watson.

Mechanical Dentistry.—M. W. Bowman Macleod.

Practical Mechanics. — Assistant Demonstrator, J. Stewart Durward. The demonstrations will be spread over the two years of hospital practice. Students will require to furnish their own hand tools.

Supplementary Classes (Free).

Dental Materia.—William Guy, F.R.C.P. and S.Ed., L.D.S Ed.

Gold filling.—H. B. Ezard, L.D.S.

Dental Metallurgy.—A. Forbes Watson, B.Sc.

Dental Histology.—G. W. Watson, L.D.S.

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, 1895-96, opens October 1st, 1895, General fee for the hospital practice and special lectures required, £25 10s.

For further particulars apply to the Dean, 31, Chambers Street, Edinburgh.

GLASGOW DENTAL HOSPITAL,

4, Chatham Place, Stirling Road.

Consulting Physician.—W. T. Gairdner, M.D., Professor of Practice of Physic, Glasgow University.

Consulting Surgeon.—Mm. M'Ewen, M.D., LL.D., Professor of Surgery, Glasgow University.

Dental Surgeons.—Biggs, John A., L.D.S. ; Cameron, D. R., L.D.S. ; Cameron, James, L.D.S. ; Gray, W. H. L.D.S. ; M'Cash, James M., L.D.S. ; Martin, W. Foulds, L.D.S. ; Naismith, Alexander, L.D.S. ; Price, Rees, L.D.S. ; Wallace, W., M.A., M.B., L.D.S. ; Whyte, Alexander, L.D.S. ; Woodburn, William Holt, L.D.S., D.D.S. ; Young, A.B., L.D.S.

Assistant Dental Surgeon.—Simmers, J. Maxwell, L.D.S.

Administrator of Anæsthetics.—Henderson, T. Brown, M.D., F.F.P.S.

LECTURERS.

Dental Surgery and Pathology.—Rees Price, L.D.S.

Dental Anatomy and Physiology.—W. Wallace, M.A. M.B., L.D.S.

Dental Mechanics.—John A. Biggs, L.D.S.

House Surgeon.—J. M. M'Millan, L.R.C.S., & P. ED., L.D.S.

Secretary and Treasurer.—D. M. Alexander, 97, West Regent Street, Glasgow.

Fees for attendance on the Lectures and Hospital Practice, £23 2s., on entering.

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. The work of the Dental Faculty is carried on in premises especially erected for the purpose, and fitted up with a due regard to the requirements of a modern Dental Education.

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.—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.—Staccey 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.

HOSPITAL FEES.

The 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, Letures, and Demonstrations.

Surgery (2 years) £10 10 0 | Surgery (1 winter) £6 6 0

N.B.—Further particulars may be obtained on application to the Registrar at the College, or to the Hon. Secretary of the Dental Department (Mr. J. Humphreys, 149, Edmund Street).

THE OWENS COLLEGE, MANCHESTER.

DENTAL DEPARTMENT.

Professors and Lecturers.—Anatomy, Professor A. H. Young, M.B., F.R.C.S. Physiology, Professor Wm. Stirling, M.D. Medicine, Professor J. Dreschfeld, M.D., F.R.C.P. Surgery, Professor T. Jones, M.B., F.R.C.S. Clinical Surgery, Professor W. Whitehead, F.R.C.S.E. Practical Surgery, Messrs. G. A. Wright, M.B., F.R.C.S.; J. Collier, M.D., F.R.C.S. Operative Surgery, F. A. Southam, M.B., F.R.C.S. Chemistry, Professor H. B. Dixon, M.A., F.R.S. Organic Chemistry, Professor W. H. Perkin, F.R.S. Materia Medica, Professor D. J. Leech, M.D., F.R.C.P. Dental Surgery, George G. Campion, L.D.S. Dental Anatomy, W. A. Hooton, L.D.S., M.R.C.S. Dental Mechanics, Thos. Tanner, L.D.S. Dental Metallurgy, Dr. C. A. Burghardt. Operative Dentistry, G. O. Whittaker, L.D.S.

Demonstrator on Dental Histology and Pathology.—D. Headridge, L.D.S.

Administrators of Anæsthetics.—D. J. Prince Stallard, M.B., A. Wilson, M.R.C.S.

Dean.—G. G. Campion, L.D.S.,Eng.

The fee for two years' hospital practice required by the College of Surgeons, is £12 12s. For further information apply to G. G. Campion, *Dean.*

The for the two years' lectures, &c., required by the dental curriculum of the Colleges of Surgeons is £50, payable in two sums of £25 each at the beginning of the first and second years of studentship.

The two years' general hospital practice is taken at the Royal Infirmary. The fee is £10 10s., and includes that for attendance on the lectures on clinical surgery.

For further particulars with regard to the Dental Department, application should be made to the Registrar, The Owens College, Manchester.

THE VICTORIA DENTAL HOSPITAL, MANCHESTER,

16, Devonshire Street, All Saints.

Consulting Physicians.—Dr. Simpson, M.R.C.S.; Dr. Leech, F.R.C.P.

Consulting Surgeons.—E. Lund, F.R.C.S.; F. A. Heath, M.R.C.S.; T. Jones, F.R.C.S.; J. Hardie, F.R.C.S.

Consulting Dental Surgeons.—H. Campion, M.R.C.S.; G. W. Smith, M.R.C.S., L.D.S.Eng.

Dental Surgeons.—G. G. Campion, L.D.S.Eng.; E. P. Collett, L.D.S.Eng.; L. Dreschfeld, L.D.S.I.; J. W. Dunkerley, L.D.S.I.; W. Dykes, L.D.S.Glas.; W. Headridge, L.D.S.I.; W. A. Hooton, L.D.S.Eng.; I. Renshaw, L.D.S.I.; W. Simms, L.D.S.I.; W. Smithard, L.D.S.I.; T. Tanner, L.D.S.Eng.; G. C. Whittaker, L.D.S.Eng.

Assistant Dental Surgeons.—D. Headridge, L.D.S.Eng.; P. A. Linnell, L.D.S.Eng.; F. W. Minshall, L.D.S.I.; C. R. Morley, L.D.S.Eng.; C. H. Smale, L.D.S.Eng.; H. T. Dreschfeld, L.D.S.Ed.

Demonstrator.—T. E. Sherratt, L.D.S.Eng.

Tutor.—J. Butterworth, L.D.S.Eng.

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.—M. Alexander, L.D.S.I. ; 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.

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 Liverpool Dental Hospital, founded in the year 1864, combines the work of a most useful charity with all the advantages of a Dental School recognised by all the licensing bodies.

The Hospital is conveniently situated within five minutes' walk of the Medical School. The premises are substantial, having four separate operating rooms and a work room, all facing north, which is recognised as the best aspect for securing a good light.

There is an abundant daily attendance of patients ; over 20,000 cases were treated last year.

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 Committee have this year incurred considerable expense in redecorating and painting the internal portions of the building, and a new room has been fitted up for the exclusive use of the students.

The electric light has been introduced (the lamps being supported on brackets specially manufactured), and will doubtless prove of immense advantage to the operators.

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. Students attending the practice of the Hospital must consider themselves strictly under the control of the Medical Officers, and must not undertake any operation without the consent of the Dental Surgeon for the day.

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.

Dental Surgeons.—Messrs. Robert Hazleton, F.R.C.S.I.; W. Booth Pearsall, 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.

Assistant Dental Surgeons.—J. S. Thomson, L.D.S.Edin.; Shenstone Bishop, L.D.S.I.

Anæsthetists.—Messrs. John G. Cronyn, L.R.C.S.I., K.L.D.C.P.I.; John R. Graves, L.R.C.S.I., L.K.C., C.P.I.; John B. Coleman, M.B., Ch.M., Ru.I.

Pathologist.—William Mallet Purser, M.D.

Registrar.—William A. Shea.

In connection with the Dental Hospital of Ireland, the Dental School will be open for the Winter Session on October 1st, 1894.

All Dental Students who have passed their Preliminary Examination are admissible to the Clinical Instruction of the Hospital, after paying Fees and subscribing to the conditions prescribed by the Staff.

In addition to Clinical Instruction, Courses of Lectures and Demonstrations will be given at the Hospital in Dental Surgery and Pathology, Mechanical Dentistry, the Administration of Anæsthetics, crowns, pivots, porcelain inlays, gold filling, regulating plates, &c.

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.

Fee for general subjects for students of dental surgery :—First winter, 31½ guineas ; first summer, 31½ guineas ; or a single payment of 63 guineas.

Dr. T. W. Shore, *Warden.*

CHARING CROSS HOSPITAL, W.C.

The Composition fee for dental students is 54 guineas in one sum, or 60 guineas, payable in two instalments of 30 guineas each, *viz* :—30 guineas on entering ; 30 guineas 12 months later.

Stanley Boyd, *Dean.*

KING'S COLLEGE, STRAND, W.C.

No special arrangements are made for dental students.

Prof. Curnow, *Dean.*

LONDON HOSPITAL, MILE END, E.

Composite fee for dental students:—Hospital practice and lectures, £42.

Munro Scott, *Warden.*

MIDDLESEX HOSPITAL, BERNERS STREET, W.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite courses of Lectures and hospital practice on payment of a fee of

54 guineas, in one sum on entrance, or by instalments of 40 guineas on entrance, and 20 guineas at the beginning of the second winter session. Sidney Coupland, M. D., *Dean.*

St. George's Hospital, Hyde Park Corner, S.W.

Fee for all the courses required at a hospital for a Diploma in Dental Surgery, exclusive of practical chemistry, £50 ; or £55 in two instalments : first year, £30 ; second year, £25.

Isambard Owen, M.D., *Dean.*

St. Mary's Hospital, Paddington, W.

Entrance fee to the general hospital practice and lectures required for the examination in Dental Surgery at the Royal College of Surgeons, England, £55 ; payable in two instalments :—First year £30 ; second year, £25. G. P. Field, *Dean.*

St. Thomas's Hospital, Albert Embankment, S.E.

The fee for attendance on the general subjects required of students in dental surgery is, for the two years, £65 ; or by instalments, £55 for the first year, and £15 for the second year. If certificates for *dental* practice are also required a special fee for that subject has to be paid. G. H. Makins, *Dean.*

Westminster Hospital, Broad Sanctuary, S. W.

The fees for the general surgical practice and lectures required for the dental diploma of the Royal College of surgeons may be paid in one or two ways, viz.—1. In one payment on entrance 50 guineas. 2. In two payments of £30 and £26, to be made respectively at the commencement of each academic year. These payments include the library fee, and entitle the student to attendance on the tutorial classes. A scholarship, value £20, is offered for competition to commencing Dental Students.

W. G. Spencer, *Dean.*

University College, Gower Street, S. W.

The fee for the courses required to be taken at a medical school for the L.D.S. is 50 guineas ; or including Chemistry, Practical Chemistry, Physics and Materia Medica, 65 guineas.

V. A. H. Horsley, *Dean.*

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.

R. N. Ramsay, Royal Bank, 24, Forrest Road, *Secretary.*

THE DENTAL RECORD.

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Editorial.

THE TEETH OF THE CHILDREN OF THE RICH.

AMONG the many interesting matters dealt with at the Annual Meeting of the British Dental Association, at Edinburgh, not least in importance was the Fifth Report of the Committee elected to investigate school children's teeth, and we specially call attention to this because it includes, we believe for the first time, the result of an investigation at a school attended solely by the children of the rich. It is certainly somewhat alarming to find that a fifth of the dentures of the boys examined are classified as "very bad." Nothing could better prove how riches are mis-spent than these statistics. Parents with ample means to obtain all that should enable them to rear healthy children yet so fail that the tissues of these are often badly formed and ill-developed. Pampered in one direction yet neglected in another the children grow up with teeth prone to decay yet improperly treated. Yet, after all is said and done, science or education, or both, can scarcely be held blameless—these surely must be faulty. At the end of a century so eminently distinguished by the attention paid to hygiene and the cure of disease, it is surely curious that we must confess so lamentable a failure. So far as the teeth are concerned we believe that dentistry may honestly claim to be able to keep these efficient for the purposes of mastication, provided the public are sufficiently educated to avail themselves properly of its services; but surely ill-developed teeth are also an index of ill-development of other tissues,

and both signs of neglect in following the advice of the physician, or of errors in and failure of his treatment. The teeth preserve throughout the life of the individual a history of the health of the patient at the time they were developing; the other tissues may recover, these cannot. Badly formed teeth tell of a childhood wrongly spent or of a child badly fed. These are points with which we, as dental surgeons, have little to do. The onus must fall on the medical attendant, and he it is who should very earnestly consider the matter. Nothing, perhaps, is more likely to impress on him the importance of this question than such "tales of woe" as these reports contain. For this reason, if for no other, though we have many others, we are glad to note the appointment of dental surgeons to better class schools. We perceive, however, one stumbling block of which men holding such appointments must beware. These children, unlike those of the poorer class, have probably at some time or other been taken to the family dentist. It may or may not be that he has shirked his duty, yet it is obvious that the officially appointed school dentist in going over such cases and finding cavities more or less recent will need much of the wisdom of the serpent if he is to avoid being looked on as an interloper, perhaps as a poacher on other men's preserves. We are inclined to think that the idea of vested interest in a patient may be, and is, carried too far, yet the professional courtesy due to our fellow practitioners should not be lost sight of. It seems to us that under such circumstances, considering the work could scarcely be undertaken without the consent of the parents, it would be wiser to submit to these a report of the work required, accompanied by an intimation that this could be done at the school *or* by the "family dentist." For the school dentist not to report on what he finds to be required would be to stultify the object of his appointment; but to voluntarily offer to accept a stated fee for his services, or to offer other inducements, would be to treat the matter in too competitive a spirit to promote professional harmony.

News and Notes.

THE *Lancet* of September 21st contains an interesting leading article on some of the disclosures contained in the second Blue Book on the Food Products Adulteration Committee. It recalls with pardonable pride the part it took, under the direction of the late Mr. Wakley, in obtaining the Act of 1875. Unfortunately, this Act left untouched manufacturers and wholesale dealers, and threw the onus of adulteration solely on the shoulders of the retailer. That this is an error, and a grevious one, is at once apparent when we read that it was possible in one notorious case to offer and dispose of by public auction in Mincing Lane, 70,000 lbs. of pepper dust, which really consisted of 1 per cent. of pepper and 99 per cent. of sand and clay.

THAT Antwerp is the principal market in the world for ivory is well known. To it buyers go from Germany, France, and England. In 1894, 583,117 lbs. were imported. Prior to 1890 ivory markets were held annually at Antwerp; since that date, however, they are held every month. Of the three principal markets for ivory, Antwerp, in 1894, took 410,066 lbs., London 153,220 lbs., and Liverpool 131,174 lbs. This rate of consumption, coupled with the gradually narrowing limits of the ivory producing area, must soon make it very rare and costly. We may congratulate ourselves that ivory has ceased to take part in the construction of dentures.

AT Klausthal, in Germany, lightning struck the wooden post of the house and fused two nails four millimétres thick. Messrs. Siemens and Halske, of Berlin, afterwards carried on a series of experiments to ascertain the force required to melt this quantity of iron. Assuming one second as the time standard, it required a current of 200 amperes and 20,000 volts representing 7,000 horse power. Assuming that the lightning occupied one-tenth of a second to fuse the two nails, the horse power required would

be 70,000. Our readers, when reading this graphic manner of expressing the power of lightning, will doubtless recall Darwen's account of the tubes formed by lightning found by him in the sand hillocks on the shores of La Plata. Similar ones had been found at Drigg, in Cumberland, under a tree, where a man had been killed by lightning. In this case the tube was not less than thirty feet long. The tubes were formed by the fusing of the silicious sand, the inner surface being smooth and vitrified, their diameter being about one inch and a quarter, and the wall about a thirtieth to a twentieth of an inch. At Paris, in the beginning of the century M. Hachette and M. Beudanc succeeded in making tubes by passing shocks through finely powdered glass; but though they used the strongest battery then obtainable and so easily fusible a material, the tubes were only an inch long. They failed entirely with powdered felspar and quartz. Nowadays with the powerful currents generated by the dynamo, quite other results would be expected, but the experiments suffice to prove the extraordinary intensity of the electrical force of lightning.

We feel like the small boy who cries at another's discomfiture: "Didn't I tell you so," and this because of the following or similar paragraphs in military papers. "A remarkable feature of the Chitral campaign was the extensive prevalence of toothache amongst the officers. The matter is receiving the serious attention of the medical authorities, and it is hoped that some very interesting statistical results will be gained from the careful investigation taking place. The epidemic first made its appearance after the active operations were over and the regiments had received orders to stand fast for the summer, and reached its most violent form just before the long expected order to partially evacuate the country had arrived. During this period the ranks of the officers of the force were well nigh decimated from this painful disease, and in nearly every case the only effective remedy appeared to be the application of a mild blister in the shape of fifteen days' leave to Murree. Sir Robert Low has advised the Government on all future expeditions to appoint a regular staff of dentists to accompany the columns with a P.D.O. (principal dentistry officer), attached to the headquarters staff, who would hold the local rank of brigade-dentist-major-general."

Dr. N. R. Macalaster says that in vulcanizing rubber between metal to produce a smooth surface, the metal can be more easily removed from the plate and a polished surface left if quicksilver be rubbed on the surface of the metal before packing the rubber.

In Washington, U.S.A., a naturalist has succeeded in inducing fresh-water mussels or clams to make beautiful pearls to order. He placed a small oval lump of beeswax between the valves of the mollusc, which at once proceeded to coat it with the pink nacre which is usually kept for the purpose of lining its shell. The mussel was kept in an aquarium for several years, and the result is an enormous pearl of great lustre and beauty. It belongs to a species common in American waters, and there seems to be no reason why it should not be put to work in a commercial way. A species of fresh-water mussel, locally known as fresh-water clams, are extremely abundant in Lake Champlain and its tributaries, and some years ago a perfect rage was inaugurated by the discovery of exquisitely beautiful pearls in the rivers of the Winooski, a river originating in the Green Mountains and flowing into Lake Champlain through the capital of that State. The craze extended till the species was practically exterminated from the river.

That interesting paper *Invention* will, for the future, be published as a penny instead of a twopenny weekly paper. It is also proposed to eliminate technical terms, and in other ways to make it a popular paper dealing with Inventions and Science.

"Items" states that the easiest and cheapest cement to prepare for uniting broken edges of glass and china is made by taking two ounces of pulverized white gum shellac and half an ounce of gum mastic. Soak them together in a couple of ounces of sulfuric ether, and add half a pint of alcohol. When dissolved, the preparation is ready for use. Heat the edges of the article to be mended, put on the cement with a brush, hold firmly till the cement has set, lay the article away for a week, and it will break anywhere else than in the mended place.

BRITISH DENTAL ASSOCIATION.

The Annual Meeting of the British Dental Association was held in Edinburgh, on August 29, 30, 31, under the Presidency of Mr. W. Bowman MacLeod, L.D.S.Edin., F.R.S.E., and was attended by a large number of members. The Principal and Senate of the Edinburgh University courteously placed the University Buildings at the disposal of the Association, and ample accommodation was thereby provided.

On Wednesday evening an informal gathering was held at the Waterloo Hotel, which was the social headquarters, and there the members were cordially welcomed by the members of the Scottish Branch, and a Smoking Concert was held.

On Thursday morning the Representative Board met and transacted business in the Court Room of the University.

General Meeting.

In the absence of the retiring President, Mr. C. S. Tomes, who, in consequence of the recent death of his father, Sir John Tomes, was unable to attend, the Chair was taken by Mr. J. Smith Turner.

Mr. Tomes in his valedictory address, which was read by the Chairman, said: Although his year of office had not been eventful, nevertheless, in many directions there was a little real progress to report. In the administration of the Dentists Act they had succeeded in prosecutions which had broken somewhat fresh ground, and so had crippled fresh forms of evasion which had hitherto been untouched. One form of attempt to evade the Dentists and similar Acts was for the intending offender to constitute himself into a bogus or "one man" company. A Departmental Committee was appointed by the Board of Trade to inquire into and suggest amendments to the existing Companies Act, and had just issued its report. This Committee was approached on behalf of the British Medical Association, the Pharmaceutical Society, and the British Dental Association, and appeared to have been so far influenced by the facts laid before them as to introduce into their draft bill, a clause, which, if it became law—and it probably would—would enable complainers to have any company formed for a fraudulent or illegal purpose compulsorily wound up, and the Court might in such a case declare the liability of any or all of the members to be unlimited. This was not much, but it was better than nothing, and they might yet

hope to get something stronger, seeing that their applications were not in any way rejected or controverted, but merely considered not to be exactly within the already too large scope of the Committee's inquiries. Turning to the calmer waters of science, their literature had been enriched by Mr. Hopewell Smith's very excellent handbook of Practical Dental Histology, which would be found of the greatest service. Dr. Black, of Jacksonville, in the *Dental Cosmos*, had recorded a vast number of experiments, many of which had led to highly suggestive results and afforded food for a good deal of thought and further experiment. For example, he had experimentally determined the force exerted in ordinary mastication, showing that that exercised by an artificial denture fell far short of that exerted by a patient's own teeth. Whilst determining the maximum pressure which could be exerted—which varied greatly in different individuals—he had been able to ascertain what force fillings had to withstand. Dr. Black had also made an important discovery in what he termed the "flow" of amalgams. By this he meant the very remarkable property which many amalgams had of slowly spreading and yielding under pressure without fracture, in this respect they differ from an ordinary malleable metal, which squeezed out under a given pressure quickly, and then yielded no more; and the yielding of a "flowing" amalgam was quite gradual and went on for a great many hours under the same pressure. According to Dr. Black a small block of dentine could be actually squeezed into a mass of hardened amalgam by a gradual pressure without becoming itself crushed. What the practical importance of this might turn out to be it was too early to say. Another group of facts he had investigated was the chemical constitution and hardness of different sorts of teeth, showing amongst other things that there was a difference between the percentage of lime salts in teeth taken from the same mouth. Distrusting this result, he (Mr. Tomes) was induced to undertake a series of experiments for himself, guarding as far as possible against ascertained or suspected sources of error, and he found that Dr. Black was probably right. He also put forward a suggestion as to the immunity from caries possessed by some mouths, viz., that there might be some substance formed which was very inimical to the growth of the necessary bacteria, a sort of caries—antitoxin in fact. In handing over the duties of his office to Mr. Bowman MacLeod, he desired to thank the Association for the

uniform kindness and courtesy with which his shortcomings had been met, so that his task had been rendered easy and pleasant.

On the motion of Mr. J. Smith Turner, a hearty vote of thanks was passed to Mr. Tomes for his services to the Association as its President, and also for his valedictory address.

Mr. Bowman MacLeod then took the Chair as President for the year.

The President's Address.

The President, after returning thanks for the high honour which had been conferred upon him, offered the members a most hearty and cordial welcome to that ancient and romantic city. After reference to the loss which the Association had sustained by the death of Sir John Tomes, who left behind him a long life well spent in the service of humanity and his profession, he said general surgery had made rapid progress during the last half century, and no less could be said of their own specialty. By a systematic course of education progress had been made, and the standard of efficiency had been raised as more and more attention had been directed to the preservation of the teeth. One of the principal factors in this betterment, this extension and exaltation of their usefulness, had been the establishment of dental hospitals in which the youth of their profession were being clinically instructed in the possibilities of conservative dentistry, and in which the general public were being taught that by a little timely attention many an errant tooth could be restored to health and usefulness. Their hospitals were good, wonderfully good, considering the short period of their existence and the wofully meagre support they received from the wealthy and benevolent public; but he was under the conviction that they could never reach their possibilities of efficiency until they could support a Chair in Clinical Dental Surgery. Other divisions of study had claims for consideration, and chairs for these would come in time, but this one had, to his mind, the most urgent claims, and should be the primary object of their efforts in shaping the immediate future of their educational institutes. It might be said that they had sufficient difficulty in obtaining money to carry on the present system without adding to the burden by creating an additional cause of expenditure, even if it would add to efficiency, and they would require before asking help from others to give proof that they had done something to deserve assistance. This,

without boasting, he thought they could do. London had three large dental hospitals ; Liverpool, Manchester, Plymouth, Newcastle, Dublin, Glasgow and Edinburgh, possessed similar institutions, which had been opened and mainly sustained by the liberality of members of their profession, in personal service, and by monetary contributions ; but as yet not one of these was free from the incubus of debt, or possessed an endowed chair, nor ever would unless they called attention to the work they had done, the work they were still doing, and, above all, the work they had still to do, but could not accomplish until they were placed in possession of sufficient means. How could this be obtained ? The Imperial Government might be approached, but he was afraid that little reliance need be placed on aid from that quarter, so that he would leave this source of probable assistance to the consideration of those who believed it to be the duty of the State to give all things to all men ; and yet he did not despair of the coming day when in one form or other Her Majesty's Government, who had already recognised their claim to professional status, would see it to be their duty to extend to their hospitals and schools substantial pecuniary support. If not to the Imperial Government, to what source were they to look for substantial aid and encouragement ? First of all, to themselves ; second, to their local corporations ; and there might be amongst themselves some who had not yet contributed their quota to the general fund. Let these now wake up and pour in a little of the metallic pabulum into the hungry and emaciated treasury. As for help from their local corporations (city and guild) they might rest assured of assistance according to their means and the desserts of the Association. He thought that most of their hospitals and schools had already received recognition from one or other of their local corporations, and he knew of no body of men more ready to promote the welfare of educational and benevolent institutions than civic corporations. Take as an instance the Town Council of this city. But for them he questioned if the town's College, the University of James VI., would ever have come into existence. Certainly it would not have long survived its birth, or risen to its present exalted position but for their helping hand and continuous encouragement. And if he might venture to mention it, their own hospital and school had been tided over its initiatory difficulties by the timely help it had received from the residue grant at the

disposal of the city, and which he prayed might be continued until they had flourished and waxed strong. There was yet another source to which they might look and from which they might expect much. He referred to that large and ever increasing class the wealthy and benevolent (or their trustees) who, if they had the facts proving the large area covered by the ministrations of the Association, the immense benefits conferred upon suffering humanity by their service in promoting and preserving special and general health, and the utter impossibility of their carrying on this good work unaided, would, with that enlightened generosity which had characterised their dealings with similar institutions, extend their aid to them. That they had so little encouragement in the past from this source was not much to be wondered at. They were young; other and older institutions had claimed attention while they had lain in the shadow of their importance and importunity. Here, then, was something to interest themselves in; a fresh development to stimulate them to renewed and increased energy, a fresh and additional plea to place before those who had helped them in the past, and a stronger and broader claim to urge upon those from whom they would seek assistance in the future. So doing, he had no doubt that before the time came round when Edinburgh should be again honoured with a visit from the Association, it would be the proud boast of their hospitals and schools that the millstone of debt hung no longer round their necks, and that now, free from the distracting and depressing effects incident to struggling for a bare existence, they were free to devote their full strength and energies to furnishing the greatest good to the greatest number, the profession, and the people.

On the motion of Mr. W. H. Breward Neale, seconded by Mr. Campbell, and supported by Mr. Waite, the President was cordially thanked for his address.

A vote of condolence with Lady Tomes in the recent bereavement she has sustained by the death of Sir John Tomes was unanimously passed on the motion of Mr. Robert Hepburn.

Sir William Muir, Principal of the University, on being introduced by the President, said how glad he was, on behalf of the authorities, to welcome the Association to the University. Any possible accommodation they could give they would only be too delighted to afford. They welcomed the Association most

heartily, and he was sure they did not recognise any other Faculty which was of greater service to humanity than the Dental.

The TREASURER (Mr. E. G. Betts), presented his Report, in which he stated that in succeeding so exceptionally able an officer as the late treasurer, Mr. H. W. Woodruff, he necessarily stood at some disadvantage. The item of legal expenses in 1894 is far larger—£136 more than in 1893. This, considering the success that has in all cases attended our arms, and the good results we may expect therefrom, might be looked on as a satisfactory fact. Every other large item of expenditure is distinctly less than in 1893, showing: On the expenses of the annual meeting a saving of £66, on stationery, printing, &c., of £97 1s. 4d., on reporting of meetings of £16, and on the Journal account of £109. The latter is especially a subject for congratulation, the total deficit on the Journal account for last year being only £44 7s. 9d. as compared with one of £178 19s. 1d. the previous year. The deposit account at the bankers, which at the commencement of that period was £400, is now £800. With the exception of current legal expenses and a few slighter items we are free from debt, and have a balance in the current account of £333 12s. 5d. During the past seventeen months 90 new members had joined, and our total number of members at the time of drawing up this report was 896 (it is probably ere this a round 100). Of these 40 are in arrears for two years and 213 for one year, making a total sum due to the Association of £307 13s.

Fifteen names had been removed from our list of members at the beginning of the present year for non-payment of their subscriptions, but he hoped that some, if not all of them, may yet see their way to pay up and rejoin.

The HON. SECRETARY (Mr. W. B. Patterson) also presented Report.

On the motion of Mr. Rees Price, seconded by Mr. Lee Rymer, J. P., the Reports were adopted.

THE ANNUAL MEETING, 1896.

Mr. BREWARD NEALE, as President of the Representative Board, reported that the Annual Meeting, according to the Bye Laws, must be held in London next year. The Board recommended that it be held in August, the exact date to be fixed by the Executive. Probably the first week would be found to be the most convenient. They also recommended the election of Mr. Frederick Canton as President elect for the ensuing year. Mr. Canton had already done

a great deal of useful work for the Association as its Secretary, its Treasurer, and as Chairman of the Representative Board.

The PRESIDENT moved that the Report of the Representative Board be adopted, that the Annual Meeting be held in August, and that Mr. Frederick Canton be President-elect.

Mr. SOMMERVILLE WOODIWISS seconded the resolution, which was agreed to.

MICROSCOPICAL SECTION.

Mr. J. H. MUMMERY, the President of the Section, delivered an address reviewing the recent work accomplished by the aid of the microscope in dental science. After referring to the work of Leeuwenhoeck in the 16th century, he said that from the second decade of the 19th century, the present science of microscopy had advanced by leaps and bounds, and where Leeuwenhoeck could announce fresh discoveries almost every day and launch out into the most various departments of physical research, now each worker who desired to add to the sum of accurate knowledge must work away diligently in his own little corner during the whole term of life allotted to him. During the past year no very marked advances had been made in dental histology, but no doubt much good work had been going on which would in due course see the light. Mr. Hopewell Smith in publishing his excellent work on "Dental Microscopy" had conferred a boon upon all workers in the field, and they owed him a debt of gratitude for bringing so much valuable material together. Abroad, Dr. Röse, of Freiburg, had carried still further his researches into the development of the teeth in the lower animals. They had to deplore the loss of Dr. Weil, of Munich, to whom the credit was due of adopting Von Koch's method of cutting sections of molluscs to the teeth, and of introducing the first process of cutting the hard and soft parts together without decalcification. A question of dental pathology which had a strong bearing upon daily practice—concerning the relative penetrative powers of coagulants and non-coagulants in the treatment of root-canals—had been the subject of an animated discussion across the Atlantic. The view seemed to be widely spread that when the death of the pulp took place, the fibrils of Tomes and the sheaths of Neumann underwent decomposition, and that the products thereby formed, even after the thorough removal of the pulp, resulted in discoloration of the entire tooth, and might, by septic examinations, act disastrously

upon the pericementum. It did not appear that there was any sufficient evidence in favour of that view, and Dr. Miller had shown that the micro-organisms penetrated but a very little distance along the tubules from the pulp canal in old, diseased roots, and that very frequently the root canal in such cases was lined with a secondary deposit which would prevent such penetration, the openings of the tubules being cut off by that means from the pulp cavity. The discussion had been carried on, however, under the assumption that decomposition of the contents of the dentinal tubule actually did take place, and that in treating root-canals, not only the canal itself but the tubuli—and, to be consistent, the lacunæ of the cementum—must be treated. Dr. Harlam, Dr. Black and others, considered that in the treatment of pulpless teeth for purposes of disinfection, coagulants were not only useless, but detrimental. In connection with that discussion, he (Mr. Mummery) mentioned that Miller long ago determined by experiment that the most powerful coagulants penetrated exceedingly rapidly. Dr. Pierce, in America, had lately attempted to show that certain forms of pyorrhœa alveolaris were in their origin quite independent of micro-organisms, and were nothing more than the manifestation of a gouty diathesis. That opinion was based on the discovery that the dark brown or greenish deposits on the roots of teeth affected by pyorrhœa were found on analysis to contain uric acid and its salts. The significance of that interesting discovery had been considerably diminished by the results of analyses published by Dr. Black, who found the same urates in ordinary tartar when pyorrhœa did not exist. That form of pyorrhœa began at the apex, or between the apex and neck, of the tooth, the gum in the early stages being firmly attached. Allowing that view of the origin of such cases to be true, they would not expect to find micro-organisms, but Dr. Miller had always found bacteria present in such deposits as were described by Dr. Pierce, so that in the present state of knowledge the etiology of even that form of that troublesome disease must be looked upon as not yet thoroughly established. Speaking of the loss which the world of science had sustained in the death of Professor Huxley, Mr. Mummery said that Professor Huxley had done much work in Dental Anatomy in former years, and helped to lay the foundation of a more accurate knowledge of the development of the teeth. Referring to the death of Sir John Tomes, Mr. Mummery said that

all progress in dental science in England dated from Sir John Tomes' discoveries and lectures on the subject. This scientific work began far back in the forties, and so firmly established were the results of his investigations that his name was associated with all the studies of dental students. Those who came under the influence of Sir John Tomes in the last mellow period of his life found him still as full as ever of keen interest in what was going on around him. He was endowed with a keen insight into character and an eminently judicial mind, which made his advice of great value, not only to the individual but to the profession at large in many a crisis of its history.

On the motion of Mr. Wilson, seconded by Mr. G. W. Watson, the thanks of the Association were accorded to Mr. Mummery for his address.

SCHOOL CHILDRENS' TEETH.

Mr. George Cunningham brought up the following :—

The Fifth Report of the Committee.

This stated that since the issue of their last report the Committee had received returns from six schools in which a little over 700 children's teeth were examined, thus making a total of 11,422 since the commencement of the investigation.

Table showing the Relative Ratio per 100 Children having Sound, Defective Temporary, and Defective Permanent Teeth (classified quarternarily), arranged in Triennial Age Groups, in 903 Children.

At St. Paul's Orphanage; Princess Alice Orphanage; and St. Mary's Convent, Birmingham; Kensington and Chelsea District School; Banstead; Rishworth Grammar School; Nazareth School, Kensington; and Haileybury College.

Age Group.	iv.-vi.		vii.-ix.		x.-xii.		xiii.-xv.		xvi.-xviii.		Quality.
No. Examined.	47		179		332		320		25		903
Sound (no decay) ...	7	14·9	19	10·6	33	9·9	23	7·2	...	...	Good.
Defective Temporary (Teeth only)	35	74·5	68	37·9	43	13·0	5	1·6	...	...	Uncertain.
Defective Permanent:											
1 to 4	5	10·6	91	50·9	225	67·8	178	55·6	10	40	Fair.
5 to 8	...	...	1	0·6	27	8 1	78	24·4	5	20	Bad.
9 to + ...	...	...	...	...	4	1·2	36	11·2	10	40	Very bad.
Total...	47	100	179	100	332	100	320	100	25	100	903

On comparison with those in a similar table in the Third Report, embracing nearly twice as many examinations, it will be seen that the three middle columns harmonize with previous results in a general way, though there are not so many good or sound dentures and rather more cases of very bad dentures, *i.e.*, with nine or more than defective permanent teeth. The inevitable increase of decay of the teeth as age advances is again clearly shown, although the numbers included in the first and fifth columns are too small to give reliable percentage results. An analysis of the special tables shows that this is mainly due to the inclusion of the Rishworth Grammar School and Haileybury College. The latter being a high-class school, bears out the results to which we called attention in the Third Report, that the teeth of the rich children are much more prone to decay than the teeth of the poor charity school children. In the whole 103 examined so far, only two had dentures free from decay or loss of teeth. Putting aside one of 12 and eight between 16 and 17 years, there were ninety-four between 13 and 15 years of age. Of these, two had *sound*, thirty-eight *fair*, thirty-five *bad*, and nineteen had *very bad* dentures. Not counting what seems an unusually large number of fractured front teeth from accidental causes; all the eight older boys were classified as *very bad*. The real condition was not so bad as these figures indicate, for a large number of carious teeth had been filled, and thirteen boys had *artificially sound* dentures, *i.e.*, required no treatment, all decay having been eradicated.

Much too rarely are the medical reports in the new Case Books filled in, but in the case of one school the medical report was very full and complete, and accompanied by an analysis of the water. That analysis concludes as follows: "The water was acid to litmus paper, the acidity amounting to 0·28 grains per gallon, if estimated as sulphuric acid. The water contains lead, no doubt taken up by the acid present, the amount being 0·09 grains per gallon." The teeth of these poor charity school children taken in the two triennial periods, X. to XII., and XIII. to XV., are quite as bad as the rich class, and decidedly worse than the average of their own class. The numbers are too small, it must be admitted, to make the percentages reliable; but, notwithstanding, one cannot dissociate the fact from the certified acidity of the water supply. Similar supplies exist, no doubt, in other schools, therefore it would be

interesting to acquire further statistics in this direction. The attention of examiners is therefore called to the importance of the character of the water supply, acidity, hardness, &c., as a part of the medical report in the case books.

Greater care should be taken in filling in the ages, as many charts have to be put aside as useless from the impossibility of classifying them. The examination of boys' teeth should never be in girls' case books, or *vice versa*, as it entails needless work in re-copying.

The Committee regret that their appeals for help and support in carrying on what must be admitted is a useful work do not meet with a more ready and more generous response from a larger number of the members of the Association.

H. Baldwin.
Geo. Cunningham.
W. B. Paterson.
R. Denison Pedley.
Sidney Spokes.

On a motion from the Chair the report was adopted.

By-Law XV.

Mr. Rees Price, Hon. Sec. of the Scottish Branch, brought forward, on behalf of that branch, an alteration of the By-Laws, of which notice had been given. By-Law XV. provides that—"The Representative Board shall consist of the President, President-Elect, and Vice-Presidents of the Association, and of at least 40 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." The proposed alteration was, "That the words, '*and the President, and the Hon. Secretary for the time being of each Branch of the Association*' be deleted from the By-Law, and the following words substituted:—'And two members from each Branch of the Association, who shall be elected at the Annual Meeting of the Branch they represent, and shall serve upon the Board for the ensuing year, and shall be eligible for annual re-election.'" He said the suggested alteration was passed practically unanimously at the Annual Meeting of the Branch. In the old days nominations for the Representative Board were made at Annual Meetings, and were then voted upon; but some three or four years ago an

alteration was made by which ballot papers were sent out, and last year that was confirmed into a By-Law. The result was that the nominations of the Branches in many instances had practically no effect. A Branch, in making a nomination, of course, did so with the knowledge that its nominee was the most desirable man as far as the Branch was concerned ; but members living in other parts of the country perhaps knew nothing of him, and he was not elected. The result was, that for one year the whole Scottish Branch was without a direct representative on the Board at all, simply because its nominated members were not fortunate enough to be selected by the ballot. The Scottish Branch, in bringing forward the suggestion, had no wish to unduly press the matter. It had been suggested that time might be saved if the proposed alteration was sent to the Branches for their consideration, and that the matter should be reported at the next annual meeting. In that way they would possibly obtain the views of the members on the matter. He moved, however, the resolution as it stood on the agenda paper.

Mr. J. S. Amoore seconded the motion.

Mr. Matthews moved as an amendent, "That the question be referred to the Branches for their consideration and report."

Mr. Rencham seconded.

Mr. George Cunningham appealed to the members not to pass such an amendment in an hurry. He was in favour of remitting the question and of taking the opinion of the Branches, but he thought it should be done through the Representative Board, and he thought the better plan would be to remit to the Representative Board not only By-Law XV. but all the other by-laws bearing upon the question, and that the Board should invite the opinion of the Branches, to be given within a definite time. If the Branches failed to return their opinion by, say January or March next, then the Board itself should draw up a report with such amendments as they thought necessary, and bring it forward at the next Annual Meeting. He moved, as a second amendment, "That By-Law XV. and the other By-Laws concerned be remitted to the Representative Board, who, after eliciting an expression of opinion from each Branch, should draw up such alterations in the By-Law as might seem necessary."

Mr. Cocker seconded the amendment.

The PRESIDENT said they had a resolution before them and two amendments. He would put the two amendments one against the other, whether the matter should be remitted *simpliciter* to the various Branches, or should be sent first to the Representative Board for them to consult the Branches and report.

Mr. CUNNINGHAM'S amendment was then put and carried by 24 votes to 3.

ELECTIONS TO THE REPRESENTATIVE BOARD.

THE PRESIDENT reported that, as the result of the ballot, the following gentlemen had been elected to the Board: — Messrs. C. S. Tomes, W. H. Woodruff, L. T. Browne-Mason; Frank Harrison, Amos Kirby, J. S. Amoore, C. Rees Price, A. Hopewell Smith, J. A. Biggs, and Alexander Kirby.

On the motion of Mr. Campbell, seconded by Mr. Headridge, the Committee of Literary Referees were reappointed.

At the Afternoon Session a lecture demonstration on "Electric Energy and its Application to Dental Surgery," by Herbert B. Ezard, Esq., L.D.S., Edinburgh, and W. Bryson, Esq., M.I.E.E., F.R.S., Glasgow, the object being to show in a simple manner the many conveniences to be derived from the adoption of electric energy in the workshop and operating room. The lecturer remarked that as he had only a limited time at his disposal, he could not read the whole of the paper as prepared, but as it was to be published in book form the members would thus have an opportunity of reading it in detail.

The principal points touched on in the paper were the following: 1. Primary Batteries. 2. Storage Cells. 3. Gas or oil Motor or Dynamo. 4. Corporation supply mains known as the street current.

Primary Batteries. The lecturers referred to the Daniel, Grove, Bunsen and Poggendorf Batteries. Referring to experiments made, he recommended his modification of the Poggendorf as the best, one of its many advantages being that it was free from obnoxious fumes.

Storage Cells. The lecturers recommended the 7 plate L type Electric Plant Supply Company's, in teak and lead lined boxes, and remarked that in connection with their use not more that 75 %

of the charge should be taken out of them, as it was apt to damage the cells. The cells must be recharged from a dynamo or by a primary battery, but the lecturers did not recommend the latter, as it would be more economical to employ primary batteries direct without the intervention of the cells.

The electric energy could also be obtained by the employment of a simple gas engine and dynamo, by means of which the motor, mallet, mouth lamp, etc., could be worked direct from the dynamo without the intervention of storage cells. "The Gardner Power Plant," exhibited by the Dental Manufacturing Company, seemed an ideal one for the dental surgeon's requirements, as it was practically self-working and self-governing. "The Gardner Power Plant" did all that the makers claimed for it. The nominal power of the dynamo was 10 volts at 10 amperes, but it actually developed 11.5 to 12 volts. At the same time there was ample power in the engine for running workroom lathes, etc., the primary cost was insignificant, and no electrical knowledge was required for working it. The consumption of gas at full load as tested by the lecturers was from 18 to 20 cubic feet per hour. For an ordinary working day of ten hours the cost would not be more than 6d. This was a small matter for the professional man, when one considered that it enabled the operator to perform his delicate operations with little or none of the fatigue associated with the ordinary foot gear.

Electric Energy from Mains. In large cities the lighting was gradually being done by electric current. Where it was possible to get this as a continuous current, the average cost of ten hours' working was about 6d., but this of course varied a little in different towns.

During and after the reading of the paper, Mr. Bryson showed motors, etc., at work from each of the currents described.

Mr. EZARD subsequently exhibited his modification of the Poggendorf battery and the "Gardner Power Plant" at work at his residence to many members of the association.

The thanks of the Association were given to the authors for their lecture and demonstration.

On the resumption of the meeting in the University, Mr. R. P. Lennox, of Cambridge, read a communication "On a method of obtaining a plaster model as good as the mouth, with the view of crowning one or more of the anterior teeth." The reader said that

the crown of the tooth was first removed by the saw, and, the pulp having been removed, the margin of the root scaled, the root-face was trimmed to a convex form by cutting down the edges all round, and the canal was opened up for the post. At that point it was found most convenient to take the depth of the canal with a post and slide, which could then be laid aside for after use. An impression was then taken ; and a small cap was filled with composition, a post passed through the middle, and cooled. Then the surface, which had been shaped into a mound about the post, was heated, and it was applied to the root-face, first passing the post into the canal. The effect of the cap and of the mounded form of the composition was to force away the gum from the root-face and give a sharp impression inside the cap, which might be almost instantly cooled by means of a syringe full of cold water. The cap and post was then removed, the composition outside the cap trimmed off, the post and cap replaced on the root, and, the neighbouring teeth having been wetted, an impression was taken with a tray, with a slot running round the bottom at its outer edges. In doing that, the post was made to strike the centre of the composition, and was directed towards the front of the tray, which guided it through the slot. The impression was then cooled with a syringe as before, and the post and impression removed. The cap was found sitting in the impression, the edge of the metal only being visible. In casting the model, the post was replaced and fixed with wax applied to the tray, there being fitted on the end of the post which was to enter the cast, a short, roughened copper tube with an open seam. When the model was cast and the post withdrawn, the tube was left behind in the model, and formed an indestructible root-canal. The model was dried and dipped in stearine.

Mr. Hern asked whether Mr. Lennox did not think he would get a better model with gutta percha than by the use of composition.

Mr. Lennox said he had always found good results from the use of composition ; but if he wanted something that would perhaps inflict a little pain upon the patient, he might use sealing wax, which would give a better impression even than gutta percha.

Chloroform in Dental Surgery.

Dr. Frederick Hewitt, Anæsthetist to the London Hospital, read a communication entitled "An enquiry concerning the safety

and sphere of applicability of Chloroform in Dental Surgery." The author stated that he had endeavoured to obtain particulars of every fatality which had occurred in Great Britain during the past fifteen years (1880-1894 inclusive), in connection with the use of general anæsthetics for dental operations. He had limited his enquiry to this period, partly because he had himself been collecting statistical information during those years, and partly because by dealing only with a comparatively recent period he had been able to place himself in communication with those concerned in the cases, and thus to greatly augment the published accounts. The author presented a table of deaths in connection with general anæsthetics administered for dental operations in Great Britain from 1880 to 1891, which showed that out of a total of 37 deaths, 27 occurred from Chloroform, 2 from "Methylene," 1 from Ether, and 5 from Nitrous Oxide gas. A special analysis was made of the chloroform fatalities in another table, and as those fatalities were so numerous, the author contended that the time had come for the expression of some authoritative statement, such as that which he hoped would be expressed by the British Dental Association, as to the proper sphere of applicability of chloroform in dental surgery. In summing up the evidence against chloroform, he urged that in the interests of the public and of the medical and dental professions it should only be used in the most exceptional cases. The safest anæsthetic should be employed for each particular case ; nitrous oxide for short operations ; ether for long ones ; and chloroform only when the state of the patient was such that ether could not be given. The chief reason why ether was not more widely used was that there was a want of proper instruction in ether giving. The surroundings in dental operations, so far as chloroform was concerned, were not nearly so favourable as in ordinary surgical cases. The postures which were the most convenient to the dental surgeon were the very worst from the anæsthetist's point of view. In addition, there was a point of extreme importance, viz. : that as the operation of tooth extraction under general anæsthetics often involved some asphyxial condition, either from posture, the presence of blood, the effects of the anæsthetic itself, or other causes, chloroform was contra-indicated, owing to the liability of the circulation of a chloroformed patient to rapidly fail in the presence of any asphyxial state. That was not so with nitrous oxide or ether. The following are the chief points to which, the

author submits, attention should be paid in the administration of chloroform for dental operations :—

1. Seeing that there is a liability when chloroform is used in dental operations for undetected embarrassment of breathing to arise, it is of paramount importance that the administrator should make *absolutely certain, from the commencement of the administration till consciousness is restored*, that air is entering and leaving the ches . Mechanical obstruction within the air-tract, from the numerous causes which are fully discussed, is very prone to arise ; and unless the administrator actually hears or feels throughout the administration that breathing is proceeding, he will be very liable to be misled.

2. The administration should be conducted with the patient in the dorsal posture, the head and shoulders being so adjusted by pillows that the head is neither flexed nor extended.

3. Owing to the fact that breathing is liable to become interfered with by either extending or flexing the head upon the trunk (a point to which the author wishes to direct special attention), an attempt should be made to keep the head as far as possible in the longitudinal axis of the body. Should it become necessary to throw the head well back, this should be done when the patient is properly under the anæsthetic, care being taken whilst this extension is present that no blood or extracted teeth gravitate towards the now insensitive and open larynx.

4. Care should be taken during operations upon the lower jaw, or when employing a mouth-gag or prop, that the depression of the lower jaw does not interfere with breathing by causing the tongue to meet the pharyngeal wall.

5. Intercurrent asphyxia from the causes which are given is far more likely to arise during light than during deep anæsthesia, so that the administrator should be on the alert for it just as the patient is entering and leaving the latter state.

6. The patient should be placed deeply under chloroform before any operation is begun. Should any signs of recovery manifest themselves before the operation is completed, care should be taken in re-applying the chloroform ; the patient's head should be turned to one side, a free air-way maintained by means of a gag, and from this point onwards only a moderately deep anæsthesia should be kept up.

7. Patients with naso-pharyngeal adenoid growths, enlarged tonsils, or nasal polypi, should be anæsthetised with special care, owing to the greater tendency to become asphyxiated which such patients naturally display.

8. At the conclusion of the operation the patient should at once be turned upon his side, a Mason's gag being placed between his jaws till consciousness is restored. The side posture allows all blood to drain from the mouth and fauces, the tongue to gravitate towards the cheek, and, by reason of the free respiration thus established, chloroform to readily escape from the circulation.

At the conclusion of the reading of the paper, the discussion was adjourned until the following day.

Conversazione.

In the evening the Lord Provost, Magistrates, and Town Council of Edinburgh gave a Conversazione in the City Chambers, on the occasion of the visit of the Association. The invitations issued by the Corporation were very largely responded to, and the Municipal Buildings, which were tastefully decked with flowers and plants, presented a very brilliant appearance. The guests as they arrived were received in the Council Chamber by Lord Provost Macdonald, who was supported by a number of City officials. The Corporation Museum was opened for the inspection of the company, and interesting information was given by the custodians as to notable articles in the collection. Ample accommodation was afforded for the very large party who assembled, and after the reception a selection of music was given in the Council Chamber by Mr. Dan Mann's Orchestra, and also by Mr. Moonie's male voice choir. Refreshments were served during the evening.

Friday.

The Benevolent Fund.

Mr. Samuel Leigh-Rymer, J.P., of Croydon, presided over a meeting of subscribers to the Dental Benevolent Fund. He explained that in the absence of Mr. Alfred Woodhouse, the Treasurer, who was in Switzerland, they had no formal report before them ; but it was understood that the funds, a statement of

which up to Christmas had been published in the Journal, were in a satisfactory condition.

The Hon. Secretary (Mr. John Ackery) submitted the Twelfth Report of the Committee of Management, covering a period of 15 months, from which it appeared that the number of contributors had considerably increased, partly due to the circulation of an appeal addressed to non-subscribing members, of whom some 60 had contributed, and with few exceptions become annual subscribers.

The Chairman, in moving the adoption of the Report, spoke of its satisfactory character, as showing that a very considerable amount of practical good had been done with—comparatively speaking—small means, and there was no doubt that the money entrusted to the Committee was administered with the utmost possible care and discrimination. It was satisfactory to find that the very small percentage of subscribers to the members of the Association had been materially augmented. Annual subscribers were, of course, the mainstay of such a society. The Report did not state to whom the increased number of subscribers was mostly due; but it was mainly due to the honorary secretary that the fund was in its present satisfactory condition. He was sure all present would agree that it was their duty to do their utmost to increase the number of subscribers to a fund which was really doing such a large amount of good amongst the poorer and destitute members of the profession, their widows and orphans.

Mr. Bacon seconded the motion, which was agreed to.

On the motion of the Chairman, seconded by Mr. Betts, Mr. Alfred Woodhouse was re-elected Treasurer of the Fund.

Mr. J. Ackery was re-elected Honorary Secretary, and the vacancy on the Committee caused by the retirement of Mr. Lloyd Williams was filled up by the election of Mr. S. J. Hutchinson.

Mr. Ash and Mr. Storer-Bennett were re-elected Auditors, and on the motion of Mr. Lawrence Read seconded by Mr. J. F. Colyer, Mr. Robbins was elected Auditor in the place of Mr. Mathieson, who had resigned.

On the motion or Mr. Waite, seconded by Mr. M. E. Harding, a vote of thanks was given to the officers for their labours during the past year.

Mr. J. Ackery, in responding, wished to thank the members for his re-election as Secretary. He said he took an immense amount of

interest in the work and would be very sorry to leave it, as he did not consider it complete. He wished to call attention to a paragraph in the Report referring to the effect of personal effort. Two or three of the London men had materially helped matters forward by getting additional annual subscribers, but they could not very well get at the countrymen. He hoped to be able to arrange some sort of scheme by which local agents would be appointed in different centres, for that was the only way in which the number of subscribers could be materially increased. He should not be satisfied until at least half of the members had become annual subscribers, and what he asked was the help of members in different centres to assist in getting subscribers and so augmenting the usefulness of the Fund.

After some general conversation on the subject,

The CHAIRMAN said the suggestion was a most valuable one, and the Committee would certainly take it into serious consideration with a view of appointing representatives throughout the country.

On the motion of Mr. Bowman MacLeod, seconded by Mr. Lawrence Read, a hearty vote of thanks was accorded to the Chairman.

DEMONSTRATIONS.

During the morning a series of demonstrations were given at the Dental Hospital. These included Gold Filling with the Electric Mallet, the cavity being prepared by means of the Suspension Engine driven by a new Reversible Electric Motor. Mounting a Logan Crown, by Leslie Fraser, L.D.S.Edin., Inverness. Crystal Mat Gold, by H. B. Ezard, L.D.S.Edin., Edinburgh. Root Filling with Oxychloride of Zinc, by J. Stirling, L.D.S.Eng., London. Further Developments in Continuous Gum Work, by H. Rose, L.D.S.Eng., London. Continuous Gum and Furnace, by J. H. Gartrell, Penzance. Glass Inlays, by W. H. Williamson, M.D., and Mr. Aber, L.D.S.Edin., D. D. S. Phil. Aberdeen. Dr. Williamson (Aberdeen), inserted a glass filling in a right lower canine, the cavity being a large labial one, extending up under the gum. He did not consider it a suitable case for glass filling, considering this method most suitable for small or medium cavities clear of the gum. A

spray of ethyl chloride was used to deaden the sensibility before using the engine, and also before removing the overhanging gum, for which latter purpose, however, he considered ethylete of soduim the best means for that end. The matrix having been formed from No. 60 gold and platinum foil, it was tacked on by a little of the glass material to a loop of platinum wire, as being more convenient for handling than the small tweezers generally used. The inlay was fused in a spirit flame, and the final fusing assisted by the blow-pipe. Fossiline of creamy consistence was used for the final insertion. Porcelain Inlay Cutting, by W. Dall, L.D.S.Glas., Glasgow. Seamless Crowns (method of making), by I. Renshaw, L.D.S.I. Rochdale. Richmond Crowns (simple method of making), by Vernon Knowles, L.D.S.Eng., Reading. Newland-Pedley Crowns by M. F. Hopson, L.D.S.Eng., London. Mode of Flasking with Brasses, by A. Wilson, L.D.S.Edin., Edinburgh. Exhibition of specimens of Mechanical Work done by pupils at the Institute of Dental Technology, London, by the Principal. Plaster impressions with Special Trays, and, Method of Tooth Extraction in the Extended Position, by G. Brunton, Leeds. A Lantern Demonstration by W. Dall, L.D.S.Glas., Glasgow. 1st. Mr. Dall demonstrated the use of his right and obtuse angle mechanical mallets in gold filling on a pocket phantom. 2nd. The use of his silver cylinders, which he annealed before using, for removing the excess of mercury from amalgam fillings. 3rd. The making of a porcelain incisor tip from a plate molar tooth which was made in seven minutes, the making true and reducing of round inlay rods, and cutting inlays from them with a No. 2, $\frac{7}{8}$-inch S. S. White diamond disc, revolved at great speed, showing plainly that the disc so revolved, with little or no pressure, cut so much better than a disc used slowly and pressed to its work, and that the edges of the inlays while being cut were not so apt to be chipped. In addition to his demonstrations he exhibited inlays, specimens of inlay work, ancient and modern and large model teeth having detachable parts, all of which were greatly admired.

Mr. Ezard gave a demonstration with mat gold, filling a lower molar left (nearly the whole of crown) preparing and filling in three-quarters of an hour, crystal gold being used throughout. The result was a surface indistinguishable from that of foil, both as to surface and hardness. The gold was packed in with Dr. Husband's egg-

shaped pluggers, and surface condensers with the Bonwill electric mallet. As regards wear and tear in mastication, Mr. Ezard stated that he had found from experience that in three years' wear it was equal in every way to ordinary gold foil.

General Meeting.

At the afternoon General Meeting, held in the University, the President in the Chair, a discussion upon Dr. Hewitt's Paper, "The Applicability of Chloroform to Dental Surgery," was opened by

Dr. D. Wallace (Edinburgh), who said that the statistics Dr. Hewitt had laid before them were most startling from the chloroformist's point of view—so startling, indeed, that one felt they were extremely difficult to combat. At the same time he thought they were deficient in more particulars than one. In the first place, they did not know the relative number of administrations of ether and chloroform in the three arbitrary divisions formed, and they did not know the relative number of teeth extractions performed under general anæsthetics other than nitrous oxide. What was the proportion between chloroform and ether in the provinces? He must say he thought that, taken all over, chloroform would probably be administered more frequently than ether, except in large centres, where there existed special anæsthetists. If they took the Dental Hospital in Edinburgh, he understood that within recent years probably over 300 cases had been chloroformed, teeth extracted, and no accident had occurred. Not only did no accident occur, but cause for anxiety had not been present in more than a very small number of cases. What was done in the Dental Hospital was to a certain extent equivalent to what was done by the anæsthetists in London. Taken all over, it seemed to be granted, according to present statistics, that ether was safer than chloroform, and he contended that all cases were ether was inadmissible, when chloroform had been given, if an accident occurred, that accident should be excluded from their statistics. Further, he held that mal-administration was much less probable with ether than with chloroform, as the former was given by special anæsthetists as a rule, while chloroform was given by all and sundry. Light anæsthesia was a state in which no operation should be attempted. His second

point was as to the relative convenience of ether and chloroform in surgery, particularly dental surgery. Before ether could displace chloroform as a routine and anæsthetic they must be sure that the method of its administration was thoroughly mastered. In his opinion, the convenience of chloroform was greater than the convenience of ether. An almcst insurmountable difficulty in connection with the administration of ether as a routine anæsthetic in general or in dental surgery, was that it could not be given by one who had not special skill in the practice of its administration. Ether had apparently a broader workable area than chloroform, and it was for the unskilled administrator theoretically safe, but in general use the convenience of chloroform counterbalanced this theoretical safety. Why was it that they had accidents occurring every now and then with chloroform ? He believed that the very discussions which had been raised on the subject had tended to produce these accidents. A form of terror had been engendered in the minds of the public, and the terror had reacted upon medical men, and it was a common thing nowadays to see a man who previously would give chloroform without any special anxiety, terrified to give it, and thus they were led into the great risk of giving too little chloroform. The method of administration differed enormously. According to the school of Lyme and Limpson, one thing only was to be observed, namely, the respiration. By others it was thought that not only was the respiration to be considered, but that the pulse was to be felt, the pupil observed, and so on. Dr. Wallace held that feeling the pulse, quite apart from distracting the administrator from the respiration, was a source of danger in itself. Chloroform might give rise to sickness, and associated with sickness there was faintness. The indication of this was partly the appearance of the face, and partly the condition of the pulse. The administrator who trusted to the pulse, feeling the pulse week, became alarmed, withdrew the cloth and waited. That was doing a very wrong thing. So long as the respiration was going on unhampered, so long as the breath was passing easily, then the pulse being weak, more chloroform should be administered. As chloroform was administered the pulse became stronger, and the patient passed into a condition of security and safety. His two points were to see that the patient was absolutely in a recumbent posture, that nothing could interfere with free respiration ; and let the operator guide

himself solely by the effect of the chloroform and not by the quantity used, and the guide to that was, as far as safety was concerned, free respiration.

Mr. J. Smith-Turner asked that the discussion should be limited as far as possible to the use of anæsthetics in dental operations. He said they had been listening to a discussion on the various merits of chloroform and ether in surgery. What they wanted to know was something about their merits in reference to dental operations.

Mr. J. F. Colyer said as dentists their duty was to consider what was the most reliable, and certainly what was the safest anæsthetic to give to the patient. The first question was did any conditions arise in which it was needful to give chloroform. His reply to that, from the experience of a good many years at the Dental Hospital, was that during the whole of that time they never had a single case in which the administration of chloroform was necessary. In his own practice he had never found it necessary, and the only conditions in which it would be needful to give chloroform would be in prolonged operations such as the extraction of a large number of teeth, or the difficult extraction of an impacted wisdom tooth. From his own point of view, the last operation was the only one in which it was justifiable to give chloroform, for it was very doubtful whether wholesale operations, such as the extraction of 13 or 14 teeth at one operation, were really called for in the routine work of dental surgery. Statistics overwhelmingly proved that chloroform was a very much more dangerous drug than ether or gas. It might be argued that the dangers of chloroform were due to its careless administration ; but nitrous oxide in the routine work of dental surgery was given equally carelessly—in fact, the chances were that it would be given more carelessly than chloroform. Within the last two years there had been two deaths recorded from nitrous oxide, both of which might have been saved by timely tracheotomy, whereas during that period they had to record something like five or six deaths from chloroform. The statistics showed that they were certainly not justified in giving patients chloroform. He had got, rather, to this stage, that if a patient was to persuade him to give him chloroform, and that patient should die under it, he should feel responsible for having caused the death. Although it might be said that there had been three or four thousand

successful administrations, still one did not know whether the next administration would not mean death. With nitrous oxide that was not the case. They had a safe anæsthetic to hand, and, therefore he thought they were not justified as dental surgeons in giving chloroform.

Mr. CUNNINGHAM said he did not wish to discuss the merits of ether or chloroform ; but what he wished to call attention to was the large number of practices going on and daily increasing, in which, thanks to their schools, major operations in dental surgery were not required. The result was that when appealed to by anæsthetists for details of cases some of them had been very glad to find, even when furnishing statistics with regard to nitrous oxide, that their administrations for extreme cases had diminished to such an extent that their records were worth nothing to the anæsthetical statistician.

Mr. DENT said that in country practices it was found necessary occasionally to remove a number of bad stumps. Cases were constantly sent to them by doctors in which patients were suffering so much from indigestion that it was necessary to remove the offending stumps. This might not be so much met with in city practice, and it was very often the case that the country doctors could not give ether. Dr. Hewitt's suggestion that the administration of ether should be taught more thoroughly in the Schools was therefore very important.

Mr. FISK said that in country practices it was sometimes necessary to remove four or five roots at one sitting, in order to save expense. He preferred himself in such cases a mixture of nitrous oxide gas, and ether ; but the question was where were they to get the men to give it. General practitioners could not be relied upon for the purpose, and there were very few who were specialists on this subject. Although he strongly preferred gas and ether to chloroform, the difficulty was in getting men in the rural districts who were capable of administering it.

DR. WILLIAMSON (Aberdeen) said : The paper, although extremely interesting to dentists, was addressed to a body who practically had very little to say in the choice of anæsthetics, because as to the use of chloroform in dental surgery they were pretty much bound down by the medical adviser. Practically in Aberdeen there was only one man who gave ether as a rule. Statistics were very doubtful in regard to the presence of fatality in such operations, and within the

memory of three or four of the oldest practitioners in his city there had been no case of fatality in twenty-five to thirty years. He believed that most deaths occurred from chloroform when it was administered by house surgeons, who were generally juniors promoted from senior students. In Dr. Hewitt's book, published in 1893, a table was given of 210 cases. They did not show a special fatality in dental operations in the use of chloroform : there were several ether operations equally fatal. The fact was, that in Scotland they were confined practically to the medical men, and for that reason they were confined to chloroform.

Dr. HEWITT, in reply, said his facts had not been attacked. He had brought forward a certain work, humble as it was, but the gentlemen who had spoken had not confined themselves to the facts before the meeting. He had not met with any personal bias; he had simply brought forward certain facts for Scotland to explain, but the representatives of that country had not explained those facts. When Dr. Wallace found it necessary to go to other countries, and to quote the opinions of some obscure people in order to reply to definite statements brought forward, that was simply due to weakness and not to strength. Statistics were admittedly liable to all sorts of interpretations. He had not compared the number of ether fatalities with the number of chloroform fatalities. He simply stated that there were a far larger number of recorded fatalities in Scotland than any other parts of Great Britain, taking all anæsthetics generally ; and he wished to know how it was that these fatalities had occurred. They did not want to know anything about the use of chloroform in other directions than dental operations. One could quite understand that there were a large number of cases in which some anæsthetic other than nitrous oxide must absolutely be used, and it was for such cases that they wished to ascertain which was the safest anæsthetic. A poor ignorant patient coming to a dentist had not the opportunity of making himself familiar with well known facts as to safety; he wished to return home to his family. The dental practitioner had his practice to look to, and he was the representative of the whole of the dental profession. The gentleman who administered the anæsthetic was, or should be, the representative of the medical profession, and between them they should be responsible for the safety of the patient, and to give the patient the very best opportunity of joining his family at home that could possibly be

afforded. He would assert that any gentleman who gave chloroform for the removal of a tooth was not giving the patient the opportunity which he deserved of joining his family. They were bound to respect that side of the question, and if ether was shown to be the safer anæsthetic—and Dr. Wallace admitted that it was—then they should educate their doctors in its administration, so that they should not be in the unfortunate position of saying that they could not give gas or ether, but that they would give chloroform. It appeared as if a great many people fell back upon chloroform simply because it was extremely easy to administer and pleasant to the patient. If those were points to be considered before the safety of the patient, then the sooner they ceased to pose as a life-saving profession the better. The very first fact of Dr. Wallace attributing the success which had attended the use of ether to the presence of skilled anæsthetists, was itself a very considerable argument in favour of the introduction into Scotland of a system which had been found to work so well in England, and what was really required at all hospitals was the presence of a properly qualified gentleman, accustomed to give anæsthetics, and with regard to smaller towns that they should have doctors who had been thoroughly instructed in the use of nitrous oxide and ether. In fact, where there were dental hospitals, it should be possible—and he hoped they would one day see it in London—for instruction to be given to outside practitioners in the use of nitrous oxide, so that when they went into practice they might be thoroughly competent to administer that anæsthetic. He had not come prepared to enter into the question of the relative merits of anæsthetics in general; he simply wished to draw attention to certain facts in connection with the use of anæsthetics in dental surgery. He believed that his facts had not been properly answered. Without any personal feeling towards anyone, he thought that the dental profession, considering its enlightened condition and the strides it had made in recent years, should in some way or other have definite rules laid down for the guidance of those entering into practice in the use of anæsthetics, and he hoped as somewhat the outcome of that discussion that that object would be accomplished.

Amalgams.

Mr. C. Robbins, L.D.S.Eng., in a paper on "Amalgams in Everyday Practice," contended that the use of amalgam as a stopping

was an absolute necessity in general practice, if the best possible was to be done for the patients under all and varying conditions. He considered that the teaching of students in the use of amalgams in dental schools should be as full and complete as in the case of gold, and complained of the haste and want of care in cavity preparation for amalgams, and of the lack of after polish, which he believed to be common faults in the majority of cases of amalgam filling. The combinations of amalgams with other materials was also dealt with and the question of amalgam and amalgam workers generally reviewed.

Mr. Geo. Cunningham said from his experience of their schools and hospitals, it was simply shameful the way in which the matter of amalgam filling was carried out. He belonged to a school where he had the honour of teaching the young men in operative dental surgery, but they had not the means in that school of having it carried out. With regard to the practical point of amalgams Mr. Tomes referred in his address to Professor Black's important papers in the *Cosmos* and it would be unfair to the meeting to pass away without expressing their value of the work of the Grand Old Man of America. Dr. Black has been criticised for not being cognisant of what had been done in this country, and especially of the splendid work done by Mr. Amos Kirby. It was there laid down as something extraordinary that amalgams, after they were put in, went on changing, and they recorded the changes for a few days. He (Mr. Cunningham) had the privilege of making a pilgrimage to Bedford, and he there found that it was not six days, nor yet six months, nor they might almost say six years that would end the change that took place. It was extremely interesting to find one amongst them who had done such valuable work, not only scientifically, but practically. Mr. Kirby had worked out his methods, and the results had been published in the Journal, but how many used these materials and appliances in practice. He (Mr. Cunningham) had not only used it in his practice, but had tried to teach it in the school.

Mr. Brunton said he had tried a good many experiments with moisture-tight amalgam, subjecting them to the test, and had brought specimens showing in many cases a considerable amount of shrinkage. He had only been able to find one moisture-tight amalgam.

Mr. Robbins, in reply, said he was not a scientific man, and had no great discovery to record. He had felt, however, for some time

past that the time had come when some encouragement should be given to the younger men to use this most valuable and humane filling. He had read with great interest the splendid work recorded in the *Cosmos* by Dr. Black, but had not referred to it in his paper.

Mr. W. Hern, M.R.C.S., L.D.S.Eng., read a paper on "Oral Hygiene." In his paper he reviewed the general conditions pertaining to the oral cavity—bacteriological and chemical. He then dealt with various directly preventative measures and spoke of tooth brushes, their size, shape, etc., when and how to use them, tooth powders and pastes, ingredients, mouth washes, tooth picks, floss silk, etc. Mouth washes he characterised as sometimes useful, but said they could not be regarded as substitutes for careful mechanical cleansing. In proportion as the brush was efficiently used so would the mouth wash become uncalled for. He referred to some indirect precautionary measures in daily work, indicating some of the local and general effects of the non-hygienic mouth. He said they should not be satisfied with the state of any mouth unless the surfaces of the teeth showed that the sweep of the tooth brush was regularly applied. He described the kind of brush he preferred, and said tooth powder should contain a scouring or polishing agent such as prepared chalk, an antiseptic, as carbolic ; an antacid ; and a neutral agent such as castile soap.

Mr. John Wessler (Stockholm) said he agreed with Mr. Hern as to the importance of the tooth brush, and as to its being—if a good one—of more importance than any powder or mouth wash. A tooth brush to be "good" should be constituted on scientific principles. Being much interested in this question, he had made a special pattern of tooth brushes, samples of which had been placed on the table. They were manufactured by Kent & Co.

Mr. Naylor rather differed from the author, and would not like it to go forth to the public that the Association really endorsed all that he had advanced. With regard to the use of tape, floss silk and tooth picks, he (Mr. Naylor) thought them highly objectionable. The paper was interesting but a little bit elementary.

Mr. Campbell said : If there was one point more than another in the paper he would emphasize it would be the more frequent use of floss silk, as being the cheapest and best dentistry that could be got.

Mr. HERN, in reply, would like to ask Mr. Naylor why he objected to the use of floss silk. He would suggest, with all due deference, that his observations had not been correct and would like him to study a book like Miller "On the Fermentation of Food Between Teeth." With regard to Dr. Wessler, and the shape of the tooth brushes he had shown, they were fairly good. They appeared to have the defect that the hair at the point would not splay forward and so reach the buccal surfaces of the wisdom tooth and second molar. He regarded the tooth brush as more important than the mouth wash, and in proportion to the thorough and careful use of the tooth brush the mouth wash became unnecessary. He quite agreed with Mr. Campbell in his remarks in regard to floss silk, and thought the sooner they could lay down a law with regard to prevention the more successful would they be.

THE DENTIST AND THE STATE.

Mr. G. CUNNINGHAM, M.A., Cantab, L.D.S.Eng., in discussing the question "What the Dentist can do for the State," said the growth of the science of public health was one of the most notable features of our day. The *rôle* of the Dentist was not yet recognised, and even when they had an important, useful and intelligently directed Institution, such as the National Health Society, it was found that they even had not the intelligence to make use of the voluntary offer of the dentists to supply them with adequate knowledge. He referred to the latest book on personal hygiene, which was not half as good as the work written by Dr. Carpenter some twelve years ago on "School Hygiene," in which he laid it down as being quite as essential that a dental officer should be attached to every school as that there should be a medical officer. The British Dental Association's collective investigations conclusively proved the existence of much preventible disease, and if disease was preventible why was it not prevented? He proceeded to explain a graphic diagram of their tooth census, showing the increase of dental disease with age, and the necessity for early attention. In this matter he said that the State Medical Officer might be a valuable coadjutor, but that only a State Dental Officer could provide efficient dental service. Such appointments to be effective should of course be adequately remunerated. Children were brought up in schools where they were fed, clothed and educated, but it was rare to find a case in which a dentist was attached to the school. They did not want the old-

fashioned school appointments that used to exist, and he said this because he himself had suffered. As an old pupil of one of Edinburgh's grandest foundations he remembered well his first lesson in dentistry. They had a gentleman who died in the odour and sanctity of his profession, and who was paid by an Institution which had almost more money than it knew what to do with the munificent sum of £5 a year. The result might be imagined. It was the fact that honorary and under-paid school dentists were synonymous with unnecessary red letter days in the school calendar. Reasonably paid school dentists meant, or should mean, conservation rather than extraction of teeth. For the naval and military forces, the dentist could increase the available number of recruits, and also the efficiency of the man. What had been done in the navy? Thanks to the very valuable work done by Mr. W. B. Patterson, their Hon. Secretary, a qualified dental surgeon had been engaged for a period of one year to attend to the teeth of all the boys received on board the "Exmouth," at a salary of £100. The Captain Superintendent in his report stated that a decided improvement in the boys' appearance and freedom from toothache had resulted from the services of the dental surgeon, and in view of these facts, the Committee unanimously recommended that the services of the surgeon be retained for another year. In discussing the question as to whether nothing could be done for the recruits of the great industrial army, Mr. Cunningham urged that the statistics already collected were for practical purposes sufficiently convincing, although extension in certain directions was advisable.

It was necessary to instruct the state bodies and the public as to the facts, and as to the means for their alienation. He urged that the Representative Board should lay the matter before the Government, and pleaded for prosecuting, urgently and assiduously, the recognition by the State of dental services, by school appointments and otherwise, as a work of national importance.

A short communication on "Springs" was made by Mr. A. J. Coxon, L.D.S.I., Wisbech. In his paper, the author described a new method of attaching springs, so that they could readily be removed and reattached by the patient. He also described a bolt and swivel with a self-contained stop and a method of making smooth faced springs. He exhibited a new apparatus for making springs and a balance for testing their strength.

Dinner.

The Annual Dinner of the Association was held in the evening, at the Waterloo Hotel, when about 150 gentlemen were present. The chair was occupied by the President, Mr. W. Bowman McLeod. Mr. W. B. Paterson, Mr. G. M. P. Murray, and Mr. C. Rees Price, secretaries respectively for the English, Irish, and Scottish branches, acted as croupiers, whilst among the general company were Lord Provost M'Donald, Judge Colston, Rev. Dr. Blair, Col. Wauchope, C.B., Prof. Struthers, Dr. P. A. Young, and Brigade-Major Cranston.

After the usual loyal and patriotic toasts, Mr. G. Cunningham proposed "The Lord Provost and Magistrates of the City." The Lord Provost in acknowledging the toast spoke of the special pleasure of the Corporation in welcoming the members of a profession which did such useful and necessary work as the dental profession.

Dr. P. A. Young, in proposing "The British Dental Association," said the association was founded for the promotion of the dental and allied sciences, and the maintenance of the honour and interests of the dental profession. He had been very much struck in looking over the list of their members to see how many had taken University degrees. This must speak volumes for the high culture of their profession. Whilst they were paying attention to the upper ranks, they were also attempting by all the means in their power to advance the general level of the profession, and they had the assurance of those in authority that they were endeavouring as far as they could to carry out the Dental Act so that the general level of the profession would be *elevated*. This was done by moral suasion, or, if that would not suffice, then by stronger means. He hoped that by their efforts the profession would go on increasing, and would take that position which it so well deserved to occupy. He coupled with the toast the name of Mr. J. C. Turner, who, along with Sir John Tomes, was a pioneer in carrying out the Dental Act.

Mr. J. Smith-Turner, in responding, said the British Dental Association seemed to be vigorous, if he might judge from the assembly he saw around him on that occasion. This was its Fifteenth Annual Meeting; it must have cut its 12-year old molar, but it had not yet cut its wisdom teeth. By the time it had done so he hoped it would become something very grand indeed. Their Association, like the City of Edinburgh, aimed at progress through

education. If they looked back a few years at what the medical profession was when the first Medical Act was passed, about 46 years ago, and remembered that the Dentists Act was only of 16 years duration they might take credit to themselves for having made considerable progress. They must also give credit where it was due, and say that the medical profession had in many respects been their right hand, extending to them not only guidance and support but also generous sympathy. Referring to the enquiry taken up by the Association as to the condition of the teeth of school children, he said the appointment of dental surgeons to certain of those schools was a step that would work a great change in the national health if carried out in its entirety. The Association had also tried to induce the authorities to establish a supervision of the teeth of recruits for the army and navy. The navy had made some few steps forward in that direction, but the result was not at present satisfactory. The Association hoped to continue the work, and if people could only realize the number of recruits who were rejected, both in the army and navy, or of men on the sick list on account of defective teeth, they would at once see the value of the work that was being done. With regard to the strong arm of the law being used to prevent people practising on a too credulous public, and the blame which had been cast on the Association for not having taken more active measures against infringers of the Act, he said the Association was gathering together slowly but surely all the power that the Act gave them ; but that power had to be tested in its every phase. He complained that in the efforts hitherto made they had not been supported by the general public. The public was decidedly on the side of the quacks, and in proof of that he mentioned that their President, who instituted a prosecution against a notorious quack in that city, had his effigy burned before his own door by a large crowd because he had discharged a duty which he thought incumbent on him as a member of the Association. He had said that their efforts were educational ; they were extending their curriculum, making it and their examinations more stringent, and gradually they hoped to bring their profession up to the proper level it should occupy with the other learned professions, the medical in particular. They were also endeavouring to enforce the provisions of the Dental Act, not for their own protection, for as educated men they could do very well without

that, but for the protection of the British public. In the name of the British Dental Association he thanked their guests for the kind way in which the toast had been received.

Mr. Breward Neale proposed the toast of the Medical Council and University of Edinburgh. He said the fact that the College of Surgeons could not receive the Association on account of structural alterations rendered them the more indebted to the University which had so hospitably sheltered them. He referred also to the question of direct representation upon the General Medical Council, claiming that if 30,000 medical men were entitled to five representatives on the Council, the 5,000 or 6,000 dentists ought at least to have one.

Dr. Struthers, in responding, expressed himself as opposed to the principle of direct representation on the Medical Council. He believed the best men upon it were the Crown nominees: they were the House of Lords, while the direct representatives had to speak to the gallery. He would increase the Crown nominees, believing that a man like Sir John Simon, who for so many years represented the Crown, was worth all the Medical Council put together.

The toast of "The Guests" was proposed by Mr. Rees-Price, and responded to by General Boswell.

The toast of "The President" concluded the list.

During the evening, Mr. Bowman MacLeod held a reception in the Victoria Hall of Waterloo Hotel for the ladies attending the meeting.

On Saturday, about 350 ladies and gentlemen visited Loch Lomond, by special train and steamer, on the invitation of the Scottish Branch. Luncheon was provided at the Tarber Hotel, and after the luncheon the concluding meeting of the Association was held. Votes of thanks were passed to the Scottish Branch for their hospitality; also to the principal and members of the Senate of the Edinburgh University; to the Lord Provost and magistrates of Edinburgh for their official reception and special entertainment in the City Chambers; to the readers of papers and demonstrators; to the ladies' commmittee and Mrs. MacLeod, and to the local Hon. Secretaries.

There was an interesting exhibit by the various manufacturing firms of dental goods and instruments. Messrs. C. Ash and Sons had an interesting exhibit, amongst which was an improved Oil

Pump Chair of great range of movement, and the Dental Manufacturing Company showed the Gardner Power Plant, which consists of a $\frac{5}{8}$-horse-power gas engine and 10-volt dynamo complete on bed plate, and fitted with exhaust silencer. The engine is the most powerful of its size yet made. It is constructed upon the most modern principles, being provided with what is known as a "hit and miss governor," which regulates the consumption of gas proportionately to the load put upon the engine. Even at full load the gas consumed is only 18 cubic feet per hour. Taking the price of gas at 3s. per 1,000, the cost of running the plant for a day of eight hours is less than $5\frac{1}{2}$d. It requires no attention beyond oiling occasionally. The dynamo has a specially wound armature of low resistance, and gives a steady current. It has a very simple arrangement of brushes, giving absolutely no trouble in adjusting. It is intended that the plant should run continuously during working hours, so that the workroom and the operating room lathes can be turned by it. At the same time the Electric Motor, Electric Reflector, Electric Mouth Lamp, Mallet and Cautery, can be worked direct from the dynamo, thus doing away with the necessity for accumulators. They also showed some Swift Drilling Burs; the quickest and cleanest cutting bur yet introduced. Some Aseptic Joint Forceps, suggested by J. Sefton Sewill, Esq., and Dentine Screws for retaining stopping, as used by A. Bowman Smith, Esq. The advantage of these screws is that they are made in lengths of about 2 inches, so as to enable any length required to be cut off, and the remainder can be used again and again until the length has been used up. Each screw has a handle, which obviates the necessity of a screwdriver. Mirror with Clamp, suggested by J. J. H. Sanders, Esq. The object of this device is to free the hand of the operator, the mirror being clamped on to the Rubber Dam instead of being held in the hand; and an entirely new form of Hydraulic Press for striking up Plates.

We regret that the name of Mr. H. B. Ezard, L.D.S., was omitted from the list of Assistant Dental Surgeons of the Edinburgh Dental School, published in our Students' Supplement, p. 422.

Abstracts and Selections.

GLASS FILLINGS, JACKET CROWNS, AMALGAM, GOLD CAPS, BRIDGES, Etc.—A SCRAP OF THEIR HISTORY.

By William H. Trueman, Philadelphia.

"In cases where a cavity is in front of a cutting tooth, the amalgam stopping is objectionable from its metallic appearance; but, if a small piece of thin platina be cut so as to fit the mouth of this cavity, and on each side of this a few catching points be soldered, glass, the colour of the teeth, may be fused on one side, and the cavity being partly stopped with amalgam, the catching points on the side uncovered by the glass, are pressed into the amalgam firmly, in the course of an hour or two, the glazed platina becomes fixed by the hardening of the amalgam; this operation, if neatly performed, must give the greatest satisfaction to the patient. It is two years since the idea of trying the experiment suggested itself to me, since then I have often practised it, and I can say always satisfactorily.

"When teeth are very much decayed, discoloured, or have their enamel much injured or disfigured, caps of gold, platina or palladium may be stamped up to fit them with the greatest exactness; the fronts of these dental caps must be glazed, and they can then be worn with much benefit."

The above paragraphs are taken *verbatim et literatim* from a "Popular Treatise on the Structure, Diseases, and Treatment of the Human Teeth," by J. L. Murphy, published at London, England, in 1837, pages 200 and 201 (No. 1594, "Dental Bibliography," by C. Geo. Crowley). Of the glass used for this purpose, he says: "Glass of any colour may be bought in the cane ready for use. All dentists ought to be provided with some of various colours, as it is useful in many instances." He gives minute directions regarding the construction of suitable furnaces for baking porcelain teeth, and various formula for preparing bodies and enamel. On this point he says: "A good composition for teeth may be made of silex, two parts; potash, two parts; dry potter's clay, one part; these must be well beat up together so as to be perfectly mixed. They had better be put in a mortar, and having been beat up some time, water

may be added to form them into a paste; this, after being well ground in the mortar, is fit for use." Teeth made from this body were first baked, then coloured, then coated as thickly as possible on the fronts, and as thinly as possible on the backs, with a mixture of one part silex, and one and a half parts potash, carefully beat up with water into a paste the consistency of cream. After this had dried they were again placed in the oven and subjected to a fierce heat for about two or three hours, when "the potash and silex will be found to have melted into a good glaze."

This description, to those who are old enough, will recall the painted teeth of our old friend, Samuel Stockton, and his compeers; teeth that had to be held to the grindstone in a certain way to prevent the enamel surface chipping off; if in an unguarded moment this was neglected, the glaze was apt to chip, at times the entire face of the tooth would scale off, occasionally burying itself into the finger end, and calling forth sundry unsaintly ejaculations.

So far as I now recall, the author quoted is the earliest writer I have met with who speaks approvingly of amalgam, or gives directions for its preparation.* While few acknowledged its use, we have ample evidence that it was used by many; and that at an early date, early in the forties, if not before, tin, platinum, gold, etc., were added to the silver used in dental amalgam. Of amalgam, on page 104, he says, "I have for many years used an amalgam of silver, prepared in the following manner, and though there are objections against it, still, until something better is laid before the public, it will be found of a highly useful nature. The ingredients necessary for the cement are silver filings, thinnest silver leaf (to be had in small books), and quicksilver. A drop of quicksilver is poured out from the bottle into a small mortar, or if more convenient, on a cloth; on this is placed a leaf of silver from the book, which, being worked into the quicksilver, becomes speedily amalgamated with it, another leaf is then added, and so on until the amalgam is a thick paste; if there be too little quicksilver in this amalgam, the want will be made perceptible by its non-adhesion, and, on being worked between the fingers, by its crumbling. If, on the contrary, it possesses too much mercury, it will be too soft, and the mercury may easily be squeezed out."

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* "American Journal of the Dental Sciences," vol. ii., p. 155, September, 1841.

"When the amalgam is brought to a proper consistency, having just sufficient mercury to enable it to be used as a paste, a small quantity of silver filings should be mixed with it: these absorb a portion of the quicksilver, and hence there is insufficient mercury left to keep the silver in a soft state: thus, after the filings are introduced, the amalgam gradually hardens. Here, then, we are in possession of a cement which may be used in a soft cold state; yet, on being placed in the tooth, speedily hardens in the cavity."

In "The Parent's Dental Guide; a Treatise on the Diseases of the Teeth and Gums, from Infancy to Old Age," etc., by William Imrie, Surgeon-Dentist, London, 1834 (No. 1583, Crowley's "Dental Bibliography"), I find on page 105 the following in relation to gold caps:

"When the back teeth have become shortened, and do not touch their opponents in the opposite jaw, one or more of them on each side of either jaw, as may be found most suitable and convenient, should be covered with *gold caps*."

"Indentations should be formed on the grinding surface of the caps to correspond with those of the teeth; and for this purpose they require to be raised on a brass model of the grinders, a process well known to dentists of ability and skill."

"When only a few molar teeth remain in the mouth, although they may be extensively decayed, it is essential to preserve them for purposes of mastication, and also to prevent the front ones falling a sacrifice to undue pressure. For this purpose the decayed molars should be plugged and afterwards restored to their original dimensions by means of gold caps. This is an effectual way, and may be recommended to persons who have an antipathy to artificial teeth." In illustration he recites a case where "the whole of the double teeth on each side of the lower jaw" were covered with gold caps to relieve the upper front teeth of undue pressure and wear caused by a wearing down of the grinding surfaces of the molars. This case, so far as the cause, the described condition, treatment, and result is concerned, reads percisely as do many such cases related in the dental journals of the last few years.

William Imrie, in a footnote, quotes from Patterson Clark. I find the words quoted in "A New System of Treating the Human Teeth," by J. Patterson Clark, M.A., Dentist. My copy is of the second edition, London, 1830 (No. 1574, Crowley's "Dental

Bibliography"). The first edition was published in 1829. Mr. Clark, from page 162, to the end of the volume, page 199, gives many cases which resemble very closely the cap and bridge work of the present day. This portion of his book deserves careful study by those interested in the history of this department of prosthetic dentistry; indeed, as the book may be inaccessible to many, a reprint of these pages might be of much interest. We have no hesitation in saying after perusing them, that if the dental engine with its revolving' tools and grindstones, and the various cements now in general use, had been known and in as general use when J. Patterson Clark wrote, the bridge work of his time would, in all probability, have been as satisfactory as is that of to-day. The want of these modern helps undoubtedly caused it to become, for the time being, a lost art.

Throughout the book there is much a thoughtful dentist will read with keen interest if not with profit. Defining his position in the profession, Mr. Clark says (page 164), "In a metropolis like this, where the division of labour, while it cannot injure the individual, is attended with advantage to the public, the art of the dentist admits of several subdivisions. Presuming on this, the author has long restricted himself to one department, viz., Preserving the natural teeth, and with a degree of success fully commensurate with his expectations. These operations consist in scaling, that is, in freeing the teeth from extraneous matter, and brushing spongy gums into a healthy state; in examining from time to time, teeth that from their shape and situation, are liable to decay, and at the proper time cutting out the commencement of caries, and thereby preventing its further progress by the introduction of gold stoppings, by means of which a smooth even surface, incapable of retaining moisture long enough to rot in, is obtained, instead of the indentations where the caries commenced; in curing toothache and tender teeth; . . . relieving children from toothache, to prevent the premature extraction of shedding teeth; and after the teeth have been lost through accident, heedless extraction, or old age, in pointing out the most appropriate mode of supplying their place by artificial means, together with the person most likely to do it well."

Mr. Clark lays particular stress upon the importance of preserving in effective usefulness the back teeth, and pointedly calls

attention to the resulting ill effects not only of their loss, but also of their lost effectiveness when from caries or wear they become so shortened as to permit the anterior teeth to occlude too forcibly. In all such cases he recommends that the shortened teeth be covered with gold caps fitting the teeth, "as gloves fit the hands," building them up by soldering upon the masticating surfaces layer after layer of gold plate, or where much addition is required he prefers to rivet a block of ivory to the gold cap, carving it to represent the missing portion of the tooth. He insists that these caps, whether of gold or ivory, shall not be left smooth and flat on the mastication surfaces, but that they be carved to represent the hills and hollows of a natural tooth, and so conform to the occluding teeth that when the mouth is shut they "lock into each other as they formerly did into the surfaces of the natural teeth." Intervening spaces between capped teeth he recommends to be filled with properly carved blocks of ivory riveted to gold plate fitted to the gums between the teeth and made continuous with the gold caps. He recommends that those portions of the caps visible from the front be cut away, and remarks of one successful case, "no trace of gold or artificial teeth could be observed on a casual glance at the lady's mouth." He gives in detail a number of cases successfully treated by dentures that must have closely resembled the removable bridges of the present day, and claims for the method suggested that not only are the anterior teeth relieved from undue pressure so that teeth loosened from that cause have regained their former firmness, but, as the pressure of mastication is borne by the capped teeth, the gums being thus relieved, the dentures are worn with much more comfort and satisfaction.

The first case Mr. Clark cites he gives as the date when treatment was commenced "about the middle of the year 1828," and in a later work published at London, 1836 ("Teeth and Dentism"), most of his remarks upon this subject are repeated.

It may be well to state that these methods are not given by Mr. Clark as originating with himself. From the language used I infer that they were methods of which he approved, well known to the dental art. While bridges supported in various ways by pins, dowels, or collars are known to be very old, and are illustrated in works I have of an earlier date ("L'Art du Dentiste," par L. Laforgue, Paris, 1802 ; "Traité complet de l'Art du Dentiste," par

F. Maury, Paris, 1828, and others), these are the only references to the early use of gold caps for protecting carious teeth and supporting dentures I have so far met with, probably a more careful and extended search might bring others to light. Jobson ("A Treatise on the Anatomy and Physiology of the Teeth," by David Wemyss Jobson, M.R.C.S.E., reprint, Baltimore, 1844), refers to their use in connection with plates and obturators, pages 112 and 118, paragraphs 121 and 122.—*Internationale.*

THE CLASSIFICATION OF SO-CALLED GREEN-STAIN.

By W. C. Barrett, M.D., D.D.S., Buffalo, N. Y.

Probably fifty per cent. of the teeth that fall under the observation of the dentist are affected by some form of pigmentation. Dentists have speculated upon it ever since there was a dental profession ; but until the time of Miller there never was, so far as I know, any such series of scientifically conducted experiments to positively determine its nature and character as could be accepted as definite. I cannot but believe that he has permanently settled the question of the etiology of this appearance in the memorable article appearing in the *Dental Cosmos* for April, 1894.

When Dr. Miller was at my house, he had with him a large number of teeth exhibiting the stain, some of it green, some brown, some red, with the varying intermediate shades. There were the teeth of children and of adults at different ages. There were a few cases in which, beneath the stain, was found eroded enamel, and there were many instances in which no sign of defalcification existed under it. There was indisputable stain upon decayed tissue, and it dropped into and followed the depressions of furrowed enamel ; but in no instance, so far as I could observe, did it appear other than as a distinctly superficial deposit. We removed the enamel-cuticle, or Nasmyth's membrane, from teeth upon which there was a marked pigmentary deposit, and in every instance the stain came with it, leaving the tissue beneath it clear, white, and unmarked. This was the case in instances of furrowed enamel, in teeth with eroded enamel, and in those in which the enamel seemed comparatively perfect. Let me say, however, that teeth whose enamel is uneroded, smooth, and polished are less frequently affected by stain, for the same reason that salivary and other deposits are not likely to be found on polished surfaces. It requires depressions, either minute or more defined, to afford lodging-places for the initial deposits, and hence eroded enamel is more predisposed to pigmentation than that which is perfect.

For purposes of classification, I shall make no distinction between the green, the blue, the black, the brown, or the red stain, or their intermediate shades. Clinically they are the same, and they have the same generic origin. If they are metallic in their source, the

colour depends upon the metal whose compounds form the stain. If they are due to bacteria, it depends upon the nature of the chromogenic organisms. Hence, no distinction will be made, except as indicating the origin of the discolouration.

Mineral Sources.—As one important factor, I will mention the metallic deposits that we frequently find upon the teeth—usually the incisors—of workers in copper, bronze, brass, iron, mercury, lead, nickel, and silver. This has all been pointed out by the authority that I have mentioned, and he also refers to the fact that trumpeters often show a discolouration brought about by the contact of the teeth with the brass mouth-piece of their instrument. The teeth of tailors, also, are often discoloured by the colouring-matter of the cloth in which they work. Among one hundred and fifty persons, workers in brass, bronze, and copper for more than one year, whom Miller examined, he did not find a single individual who did not show more or less of green-stain upon the upper teeth, and this in varying shades. I may say that I have myself examined about fifty such, with nearly the same result, the only exceptions being in persons who were fastidious in the care of their mouth, or whose teeth were incrusted in other deposits.

There are many animals whose teeth are covered by shining metallic deposits. These are chiefly or wholly among the graminivora. In some species the teeth of nearly every individual appear as if freshly gilded. In others they are quite black. Miller says he has found manganese deposits upon the teeth of the elephant, rhinoceros, dromedary, elk, deer, and cow. We all know that superficial discoloration is frequently found at the margins of amalgam fillings, and workers in mercury are liable to special deposits upon the teeth. The very hair of copper-workers becomes discoloured, and their teeth form no exception.

Fermentation of Organic Matter.—The white, cheesy deposit that is found about the necks of teeth, especially such as suffer from neglect, is apt in the course of the fermentation which it undergoes to become discoloured, or, rather, to leave about the necks of the teeth a pigmentary deposit. This may arise from the mixture with it of mineral substances which are finally precipitated, or it may be the result of the chemical changes through which the matter passes. This cheesy deposit may have either an acid or an alkaline reaction, according to the character of the fermentation which is going on. If it be acid, the erosion of the teeth beneath it may be easily comprehended. We have but to reflect that the surface of the cervical portions of the tooth being thus superficially decalcified, if the character of the fermentation should change, and mineral or other pigmentary matter become a constituent of the deposit, it may be precipitated upon the eroded surface of the tooth, and thus give origin to a distinct stain.

Chromogenic Bacteria.—It is well known to all observers that certain forms of micro-organisms produce a distinct colouring-matter. Many of the macroscopic fungi do this, and we find the most brilliant colours in the mushrooms, molds, &c. Deposits about the teeth may become infected with these chromogenic or colour-producing bacteria, and thus the tissues will be stained yellow, red, or some other colour.

Sanguinary Deposits.—I believe it to be the case that in some instances the discolouration of the teeth is due to deposits from the blood. Miller says that if in the presence of air or oxygen a current of sulfuretted hydrogen is brought in contact with fresh blood, sulfo-methæmoglobin will be formed, which is greenish-red in concentrated and green in dilute solutions. It is not probable that this will be a very important factor in the production of these coloured deposits, yet it will account for some instances.

Foreign Organic Matter.—We all know that the teeth of tobacco-users become deeply dyed in some instances. This is not usually confined to any special locality, but if when applied, as it usually is, alike to all portions of the tooth it stains, one may readily comprehend that other substances may be introduced into the mouth whose action will, because of limiting circumstances, or through non-liability of some of the tissues to their effects, cause a pigmentary deposit.

The Green-Stain of Childhood.—Thus far we have considered only the discolouration that may be found on the teeth of adults. It is evident that the same rules as to classification cannot obtain in the case of children. We must eliminate the metallic causes and search for other origins. Sufficient still remains in the action of ferments. There is not the same diversity in the colour of the pigments, and this leads to the conclusion that there are fewer causes to classify. At first thought, we might imagine that the enamel-cuticle plays an important part in the green-stain of childhood, but it has been shown that it has appeared upon the surface of phosphate fillings in the deciduous teeth. That it may be changed by the application of bleaching-agents like peroxid of hydrogen, would indicate that it is of organic origin, although it does not positively demonstrate it. There is a constant decomposition of food about the teeth, and bacteria are especially active in the oral cavities of children. The secretions of the mucous glands, that are somewhat specialized at the gum-margins, are frequently degenerated, and, under the action of ferment organisms, decomposed, and this may cause a pigmentary deposit, which will naturally follow the festoon of the gums and give the crescentic appearance which the green-stain of childhood usually presents. It follows, then, that this form of discolouration should probably be classed with those which are of fermentive or bacterial origin.

Conclusions.—I have little faith in the pathological significance of green-stain, and that I hold the belief that we, as practitioners, need not trouble our heads about it, except to remove it by mechanical means. The erosion that is often found beneath it must have preceded its deposit, for it invariably ceases when there is a complete coating over the eroded places. It never penetrates beneath the enamel-cuticle when that exists upon the tooth. It may be dissolved by chemical agents, and the most careful chemical analysis shows nothing in it that would be injurious. While it may be infected by bacteria, and while the stain may be the effects of micro-organisms, it cannot be shown to entirely consist of those organisms. Heide and Charpentier believed it to consist of leptothrix threads, but later observations show that this was a manifest error.—*Cosmos.*

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NOTES ON THE TREATMENT AND FILLING OF TEETH.

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

INTRODUCTION.

IT is not intended in the following notes to enter exhaustively into the subject of treating and filling teeth, but merely to allude to certain practical points in a simple manner. The scientific principles which underlie all practical work are not dealt with, for they are best studied in the works of those who have devoted much time to scientific research. It has been frequently stated, and is very true, that success in any operation depends more on the man who performs it than on the method he employs, and consequently a description of personal work, in which there is little, if anything, that is new or original may be of small interest to the experienced. It is hoped, however, that here and there may be found a hint that will be of service to younger practitioners.

THE RELIEF OF PAIN.

As many patients consult a dentist primarily for the relief of toothache, it will be well to briefly consider the usual causes of this most distressing pain and the remedies which generally relieve it.

Toothache is most frequently caused by irritation and inflammation of the tooth-pulp, by irritation and inflammation of the dental periosteum, or by a combined inflammation of both these parts.

In the various text books accurate and careful descriptions of the pain caused by these different conditions, and also by different stages of the same condition, are clearly set forth ; but it is my experience that few patients are capable of accurately describing the pain they have suffered, and beyond making a few general inquiries, such as how long the pain has existed, whether or no it keeps them awake at night, and whether it is very severe, the questioning of patients is of very little value, and the diagnosis must always principally

depend on the eyes and instruments of the operator. If the tooth to which the patient refers the pain is carious, the decay should be removed sufficiently to admit a temporary filling. If the pulp is not exposed, and the tooth is not tender when externally pressed on in all directions ; if there is no tenderness on applying pressure to the gum over the roots of the tooth, and if the pain has not been severe, it may be presumed the cause is pulp irritation, and that the case will be readily amenable to treatment. A paste of carbolic acid and tannin, or carbolic acid, tannin, and oil of cloves, may be placed in the cavity and sealed up (using as little pressure in the direction of the pulp as possible) with either temporary gutta percha or cotton wool saturated with chlorapercha. This latter is preferable to mastic or sandarach varnish. It is not so sticky, and is consequently more convenient and agreeable to handle.

As a rule the pain will rapidly disappear under this treatment, and the more or less softened dentine which covers the pulp will be hardened.

If the tannin paste does not relieve the pain, a piece of cotton wool, saturated with carbolic acid or oil of cloves, and sealed up in the cavity will often be beneficial. Should this fail to stop the pain, the rubber dam may be applied, and the cavity thoroughly dried with absolute alcohol and warm air. Alternate applications of chloroform, carbolic, and oil of cloves will then often give complete relief.

If this should fail, it becomes usually a question of whether the pulp shall be boldly opened into, so as to enable the remedies to be placed in direct contact with it, whether arsenical paste shall be at once applied—informing the patient that probably severe pain will ensue for some hours—or whether the tooth shall be extracted. The position of the cavity, the value of the tooth, and the temperament of the patient are all factors in determining the line of treatment. If on removing the loose débris from the cavity a portion of the pulp is seen to be exposed, it is well to remove as much of the softened dentine in the vicinity of the exposure as can be done without causing pain. A pellet of cotton wool saturated with carbolic acid or oil of cloves, and sealed up with a temporary filling, usually stops the pain.

If there is an opening into the pulp chamber, and any doubt exists as to whether the pulp is alive, or partially or wholly dead, a

very fine Donaldson bristle with a sharp point should be delicately inserted. If care is used, and the pulp is alive, the patient will only feel a slight prick, not amounting to pain. Should the insertion of the bristle cause no sensation, the pulp chamber should be freely opened, and explorations made down the root canals. In inserting the bristle into a root canal one is occasionally deceived, for even slight pressure may cause the patient to wince, and the operator to conclude he has pricked into living pulp, when the real cause of the pain is the pressure conveyed to an inflamed peridental membrane. It is astonishing how little pressure, even with such a delicate instrument as a Donaldson bristle, will sometimes cause a patient to tell the operator he has "touched the nerve," subsequent examination revealing that the pulp is entirely dead.

Periosteal inflammation, caused by an inflamed pulp, is readily relieved by soothing the pulp with any of the remedies above mentioned. The treatment is, however, often complicated, owing to the tooth being so sore to the touch that the patient will endure very little, if any, manipulation. Inflammation of the alveolar periosteum, or dental periosteum, or peridental membrane, as it is variously termed, is generally caused by septic poison from a dead pulp, or by the irritation of confined gases. The pain is usually relieved by freely opening the pulp chamber, thus giving vent to the foul gases of decomposition, and by the application of counter irritants to the gum: iodine liniment being very useful for this purpose. Capsicum plasters are also very good, the difficulty being for the patient to keep them in place sufficiently long to be of service.

When peridental inflammation has reached the suppurative stage, very little relief will be obtained until the pus is able to escape. In many cases the fine steel bristle may be passed through the apex of the root, and the pus will at once flow through the canal. In other cases the patient may be directed to poultice the gum with pieces of hot figs, or apply the more convenient Capsicum plasters, until the pus is drawn through the alveolus into the gum, whence it is readily evacuated with a lancet. Drilling through the gum and aveolus gives speedy relief in many cases, but is too heroic a method for general practice.

In peridental inflammation extreme tenderness of the tooth to pressure often prevents the manipulation necessary to give speedy relief. In these cases it often becomes a question of the judgment of

the operator whether he will attempt to get rid of the pain by trusting solely to local applications to the gum, or whether he will at once extract the tooth.

An excellent method in cases of extreme soreness, where the cavity of decay is very accessible, and also in cases when the patient is suffering severe pulpitis not relieved by the usual applications, is to administer gas and drill into the pulp chamber with a clean, sharp burr and if the pulp is alive to also remove as much of it as possible with the burr, and then, after allowing it to bleed for some time, to apply one of the usual remedies, such as oil of cloves or carbolic acid ; and if the pulp is dead, to simply place a pellet of cotton wool somewhat loosely in the cavity to prevent its becoming choked up with food. In all cases of obstinate toothache the application to the gum of the following mixture—Alcohol, 1 oz., Chloroform, 2 oz., Ether, ¾ oz., Gum Camphor, ½ oz., Laudanum, 1-8th oz., Oil of Cloves, ½ dr.—is very valuable.* To apply it, saturate a fairly large pellet of cotton wool and hold it on the gums from two to five minutes, taking care to prevent its running on to the face, as it is apt to irritate and burn the skin. It is also a useful remedy to apply directly to an inflamed pulp, or to the socket of an extracted tooth if pain is suffered after the operation.

The diagnosis of the cause of toothache is often difficult. Frequently the pain is referred by the patient to a tooth that is perfectly sound. An examination of all the teeth in both jaws should be made, and if, as is usually the case, one or more decayed teeth are found on the same side of the face as the tooth to which the pain is referred, the treatment of one or more of these teeth will give relief. Pain caused by one decayed tooth may be referred to any other tooth in either jaw on the same side of the face as the affected tooth, but it is extremely rare for it to pass the median line. Thus, I have known pain caused by a left lower wisdom tooth to be felt in a left upper central incisor, but never in a right upper central, or in any tooth on the right side of either jaw. Frequently the pain is referred to one of the branches of the fifth nerve, and is then termed neuralgia. The pain is usually felt under or over the eye, in the temporal region, in and under the ear, running upwards to the temporal region, or downwards to the shoulder and arm.

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* "Harris's Dental Surgery."

Pain under or over the eye usually points to upper teeth being affected, while pain in or about the ear, particularly if the pain shoots downwards, points to lower teeth, "while pain over the parietal eminence, to trouble from either upper or lower teeth." (Smale and Colyer.)

In these cases the condition of the decayed teeth must be ascertained and suitable remedies applied, when the neuralgic pain will usually cease.

In cases where several teeth have been filled, and the patient cannot locate the pain in any one tooth in particular, the diagnosis is again often difficult. Tenderness of a tooth to pressure, or tenderness of the gum over any particular tooth, or looseness of a tooth is sufficient evidence for the removal of the filling.

In other cases the application of heat and cold must be resorted to. To apply heat make a ball ended steel burnisher, or the copper bulb of the Evans' Root Drier, very hot, or the hot air syringe may be used; while cold is conveniently applied by holding a small ball of cotton wool in the foil carriers, spraying chloride of ethyl on to it until it is covered with particles of ice, and then rapidly applying it. If all the filled teeth are separately tested in this way, one or other of them will usually prove either more or less sensitive than the rest, and the filling of this tooth must be removed and the conditions ascertained and treated. Tapping the teeth with the handle of a steel instrument is also useful; sometimes a tooth will prove more tender than the others if tested in this manner, and this is often a useful guide.

The above methods of diagnosis apply to cases where none of the teeth are carious, with the exception that if any one tooth responds to the test it must be drilled into through the sound structure. Before drilling into a tooth that is externally sound great care must be taken, and if any doubt exists it is better for the patient to wait to see if the pain will finally locate itself in one particular tooth, or symptoms develop enabling a more accurate diagnosis to be made. If an apparently sound tooth is less translucent, or darker in colour than its fellows, it will generally be found to contain a dead pulp, and it may be opened into in these cases without any hesitation.

Severe toothache, which is often of the referred or reflected kind, is frequently caused by the difficult eruption of a wisdom tooth, particularly a lower wisdom. This possible factor must always be considered. The treatment is to cut away the gum over the erupting tooth, and

cauterise the edges with nitrate of silver. If this does not relieve the pain the wisdom tooth must be extracted, and if this is an uncertain or risky operation, the tooth immediately in front must be sacrificed. This gives room for the wisdom tooth to erupt, and by thus relieving pressure the pain ceases. Secondary dentine often fills up part or the whole of the bulbous portion of the pulp chamber, sometimes also filling up a considerable portion of the root canals. In all cases, therefore, where the pulp does not appear to be exposed, and the application of the usual remedies fails, the pulp chamber must be drilled into if possible, and if found to be filled with secondary dentine, it must be cut away until the orifices of the root canals are exposed. If this cannot be accomplished, and the pain is not relieved by counter-irritants or hot applications to the gums, the tooth must be extracted. The formation of what are known as pulp stones often causes severe pain, which is difficult to relieve, owing to these stones forming a barrier to the absorption of whatever remedy is applied. The treatment for the relief of the pain will be the same as in other cases of pulpitis. Irritation of the peridental membrane may be due to constitutional causes, or to the presence of tartar. In either case the careful and thorough removal of tartar and the application of tincture of iodine to the gums will be beneficial.

Rhizodontrophy

Is the operation of relieving pain due to a dead pulp, or preventing its recurrence after filling in these cases by drilling a small hole into the pulp chamber just under the free edge of the gum, usually on the buccal or labial surface, and at right angles to the long axis of the tooth, thus forming a vent for the escape of the gases of decomposition, and sometimes for pus.

Some dentists, instead of cleansing and filling roots, perform Rhizodontrophy whenever called upon to fill pulpless teeth, or to save the trouble of drilling out a filling and treating the roots when a pulp has died under a filling. This is a slovenly practice, which cannot he too strongly condemned. Occasionally it may prove of great value, when a patient, for instance, is about to leave the neighbourhood, and there is no time to properly treat the tooth, or in cases where a tooth is very sore, and the cutting out of a filling, or the opening of the pulp chamber through the cavity of decay cannot be endured, and it is found that drilling at right angles through the

neck of the tooth is quite bearable, particularly if the palatal side of the tooth is well supported by the thumb and fingers of the left hand. In these cases the vent hole is not to take the place of root treatment and filling, but is used as a means of enabling it to be subsequently carried out, when, of course, the vent hole will be filled up. It is, however, decidedly preferable to open directly and freely into the pulp chamber through the cavity of decay, or by cutting out a filling when necessary whenever it is possible to do so. It is rather awkward for the Rhizodontrophist when the drill pops into a living instead of, as was expected, a dead pulp. It is also unsatisfactory when the pulp chamber happens to be filled up with secondary dentine. It is, therefore, an operation only to be performed in exceptional cases, as above mentioned, and also where, owing either to exceptional difficulties of manipulation, or extraordinary resistance of a tooth to the usual treatment, it becomes a question of leaving a permanent vent hole or extracting the tooth.

Notwithstanding the fact that toothache, if intelligently diagnosed, generally rapidly responds to local treatment, there are many cases in which systemic treatment in addition is necessary if the patient is to be relieved from pain as speedily as possible. Acute peridental inflammation frequently causes constitutional disturbance, and in cases where the dentist finds that his local treatment is not readily responded to, it is distinctly advisable to refer the patient to a medical man, who will prescribe the appropriate constitutional remedies. Unfortunately, many patients imagine that extraction will give immediate relief in all cases, and are also so impatient and intolerant of pain that they are not only willing and anxious to have valuable teeth removed, but in many cases insist on it. Of course, a conscientious dentist can refuse to perform the operation, but his best endeavours are liable to be misconstrued, and it would be better, both for the public and the dental profession, if these conditions were more generally recognised and the best methods of treating them appreciated.

Removal of Tartar.

After attending to any teeth that have ached it is always advisable to remove all tartar from the teeth.

This is often a tedious and usually an uninteresting operation, and its proper performance is frequenty neglected. To remove tartar in a neat and efficient manner, with as little laceration of the gums as

possible, demands considerable skill, and often considerable time Modern small instruments are much better adapted for this purpose than the old-fashioned large and clumsy ones.

No special directions can be given as to how to remove tartar ; a push or a pull cut may be used, as convenient, and pricking into masses of tartar with a sharp-pointed, right-angle instrument is frequently very efficacious.

If there is any very great collection of tartar, and particularly if the gums are spongy or inflamed, it is distinctly advisable to remove the tartar at several sittings, painting the gums with tincture of iodine at the conclusion of each sitting.

Spoon excavators of various sizes and curves are most useful instruments for the removal of tartar in connection with those specially designed for the purpose.

Pyorrhœa Alveolaris.

This is a disease the etiology of which is obscure. As a rule it is considered to be a local expression of some constitutional disturbance, and probably is caused by different derangements of the health in different individuals. In some cases it appears to be caused by the local irritation of salivary tartar.

The disease probably varies somewhat according to whatever may be its cause, and also in different constitutions; but all this is not at the present time clearly understood, and for general purposes it may be said that the disease consists of a wasting away of the sockets of the teeth, usually in a more or less irregular manner, causing them to become more or less loose, and forming a space or pocket between the root of the tooth and the gums.

Pus often exudes from these pockets, but is often absent. Small brown scales of an exceedingly hard and adhesive tartar are deposited on the root. This has been given the name of sanguinary, or serumnal tartar, as it appears to be deposited from the exudations of the diseased tissues, and not from the saliva. Any improvement that can be effected greatly depends on a thorough removal of this tartar. This is difficult to accomplish. It must be done almost entirely by the sense of touch, and the scales are often so firmly adherent to the root, and project so little that there is the greatest possibility of the instrument slipping over them without the operator being conscious of their presence. This may to a great extent be avoided by using instruments similar to Fig. 1. This instrument should be inserted

as deeply as possible into the pocket, and the cutting edge made to bite into the cementum, so that the root itself, as well as the tartar is scraped. The root is denuded of periosteum where this tartar is deposited, and the slight scraping of the cementum will do no harm, and is infinitely preferable to leaving particles of tartar, for where any of these are left the parts rarely, if ever, improve.

When the tartar is removed, the pockets and edges of the gum should be treated with antiseptics, escarotics, or astringents, as may seem good, chloride of zinc being a very useful remedy. It may be worked into the pockets by means of a stick of orangewood, trimmed to a fine flat point. A dentifrice, or mouth wash suitable to the conditions, may also be prescribed. There again chloride of zinc is efficacious. From two to four grains to the one of either rose or orange flower water may be used as a mouth wash with advantage.

If one or more teeth are sufficiently loose to be moved about by the bite in masticating, they should be shortened, and if they still show no improvement, they should be firmly held by being ligated to other teeth by soft platinum, or gold wire, or by means of a specially-constructed mechanical appliance. Nature is thus given a chance to repair lost tissue, and the teeth to eventually become firm, when the appliance should be removed. Success in the treatment of this disease is always doubtful. If the sockets of the teeth are very much destroyed and the teeth are carrying [illegible] yance, it is better, in the majority of cases, to extract them. If, on the contrary, the destruction is not very extensive, the treatment may be undertaken with every probability of, at any rate, greatly improving the conditions, and in some cases, although the lost tissue is not perfectly restored, the teeth will become quite firm and useful in mastication, and the disease is, for all practical purposes, cured. Much, however, will depend on the patient's health, and any constitutional derangement should receive attention, otherwise the result of the local treatment will be often unsatisfactory. It is very important when a good result is attained for the teeth to be carefully scaled at regular intervals.

The thorough removal of the tartar from the roots, on which so much depends, frequently causes pain. Much can be done to mitigate this by the use of cocaine, but there are nervous irritable patients for whom this operation cannot be satisfactorily carried out, and the loss of whose teeth is, in consequence, only a matter of time.

(*To be continued.*)

NEURALGIA.*

By H. W. Turner.

Mr. President and Gentlemen,—It will be my endeavour this evening to bring before you the more important causes of Neuralgia with its symptoms and treatment, and then to dwell for a short time on that special branch of Neuralgia, which is of especial interest to us as dental students, namely, Neuralgia of the fifth cranial nerve, or trifacial neuralgia.

The first question that confronts us, in dealing with this subject, is :—What is Neuralgia? In it pain is the most important and prominent symptom. Some say that it is a disease in itself, others that it is only the symptom of some other disease. Some say that lesions of the nerve trunk occur, but from investigations that have been made there have been found in the neurilemma, medulla and axis cylinder of the nerve granular deposits, but in only a very few cases have there been found any central lesions. Neuralgia may be defined as a disease of the nervous system, in which pain is the prominent symptom, which follows in the course of nerve trunks and ramifies in their terminal branches.

There are many varieties of Neuralgia, and they may be divided into two main groups. (*a*) Superficial ; (*b*) Visceral.

To take the first group—the superficial—it may be sub-divided into—(*a*) Trifacial (of which I will deal shortly) ; (*b*) Cervico Occipital ; (*c*) Cervico brachial ; (*d*) Intercostal ; (*e*) Obturator ; (*f*) Crural ; (*g*) Lumbo Abdominal ; (*h*) Femoro Popliteal or Sciatica. The Cervico Occipital and Cervico Brachial varieties are of interest to us, as they are sometimes the seats of Neuralgia due to certain morbid conditions of the teeth.

In the Cervico Occipital Neuralgia the nerves affected are the posterior branches of the first four pairs of spinal nerves, and of these the nerve most affected is the great Occipital, the internal branch of the posterior division of the second cervical nerve, which supplies the integument of the back of the scalp and as far forward as the vertex.

In cervico brachial Neuralgia the nerves affected are the posterior branches of the four lower cervical nerves and the brachial plexus, causing pain in the shoulder, neck and arm, following down in the course of one or more nerve trunks.

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

The chief visceral varieties are—(*a*) Cardiac; (*b*) Uterine and Ovarian; (*c*) Gastric; (*d*) Neuralgia of kidneys, Urethra and rectum As to the symptoms, at first there is generally numbness and cutaneous anæsthesia, followed by intermittent pain, which increases in severity and is of a darting, boring, gnawing character, increasing in frequency as the attack increases in length. This is then followed by complete loss of the pain, but generally to be followed sooner or later by another attack. When the pain is most severe it may radiate to other nerves with which it is connected and so increase the area of suffering.

Very frequently in bad cases certain definite and exceedingly painful points may be found, and these always correspond with the points of emergence of a nerve from a bony grove, or of a nerve branch becoming subcutaneous, or of a nerve passing through some muscular aponeurosis. Vaso motor disturbances are frequent: such as palor or intense redness. In cases when a nerve supplying a gland is affected increased secretion follows. Loss of sensation in the skin over parts affected often follows, though at first it is sensitive to touch.

Neuralgia may be diagnosed by its typical sharp, shooting, boring pain of an intermittent character, which follows in the course of a nerve trunk, with certain particularly painful spots.

In making a diagnosis it may be confounded with other diseases, the chief of which are—(*a*) Locomotor Ataxy; (*b*) Rheumatism; (*c*) Myalgia.

In Locomotor Ataxy the pain is of a lightning-like rapidity, somewhat resembling Neuralgia, but they are not localised, and are often accompanied of diplopia, and also absence of patellar reflex.

In Rheumatism the pain is diffused and influenced by movement, and in acute cases is accompanied by a high temperature, and more especially pain in the larger joints.

In Myalgia the pain does not occur in paroxysms, but is dependent on movement.

In the treatment of Neuralgia one of the most important points is to pay particular attention to the general condition of the patient, *i.e.*, whether the patient is suffering from malnutrition, anæmia, or loss of tone, when the diet should be nutritious and easy of assimilation. In such cases codliver oil and tonics are especially indicated. In examining cases due to anæmia, it is well to observe the bloodless

condition of the gums and inner surface of the lower eyelid, since anæmia may be the cause, in spite of a fair amount of colour in the face. Also, in all cases of Neuralgia, the patient should, as far as possible, be kept free from worry, noise, or dazzling light, especially in the trigeminal variety.

The hygienic surroundings of the patient should be looked after, and the patient must not be allowed to remain in close, stuffy rooms, but have as much fresh air as possible, while avoiding draughts.

A considerable amount of relief may be obtained by the use of small blisters applied close to the principal focus of pain. In very bad cases of long duration, a portion of the nerve may be excised, or, what is frequently very satisfactory in result, the nerve may be stretched. In cases where all attempts have failed removal of the patient to a warm, dry climate is frequently successful. Special drugs are recommended in special cases of Neuralgia, the most useful of which are quinine and iodide of potassium.

In cases of Neuralgia resulting from rheumatism, salycylate of sodium, in 10 to 20-gr. doses twice or three times daily may be of some good, but it is of no use in chronic cases or gout. Failing this, one or two grs. of potassium iodide, with about 10 to 15 grs. of sodium carbonate may be useful. In cases due to malaria, which is a very common cause of Neuralgia, quinine, in 10 to 15-gr. doses, twice or three times daily, some time before a paroxysm, is very useful, it also is in cases of a gouty nature, when about 1 gr. of the acetic extract of colchicum may be given as well. Quinine is very useful, especially in cases of Neuralgia of the first division of the fifth cranial nerve.

Having briefly attempted to give a general description of Neuralgia, I will now try to describe briefly Neuralgia of the fifth cranial nerve, or Trigeminal Neuralgia, also commonly known as Tic-Doloreux.

Of all the nerves in the body, this is the one most commonly the seat of Neuralgia ; and when one sees, as we do in a hospital like ours, the large number, I may say without exaggeration, the hundreds of cases which every week come under our care for treatment, where the terminal branches of this nerve, in communication with the teeth, are subject to such constant irritation, and cause such intense suffering ; and when we think of the large area of this

nerve's distribution, and its numerous communications with other cranial nerves, there is no wonder that it should be affected more frequently than other nerves.

This, the largest cranial nerve, has various functions. Arising by two roots, of which the anterior is the smaller and motor root, and the posterior the larger and sensory—thus closely resembling a spinal nerve—it is at once a motor nerve, a nerve of common sensation, and one of special sense—being a motor nerve to the masticatory muscles, and of special sense of taste by the lingual branch, and is the great nerve of sensation to the face and head.

Its communication by the nasal branch of the opthalmic division through the lenticular ganglion with the third nerve accounts for disordered movements of the eyeball. With the facial nerve it communicates in several ways. Through Meckels's ganglion it communicates by the vidian nerve with the geniculate ganglion of the facial, also by the otic ganglion of the inferior maxillary nerve through the small petrosal nerve. Its communication with the sympathetic system of nerves are also numerous, through the gasserion ganglion, the otic, lenticular, and Meckels's ganglion.

It also communicates through the otic ganglion with the glosso pharyngeal nerve. Hence, with so vast a communication, Neuralgia of the fifth cranial nerve may easily be set up by irritation of almost any nerve of the head. Besides its great area of distribution, when affected with Neuralgia there are a great number of special areas of tenderness and pain, corresponding chiefly with points where the nerve pierces bone or facia, or becomes subcutaneous. Thus, in the ophthalmic division tender points exist where—(*a*) the supra orbital nerve emerges from the foramen on the supra orbital arch; (*b*) where the nasal branch becomes cutaneous above the ala of the nose.

In the superior maxillary division, at the—(*a*) infra orbital foramen, and (*b*) over the malar eminence.

In the infra maxillary division the—(*a*) mental foramen and (*b*) parietal eminence.

I think Neuralgia of the fifth nerve may be divided into two classes—(I.) that known as epileptiform Neuralgia, the most severe form of all Neuralgias; (II.) that of a less severe form, due in the greater number of cases to the diseased condition of the teeth.

Taking the first form, its most characteristic feature is the absolute suddenness with which a paroxysm comes on, and the fearful and

intense and almost unbearable pain, and also the equal suddeness of its departure. A patient may be sitting down quietly, when he is suddenly attacked, the pain being so intense that he may get up and rush about the room in absolute despair. It may attack one or all the three branches. Frequently the muscles of the face are thrown into violent spasms, and also flushing of the face and lacrymation may occur. The paroxysms may last about twenty to thirty seconds, and may occur as often as every few hours, or even less, or may be absent for a few months, only to return as severe as ever. Patients who are victims to it acquire a worn, haggard, and aged expression.

This class of cases occurs almost invariably in people past middle life, very rarely before the age of forty years, and chiefly in people over sixty. Patients frequently come of a family which is tainted with insanity. This kind of Neuralgia never seems to be of reflex origin, nor due to peripheral irritation of any branch of the fifth or other nerves.

The second kind, which is certainly of a less intense and severe character, is exceedingly common, and occurs in people of all ages, and which most frequently is due to some diseased condition of the teeth. The pain is of a darting, shooting nature, passing along in the course of the branches of the fifth nerve and is frequently accompanied with a dull gnawing sensation, and comes on in paroxysms. It is greatly aggravated by exhaustion, want of food, anæmia, and overwork or anxiety. Patients frequently obtain temporary relief by taking a dose of quinine. The most general cause of this class of Neuralgia is chronic imflammation of the tooth pulp, but various other causes may give rise to it. The more common are—(1) Difficulty in eruption of wisdom teeth; (2) Exostosis; (3) Presence of secondary dentine; (4) Alveolar periostitis; (5) Overcrowding of teeth; (6) Decomposition of a dead pulp in a confined space.

In dealing with cases of this kind it is frequently far from easy to arrive at a correct diagnosis, and, it must not be inferred that Neuralgia caused, for instance, by some affection of a tooth in the lower jaw, should of necessity follow in the course of the inferior maxillary division, as it is by no means always the case. Indeed the globe of the eye, the supra orbital nerve and the temple, and especially a spot near the vertex, are frequently the seats of Neuralgia due to affections of the teeth.

A very interesting case is recorded of a patient who for some years was subject to violent headaches confined to a small area a little to the left of the vertex, recurring three or four times a week. The spot became hot and relief was afforded by pressure with the hand. A left upper canine tooth was suspected and was extracted with most satisfactory results, no recurrence of the attacks occurring. Other cases were also recorded, as the case in "Tomes' Dental Surgery," of a patient complaining of pain in a perfectly sound upper second molar. The real tooth causing the trouble being the corresponding tooth in the lower jaw, which was extracted under gas, and the patient could not be persuaded that it was the lower tooth and not the upper one that had been extracted, till he felt the space caused by its extraction in the lower jaw.

It must not be inferred that all cases of this kind of Neuralgia are due to the teeth, for they may have their origin from various other causes, and may be cases rather for treatment by a physician than by the dental surgeon, in which case it is advisable to refer them to their doctor; and also I think it would be advisable for all medical men who have patients suffering from any Neuralgia of the fifth nerve to refer them to a dental surgeon, to have a thorough and close examination of their teeth, to see if there should be any likely cause for the Neuralgia.

Reports of Societies.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

Ordinary General Meeting of the Students' Society of the Dental Hospital of London, held on Monday, October 14th, 1895; the President, Mr. F. J. Bennet, in the chair.

The minutes of the last Meeting were read and confirmed.

The following gentlemen were admitted members of the Society:—Messrs. T. W. Thew; Henry Westron; T. H. Miller; W. W. James; Henry J. Morris; M. White; W. Anderson; W. A. Schlesinger; Fred. Billing; J. Gibson.

On casual communications, being called for:—

Mr. J. Douglas showed a model of an upper jaw with a supernumerary tooth situated behind the centrals. Also models showing an open bite occurring in the temporary dentition of a child aged seven. The little patient had recently had some adenoids removed.

Mr. DENSHAM said that adenoids did not usually appear till between the sixth and ninth year, by which time the temporary teeth were in place; but he would like to know whether there was any history of thumb-sucking.

Mr. DOUGLAS said there was no history of thumb-sucking, but the child had been in the habit of sucking its tongue.

Mr. H. W. TURNER showed a left lower second molar with three roots; one of the roots was bent upon itself, nearly at a right angle, and the foramen was not at the apex, but at the angle of the bend.

He then recorded a case of extensive necrosis following the insertion of a pivot. Three months ago he pivoted a left upper central incisor, after carefully preparing and sealing the root. About eight weeks later the girl (aged 15) returned with the other three incisors loose, and also the left canine, an abscess being present over each of these roots, and a large piece of necrosed bone could be felt. She gave the following history: After leaving the hospital she was unwell (she being a strumous looking child) and was laid-up. The next day she noticed a small abscess above the root of the tooth that had been pivoted; it was left, and got worse, and the pus passed upwards, infiltrating the tissues of the cheek. She was treated then for erysipelas. On her return to the hospital she was seen by one of the surgeons, who removed the four loose teeth and the pivot. He then found a large piece of necrosed bone extending from the canine tooth on the left to the lateral on the right side, and this was removed. The girl now attended the hospital regularly, and had it dressed with a solution of potassium permanganate each time. It progressed favourably under treatment, and in about two months time it is hoped she may be able to have a small plate fitted. The pivoted root was split and was found quite clean; but the apical foramen was rather large, and it is possible that some septic matter had been forced through it. The chief point of interest was the trouble extending across the middle line of the mouth.

Mr. W. S. NOWELL recorded what he supposed to be a case of electrical shock felt on connecting two contiguous fillings. A mesial cavity in a left lower wisdom tooth was filled with copper amalgam, and a distal cavity in the left lower second molar was filled with submarine amalgam. These two fillings were well polished and were not in actual contact. Whenever the metal rim of a mouth mirror was placed so as to touch both fillings simultaneously

a distinct shock was felt by the patient. A fortnight later the same sudden pain could be elicited in the same manner, although the fillings otherwise were perfectly comfortable.

Mr. WORKMAN said that a patient, for whom he had inserted a gold filling in an upper central, had complained of a similar sharp shock whenever the filling was accidentally touched with a dinner fork.

Mr. PADGET mentioned a case of abnormality in the size of a right lower lateral in a patient aged six, who attended at the hospital. The model showed the tooth to be about the size of a normal upper central.

Mr. PADGET then said : I wish to call your attention to a case of deficiency of the permanent teeth. The patient, who attended this hospital, was a girl, aged 12. There are but eleven teeth present, which in the upper jaw consist of two molars (one on each side), two central incisors, and two canines; whilst in the mandible there are two molars (one on each side), two stunted canines, resembling the conical supernumerary teeth, and one bicuspid. It will be remembered that of individual teeth the upper lateral is most frequently absent, next in order the second lower bicuspid, and then the third molar. When, however, a series of teeth are absent we usually find present a molar on either side, upper and lower, and one or two more or less malformed teeth in the incisor regions. So that this case follows somewhat the usual rule. Many temporary teeth are often present in these cases, but the only relic of the temporary dentition in this case is a remnant of a temporary molar in the mandible. There are models of a number of cases of absence of permanent teeth in the Museum of the Odontological Society, and also many cases to be found scattered throughout dental literature. These cases vary from absence of one tooth to that exceedingly rare condition total absence of teeth. The chief interest I think lies in the theories which have been advanced to explain deficiency of teeth. Several years ago Mr. Bland Sutton pointed out that the late appearance of teeth, so common in rickety children, might be attributed to abnormal thickness of the follicle. This certainly seems very feasible, inasmuch as this disease affects most particularly membranes engaged in the formation of bone. Moreover too this is borne out by specimens in the museum. Thus, a Dasyure, the skeleton of which was softened by rickets, had a fibrous odontome. Now, it is well known that this class of odontomes is due to the

hypertrophy of the follicle; and it is also generally recognised that there is a close connection between these odontomes and rickets. I conclude, therefore (whether rightly or wrongly I should like to be informed), that the follicle may become either excessively hypertrophied, forming a fibrous odontome, or only moderately hypertrophied, but yet enough to interfere with the eruption of the teeth. Such, however, are cases of retarded eruption, and not of absence of teeth. That many cases of deficiency are possibly merely cases of retarded eruption is borne out by the fact that there are a number of cases on record where teeth have been erupted late in life, their eruption often being brought about by the pressure of artificial teeth. Rickets, however, cannot be responsible for all the cases of deficient teeth, seeing that it has not always occurred. Indeed, in the case I have brought before you, there is no history of rickets, but the patient did suffer from a sharp attack of measles at the age of six. Now, as the exanthemata expand their chief force on the integuments, it is not surprising that the teeth, members of the integumentary system, become involved. Hence, it has been surmised that the inflammatory action of the disease results in hypertrophy of the follicle, or, where one of the exanthemata is contracted at a very early age, the permanent germs may perhaps become arrested in their development. Of course, as is shown by Tomes, Salter and others, deficiency of the teeth is often congenital, whilst hereditary syphilis may also at times account for it. Mechanical violence during the development of the teeth, either with the forceps or otherwise, may also be a cause by destroying germs. Unfortunately, one is not able to make anything like trustworthy deductions from the models in the Odontological Society's Museum, because it is the exception to find any real history attached to them. All we learn is the meagre fact that a certain number of teeth are absent. If we knew in each case the history of childhood we might find these cases of greater value. We know that correlations of growth exist between the hairs and the teeth, and it is interesting to note that there are several cases of deficiency of teeth being associated with almost complete baldness, but there was nothing abnormal about the hair of this child.

Owing to the death of Sir John Tomes, a vote of condolence to Lady Tomes and Mr. Charles Tomes was then proposed by the President, and seconded by Mr. W. S. Nowell.

The President then called on Mr. H. W. Turner for his paper on Neuralgia. (See page 488.)

The following gentlemen took part in the discussion which followed: the President, Mr. W. J. May, Mr. Densham, Mr. Nowell, and Mr. Douglas.

A vote of thanks was accorded to Mr. Turner for his paper, and to those gentlemen bringing forward casual communications.

The next Meeting would take place on Monday November 11th, when Mr. W. F. Forsyth, jun., will read a paper on "Fractures of the Jaws."

Review.

Dental Materia Medica and Therapeutics. By James Stocken, L.D.S., Eng. *Fourth Edition.* Revised by Leslie M. Stocken, L.R.C.P., M.R.C.S., L.D.S., and J. O. Butcher, L.D.S., Eng. Published by H. K. Lewis.

The new edition of this well-known work, long delayed by the continued indisposition of Mr. James Stocken, is the labour of two new editors, who may be congratulated on their task. We are glad to note that they have thoroughly revised, and, indeed, largely re-written the text, and by most judicious compression and excision have reduced the book to a small, compact manual. At the same time a description of many new drugs which have come into use since the previous editions will be found therein. Doubtless the editors must have been considerably troubled whether or no to include many drugs, the use of which is urged from time to time; but we think they have shown wise discretion in only including such as are of proved merit. Perhaps, in some instances, the text might have been extended with advantage; thus, under Iodine, we think it would have been well to have mentioned some of its preparations, as the tincture and the liniment, together with their relative strengths; and again, no mention is made of the solubilities of such drugs as Chlorate of Potash; indeed, we should be glad to see a table of solubilities added in any future edition. The book is one which a student may study with advantage, and to which the practitioner may refer with confidence.

THE DENTAL RECORD, LONDON: NOV. 1, 1895.

BETTER THAN GOLD MINES.

THE action "Harris v. Lucas," of which we publish a report on another page, is most interesting reading. If it were not for the hardship inflicted on Mr. Lucas by the result of the action, we should feel almost inclined to be grateful to his assistant for opening up to us a new road to fortune. Acting as patient instead of adviser, we have but to submit to sufficient trivial operations, fidgeting about during their performance, to at last reach our reward. A trumpery scratch, a little abrasion, a little drug spilt, or one or other of the many little accidents that might occur, and we are in a position to claim substantial damages, or at least so the result of this action would teach us. Alas! juries, like gold mines, are so uncertain in their results, that, standing to our readers somewhat in *loco parentis*, we certainly hesitate to advise their speculating in this direction. Yet it would seem a fairly safe speculation, for the case, bearing on the face of it so many indications of failure, yet was so brilliantly successful. Here is a patient consulting a man who she admits had attended her twice before, and on both occasions he had treated her skilfully, yet, who recovers substantial damages when on a third visit a slight misfortune happens. The plaintiff, with marvellous self-abnegation, is content to value her injury at £10, but the dispassionate! jury feel that nothing less than five times that amount will meet the case. She calls her own doctor to prove the "burnt nature of her face" that "in a day or two later the corner of the mouth began to fester" and that "subsequently she went for a holiday, her face being too bad to allow her to continue her business" and he has to confess "that the

skin was not burnt, neither was there any blister" nor did he think the marks on her face "would be visible for more than four or five days" after her visit to him. Perhaps it was because her own witness had so flaunted her that the jury gave her this nice little recompense. One thing, however, we cannot forgive Mr. Shrubsole; it is that he should venture to speak of this lady as "thin-skinned." Everyone will, we are sure, understand her annoyance. Fancy when our only boast and attraction is the thickness of our dermal appendage to be told we have a transparent, delicate, snowy silk-like skin! Is it not horrible! Or when we feel absolutely callous to feelings of delicacy, notions of propriety, or refined sensation to be told we possess these dreadful qualifications! Is it not enough to make a hippopotamus gambol with feline ferocity? Really, when we come to think about it, pay at the rate of £3,550 per annum is but a poor recompense for our sufferings, even if we make light of a spot on the chin, lasting five days. Perhaps those checked from activity in another place by the present depression of prices may like to devote their attention to this new field of venture, but we would like to suggest to those who wish to continue to follow the profession of dental surgery, that it would be wise to abandon the use of so irritant a drug as carbolic acid for the treatment of pyorrhœa alveolaris, and to use one of the other less caustic drugs which have at least an equal germicidal power.

News and Notes.

We are glad to note that the Liverpool Dental Hospital has received a legacy of £100.

The Examination at the Royal College of Surgeons, England for the Licence in Dental Surgery, commences on Friday, the 8th inst.

Mr. I. Bennett and Mr. Stephens have been appointed Demonstrators at the Dental Hospital of London.

The Annual Dinner of the past and present students of the Dental Hospital of London will be held on Saturday, November 30th, at the Café Royal. Mr. F. Canton in the chair.

Mr. J. Graham Munro, L.D.S., has been appointed Dental Surgeon at the Incorporated Edinburgh Dental Hospital and School, *vice* Mr. W. Forrester, resigned, and Mr. Fred. J. Turnbull, L.R.C.P. & S., L.D.S., appointed Assistant Dental Surgeon *vice* Mr. J. Graham Munro, promoted.

The opening Meeting of the new Session of the Odontological Society of Great Britain, will be held on Monday, November 4th, at 8 o'clock, when the President, Mr. David Hepburn, will deliver his Inaugural Address. Casual Communications will be made by Mr. C. J. Boyd Wallis :—1. "On the Discolouration of Teeth after using Hyd. Perchlor." 2. "Some remarks on Amalgams." And by Mr. Main Nicoll—1. "Ptosis of Dental origin." 2. "Fracture of the Maxillary Tuberosity during the Extraction of the Second Molar Tooth." The discussion of Mr. Cunningham's Paper "On the Immediate Regulation of Irregular Teeth," and Mr. Sydney Spokes' communication on the same subject will be resumed.

The new Dental Hospital, at Lincoln Place, Dublin, began last March, will, it is hoped, be completed by the end of the year. The total length of the building will be eighty-five feet, depth, not including sectional extensions, thirty feet, and the height nearly seventy feet. It will be constructed of Dumfries red sandstone and brick with elaborate white Portland carved ornamentation. There will be a wide stone staircase ascending to the operating and examining rooms. On the ground floor will be the boardroom, kitchen, laundry, and heating chamber, and also four bedrooms for the officials. On the first floor will be the laboratory and museum. The lecture room will occupy a portion of the first and second

storeys. On the second floor will be the extracting-room, operating, and anæsthetics, and comfortably-fitted and well-ventilated recovery rooms; while the filling-room and bacteriological laboratory will occupy the third floor. The roof over the filling-room is of unique design—semi-circular, supported on pitch pine arches, and containing a great deal of glass.

It is said that in Canada a regular inspection of the teeth of children in the public schools is about to be introduced.

A writer in the *Cosmos* suggests a little wrinkle that he has made use of for years. It is the substitution of coal oil for other oils in the laboratory. Used freely on the oil-stone it keeps the latter fresh and clean, and there is left upon it no film of steel covering the surface of the stone and lessening its effectiveness. Used upon lathes, it removes all those gummy collections of old lubricants, and cleans journals and all other surfaces quite as well or better than does lye. It will remove many of the discolouring accumulations from the surfaces of fine wood-work. Use it to soak old instruments in, to remove rust, &c.

On October 1st, at the London Sheriffs' Court, Bloomsbury before Mr. Under-Sheriff Burchell and a special jury, Mr. Walter Edward Johnson, dentist, of Newton Lodge, Finchley New Road St. John's Wood, claimed from the railway company £2,205 as compensation for the destruction of his premises consequent upon the construction of the new line to London, the chief terminus of which will be at St. John's Wood. The claimant, Mr. Johnson, stated that his business as a dentist, in 1893, after taking into account every possible deduction, showed a profit of over £100; in 1894, £120; and up to August 31st this year the books showed that the present year's working would have been a profit close upon £320. It would be impossible for him to secure suitable premises in the neighbourhood under a rental of £300 per annum. In cross-examination witness said that the railway company had offered him a house close to the one he had been compelled to quit, but, owing to a tunnel being constructed through the garden at the back of the

premises, and the Metropolitan Railway running in front, the house was altogether unsafe, and would assuredly collapse at no distant date. Even if it were safe, the noise and vibration caused by the passing trains would be disastrous to his business, as patients would naturally refuse to have teeth drawn when the house was shaking like an "aspen-leaf." In further cross examination witness said that he had once made his claim £1,850, but afterwards altered it to £2,205, and he then changed his solicitors, because he thought it was high time, seeing that they advised him to accept £520, which was the estimate of the Board of Trade. He thought this sum was not sufficient, and he intended to get as much as he could from the railway company. The jury assessed the damages at £1,000.

As showing the increase in price of platinum, largely due to the demand for it for electrical purposes, the *Journal für Zähnheilkunde* states that a few years ago the platinum mines of the Ural sold the metal for 2,700 roubles the "pod," about 16 kilogrammes; but in 1893 an English company obtained a contract for the entire output for a period of ten years of the Tagil mine, at 8,000 roubles the "pod," whilst recently a French company have obtained a contract for the output of the remaining mines at a price of 12,500 roubles the "pod." It is obvious these two companies will be in a position to largely determine the price of platinum, though we may hope for the discovery of a composition which may replace the metal, at any rate for electrical purposes.

Legal.

HARRIS v. LUCAS.

This was a claim by Mr. Arthur John Harris, proprietor of the "Kent," public-house, High Street, Gravesend, for £10, for injury to his wife, Mrs. Harris, by the negligence of the defendant's assistant, and also for loss of services through such injury.—Mr. G. F. Hohler, instructed by Mr. T. T. Chapman, was for the plaintiff; and Mr. Muir, instructed by Messrs. Tolhurst, Lovell, & Clinch, was for the defendant, Mr. George John Lucas.—The case was heard before a jury.

Mr. Hohler, in opening the case, said Mr. Lucas had a business in London, and a branch business in Gravesend, the latter being conducted by his assistant, Mr. Shrubsole, who, in his employer's absence, attended to the patients. Mrs. Harris went to the Gravesend branch to have a tooth removed, and whilst she was there Mr. Shrubsole suggested that the tartar at the back of the teeth should be removed. At a later date Mrs. Harris, acting upon this suggestion, went and had the tartar removed. After Mr. Shrubsole had done this, he proceeded to use a solution of carbolic acid for washing out the mouth. This was a thing that wanted very careful handling. Mr. Shrubsole seemed to have put some of the acid on a sponge, and, after placing it on a treadle machine, applied it to Mrs. Harris's mouth, but apparently before he got the sponge in the mouth he put the treadle in motion, with the result that some of the acid spurted on Mrs. Harris's face. This was very painful, and when she got outside her face was very much inflamed. She went to Dr. Phillips, who gave her some soothing ointment for the face, and told her how to apply it. When she arrived home, her husband noticed the burnt nature of her face, and on the morrow he instructed his solicitor to write to Mr. Lucas on the matter. Afterwards Mr. Shrubsole called upon Mr. Harris, and said he was very sorry about it, and Mr. Harris replied that he would expect out-of-pocket expenses only to be met, and he would see how his wife went on before deciding about future action. A day or two later the acid in the corner of Mrs. Harris's mouth began to fester, and she again had to go Dr. Phillips. She also went to see Mr. Shrubsole, who was very offensive to her : said she was thin-skinned, that the case was trumped up, and that she was making a fuss about nothing. Mrs. Harris was annoyed, and she left the place, and subsequently she went for a holiday, as her face was too bad to allow her to continue her business. Afterwards Mr. Harris instructed Mr. Chapman to write to Mr. Lucas, asking what compensation he was prepared to make. To that letter Mr. Lucas did not reply, nor did he take any notice of letters sent on two subsequent occasions. On August 26th, not having heard from Mr. Lucas, the plaintiff was bound to take the present proceedings.

Mrs. A. J. Harris, wife of Arthur John Harris, of the "Kent," public-house, said she went to have a tooth taken out by Mr. Lucas, and she was then advised to have some tartar removed. This she

subsequently did, her friend, Mrs. Liley, being with her. When Mr. Shrubsole had removed the tartar, he put some carbolic acid in her mouth, and moved a machine with his foot, which sent the acid over her face. Mr. Shrubsole admitted that he had made it too strong. She went to Dr. Phillips, who gave her some ointment. She suffered very much through it for two or three days. A day or two afterwards her face became worse, and she again went to Dr. Phillips. She also went to see Mr. Shrubsole, and told him about it, and he replied that it was a very trumpery case, and added that she was thin-skinned. Subsequently she went away for a holiday, the state of her face being such that it was impossible for her to continue her duties in the bar of her husband's house.—By Mr. Muir: Mr. Shrubsole had attended her twice before, and on both occasions he had treated her skilfully. She did not think Mr. Shrubsole was referring to her face when he said she was thin-skinned. She took it as a mental reference.

Mrs. Liley, wife of Mr. John Liley, corroborated the evidence of the last witness as to the acid being thrown on her face.

Dr. H. A. Phillips, said Mrs. Harris came to him on April 19th, and there were several marks on her face and in the corner of her mouth, caused by carbolic acid.—By Mr. Muir: It would have been painful, but the skin was not burnt, neither were there any blisters. —By His Honour: If the acid had been strong it would have caused blisters immediately.—By Mr. Muir: He knew Mr. Shrubsole, and believed he was a skilful operator. It could not have been pure acid, or anything approaching it, that had been placed on her face. He did not think the marks that were on her face when she visited him would be visible for more than four or five days.

Arthur John Harris, the plaintiff, said that when his wife came home he was shocked at the appearance of her face. As the result of the injury she had to go for a holiday. Mr. Shrubsole came and saw him about the matter, and spoke to him very politely about it.

The witnesses for the defence were then called.

Ernest Shrubsole said he operated on Mrs. Harris's teeth. He had had the necessary course at the Royal College of Dental Surgeons, and had also had ten and a-half years' training, The object of using solution of carbolic acid was to kill the germs which were customary in Riggs' disease, from which Mrs. Harris was suffering. The solution was a ten per cent. solution. The cause of

the solution splashing Mrs. Harris's face was a slight movement she made when he was about to apply it. When Mrs. Harris came to see him he was not intentionally rude to her.—By Mr. Hohler : It was not a common thing for him to splash the solution if the patient was quiet. He did not tell Mr. Harris when he called on him that the splashing was caused by his wife moving when the operation was being performed. The splashing took place when the brush was in the mouth and was being revolved, and it was then that the patient moved. He denied that he said the acid was too strong.

Mr. George John Lucas, licensed dental surgeon, said he had attended Mrs. Harris previous to the date of the present case, and he then saw that her mouth was in an unhealthy condition. In his opinion Mr. Shrubsole was a skilful operator.—By Mr. Hohler : The reason why he did not reply to Mr. Harris's communications, or to those of his solicitor, was because when the first letter was brought the messenger suggested that Mr. Lucas should not see it, but that the matter should be "squared."

Mr. Albert Beveridge, Licentiate of the Royal College of Dental Surgeons, said he had known Mr. Shrubsole for the past three or four years, and he was a very skilful operator. It was possible that the acid would splash over a patient's face if the patient moved when the operation was being performed. It was quite proper to use a ten per cent. solution, and to apply it as Mr. Shrusole had done.

Mr. Muir, in addressing the jury, said that if actions such as this one were to be brought against dental surgeons, simply because a few spots got upon a patient's face, the profession would become a terror.

Mr. Hohler also addressed the jury.

His Honour said the jury had to consider two questions : (1) was there any negligence in using a proper solution of carbolic acid ? and (2) was there any negligence or want of skill in the operation ? —The jury awarded £50 damages.—*Gravesend Standard.*

BANKRUPTCY PROCEEDINGS.

Re Abraham Berlyn, 78, Gough Road, Edgbaston, and carrying on business at 11, Bennett's Hill, and 77, Summer Hill Road, Birmingham, and at No. 1, High Street, Stratford-on-Avon, dental surgeon.—A meeting of the creditors in this matter has been held at

the office of the Official Receiver, Colmore Row. Mr. Woollett (deputy official receiver) presiding. The statement of affairs showed liabilities £2,424 17s. 6d., and assets £77 5s. 9d.—The Official Receiver reported that up to 1892 the bankrupt was engaged as a dentist's assistant. In January, 1892, he commenced, without capital, as a dentist, at 27, Paradise Street, Birmingham. He remained there until September, 1893, when he purchased the business carried on by a Mr. A. Whitehead, at 11, Bennett's Hill, Birmingham, and 1, High Street, Stratford-on-Avon. He agreed to pay £875, by instalments extending over a period of five years. The amount now due to Mr. Whitehead was £600, and he retained the lease of the premises in Bennett's Hill as security. To enable the bankrupt to pay the expenses of removal and buy furniture, &c., he borrowed £160 from Messrs. Pepper and Tangye, upon security of two life policies, and a charge upon present and future book-debts. On August 1st, 1894, a Mr. Britton joined him in partnership, and paid £450 for a share in the business. In February, 1895, the bankrupt borrowed £100 from a Mr. Hull, and gave him a charge upon the book-debts in existence at that time. He did not inform Mr. Hull of the assignment to Messrs. Pepper and Tangye. On the 18th April, 1895, he borrowed £33 from a Mr. Robert Barratt, and gave him a bill of sale upon some of the effects as security for the repayment of the principal and interest at 25 per cent. In May, 1895, be borrowed £50 from Mr. C. U. Jagger, and assigned a debt as security. In the same month the bankrupt purchased the goodwill of a business at 77, Summer Hill Road, for £40. The business was managed by a Mr. Thomas, who claimed the greater part of the furniture there. One room was furnished by the bankrupt with furniture supplied on the hire system, towards which he paid £2. The furniture was removed by the owners on the day the receiving order was made. At the commencement of August the bankrupt borrowed £50 from Messrs. J. D. and E. T. Kerr. On the 16th August, 1895, the partnership with Mr. Britton was dissolved, and Mr. Britton left the concern, receiving £350 as his share of the capital. Messrs. Kerr advanced the bankrupt the amount, and he (the Official Receiver) was informed by the bankrupt that a provisional agreement for a partnership was executed, by which Messrs. Kerr were to receive one-half of the net profits. The bankrupt did not inform them of the different securities he had given to creditors,

and stated the liabilities of the firm were only £65, without disclosing the fact that he had considerable private liabilities. The bankrupt stated that on the 18th August he wrote Messrs. Kerr that he was pressed by creditors, and asking if they would help him. On the following evening Mr. E. T. Kerr and his then solicitor went to the bankrupt's house, and told him they did not wish to proceed with the proposed partnership, and they were willing to take over the business in satisfaction of the £350 and £50 before referred to. A deed was accordingly executed by which the bankrupt assigned his interest in the goodwill and business at Bennett's Hill, and also the book debts. A further deed was assigned by which the bankrupt was to be employed as manager. Although the businesses at Stratford-on-Avon and Summer Hill Road were not mentioned in the deed, the bankrupt undertook not to practice within thirty miles of Birmingham for six years, but how he was to carry on business at these two places he (the Official Receiver) was at a loss to understand. As this assignment was executed only a few days before the petition, it appeared to call for enquiry with the view of ascertaining whether it amounted to a preference or an act of bankruptcy. As the assets in hand were insufficient to pay the costs of enquiry, he should be glad to know if the creditors were willing to guarantee them. On the 22nd August an execution was levied, and the effects were advertised to be sold by auction. The insolvency was attributed to want of capital, borrowing money at a heavy rate of interest, and becoming surety for a friend for £200. According to the statement of affairs there were thirty-one creditors for money advanced to the bankrupt, whose debts amounted to £2,131 5s.—Mr. Woollett (deputy official receiver) presided, and Mr. Bloor (from the office of Mr. Coulton) appeared for the debtor. Creditors were represented by Mr. Pepper, Mr. Cross, Mr. Jaques, and Mr. Walthall. —Mr. Woollett said there were a great many serious questions which would have to be asked the debtor, but he suggested that they should be deferred until he was on oath before the Registrar. —Mr. Pepper (Pepper and Tangye) said that the £160 lent by his firm to the debtor was to assist him in purchasing a practice and putting him on his legs. The ingratitude they had received was apparent. A number of people who had been returned as creditors of Berlyn repudiated the debts, and one gentleman so returned stated that he never been inside the debtor's office.—Mr. Read, a

creditor, who appeared in person, said that the debtor came to him on April 27th, and borrowed £15 to purchase a business. If there was no purchase of a business on that date the money had been obtained by false pretences, and he should like to know if he could not prosecute him.--Mr. Pepper said Mr. Read's case was only as bad as one or two others where money had been lent to the debtor because of his father's respectability.—Mr. Woollett stated that if there was a case for prosecution the whole facts would be laid before the Public Prosecutor. —The Official Receiver was appointed trustee.—*Birmingham Post.*

Abstracts and Selections.

THE MAKING OF ALLOYS FOR DENTAL AMALGAM.*

By Dr. J. O. Brown, Chicago, Ill.

Had my subject been the making of alloys, without any definite specifications, it would have been of much wider range, but at the same time the greater portion of area covered would not have come within the domain of dentistry.

We as dentists, however, will confine ourselves to those particular chemical and metallic compounds with which the profession is brought into daily contact.

The word "alloy" is believed to be derived from the French "aloi" (the metal of the standard coin), a contraction of "a-la-loi" (according to the law).

The alchemist who divided the metals into "noble" and "base," also used the term to express a combination of the former with the latter, in which case its nobility was said to be "alloyed," or "allayed." When one of the metals composing an alloy is mercury, the combination is called an *amalgam;* hence, the difference between an alloy and an amalgam is, an alloy is a combination of two or more metals fused together by heat, while amalgam is an alloy having mercury as one of its constituents.

Flagg says: "Two or more metals melted together form an alloy; one or more metals held in combination with mercury, *by* mercury, is an amalgam."

Although amalgam is not my subject, a brief history of the same will not be out of place in connection. The word "amalgam"

* Read before the Hayden Dental Society.

is from the Greek "malagma," from "malasso," to soften, the presence of mercury lowering the melting point of such a mixture.

Amalgam was first brought into use as a tooth filling material and advocated by one M. Taveau, of Paris, about the year 1826, and was called by him "Silver Paste." This metallic preparation was first brought to the notice of the dental profession in the United States about 1830, by the advertisement of two Frenchmen by the name of Crawcour. It was called by them the "Royal Mineral Succedaneum," succedaneum meaning a replacer or substitute. From the advent of the Frenchmen and the introduction of their "succedaneum," until about the year 1850, was what is known as the "amalgam war," which was waged pro and con among the members of the dental profession, resulting in personal enmity in some cases, in the disbandment of some of the societies, and, lastly, but by no means the least, it provoked hard study, exhaustive researches and experiments which have proven of much and lasting good to suffering humanity.

The different metallic substances contained in many alloys of to-day are: Tin, silver, gold, platinum, copper, zinc, cadmium, antimony, aluminium and aluminium bronze, and in some a mere trace of palladium. The first alloy used in this country was the "Royal Mineral Succedaneum," which was silver coin filings, and was of silver 90 per cent., copper 10 per cent.

To make this paper more explicit I will give a qualitive chemical analysis of the different metallic compounds contained in the alloys under discussion.

1st. Tin.—Symbol, s.n., Latin name, stannum, equivalence II. and 4; specific gravity, 7·29 to 7·30; atomic weight, 117·7; revised weight, 117·698; fusing point, 442 deg. F. (According to some, 458·6 deg. F.)

2nd. Silver.—Symbol, Ag.; Latin name, argentum; equivalence, 1 & 3; specific gravity, 10·40 to 10·57; atomic weight, 108; revised atomic weight, 107·675; fusing point, 1873 deg. F.; expands on solidifying.

3rd. Gold.—Symbol, Au.; Latin name, aurum; equivalence, 1 & III.; specific gravity, 19·26 to 19·34; precipitated gold, 19·49; atomic weight, 196·2; revised atomic weight, 196·155; fusing point, 2016 deg. F.

4th. Platinum.—Symbol, pt. ; Latin name, platinum ; equivalence, II. & 4 ; specific gravity, 21·50 ; atomic weight, 197 ; revised atomic weight, 196·700 ; fusing point above 3,500 deg. ; in oxyhydrogen flame or coal gas and oxygen flame.

5th. Copper.—Symbol, cu. ; Latin name, cuprum ; equivalence (cu. 2) & II. ; specific gravity, 8·914 to 8·952 ; atomic weight, 63·2 ; revised atomic weight, 63·173 ; fusing point, 1996 deg. F.

6th. Zinc.—Symbol, zn. ; Latin name, zincum ; equivalence II. ; specific gravity, 7·10 to 7·20 ; atomic weight, 65 ; revised atomic weight, 64,904 ; fusing point, 773 deg. F.

7th. Cadmium.—Symbol, cd. ; Latin name, cadmium ; equivalence, II. ; specific gravity, 8·96 ; atomic weight, 112 ; molecule composed of one atom, revised atomic weight, 111,835; fusing point, 442 deg. F.

8th. Antimony.—Symbol, sb. ; Latin name, stibium ; equivalence, III. & V., specific gravity, 6·72 ; atomic weight, 120 ; revised atomic weight, 119·955 ; fusing point, 842 deg. F.

9th. Palladium.—Symbol, pd. ; Latin name, palladium, equivalence, II. & IV. ; specific gravity, 11·80 ; atomic weight, 106 ; revised atomic weight, 105·737 ; fusing point lower than platinum, but requires oxyhydrogen blowpipe.

10th. Aluminium.—Symbol, al. ; Latin name, aluminium or aluminum ; equivalence, IV. and $(Al\ 2)^{VI.}$; specific gravity, 2·50 to 2·67 ; atomic weight, 27 ; revised atomic weight, 27·009 ; fusing point, 1296 deg. F.

11th. Aluminium bronze, which is an alloy in itself composed of 900 parts copper to 100 parts of aluminium, and is of golden hue.

To give a quantitative analysis of the different alloys in use would make a paper of such length that I fear it would be rather monotonous, so I will simply refer you to page 813, Vol. III., of the "American System of Dentistry," there you will find a quantitative analysis of sixty-five of the principal alloys now in use.

The metals for a dental alloy should be very carefully selected with a view to their quality, which of necessity should be "C. P." The best kind of a furnace for the fusion of the metals is one of Fletcher's Gas Injector Furnaces. The crucibles used in the work are either the refractory sand crucible, sometimes called Hessian crucibles, the French clay crucibles, or the plumbago or graphite crucible of these the latter is preferable.

Having brought the crucible to a bright red heat, a sufficient quantity of borax is then dropped in and allowed to fuse and coat the whole inner surface, after which the high fusing metals should be put in in small pieces and allowed to become thoroughly fused. When this is accomplished, the lower fusing bodies may be added ; when fusion is complete pour into a suitable ingot mould, after which it may be comminuted by means of a file, or in the lathe by a cutter.

I have seen some alloys made where the tin was first fused and then the other metals added in the order of their fusibility, but at the same time the mass was kept under a sufficient quantity of borax to prevent oxidization.

I have also seen alloys made where all the metals were mixed very carefully together and all fused at the same time. The relation of the fusing point of alloys to those of its constituent metals is also variable and *cannot* be anticipated theoretically. The fusing point of an alloy is always less than that of the least fusible metal which is contained in it, and often below the melting point of the most fusible of its constituents. To illustrate this one can take pure iron, which is extremely refractory, and combine it with the proper quantities of arsenic and phosphorus, and it can be melted in a cast iron pot without adhering to it.

An alloy can be materially damaged if an insufficient quantity of flux is used. Borax, borax glass, common salt, soda ash, &c., are used for this purpose. If these are not used in sufficient quantity there will be loss in strength by oxidation and in quantity by volatilization. Dr. Ambler Tees recommends to prevent volatilization of the tin, that it be fused under borax in a separate crucible, and the higher fusing bodies when molten be poured into the melted tin. Some use a quantity of carbon on top to prevent oxidation, and the general practice is to use a red hot iron rod for stirring, so as to get a thorough mix, but the best method is to stir or puddle the molten mass with a green stick if it can be had, if not a dry one of any kind will do, for the moment the stick is inserted in the molten mass combustion takes place immediately, causing the metals to boil and become thoroughly homogenous.

Liquation or separation of the alloy into metallic combinations of different composition arranged in the ingot in the order of their relative specific gravities ; this may be avoided by raising the

temperature to a somewhat higher degree than is necessary for their fusion, and then pour into a cold iron ingot mould which will chill it instantly before any separation takes place. If the alloy is not at the proper temperature liquation will occur in the crucible, and an imperfect mixture will be the result, necessitating remelting and pouring it at a higher temperature to remedy the evil.

I would wish to state that I have no axe to grind, nor am I in any way interested in any alloy, and furthermore am not under any obligations to any person or persons making alloys for dental amalgams, and whatever I say in this paper is my honest conviction and experience.

There have been numerous alloys put upon the market and styled G. & P. alloys which did not have a trace of either metal. Then we have had the era of copper amalgams, which, as Flagg says, is "a metal held in combination with mercury by mercury." While it is an alloy of copper and mercury, it is an amalgam from the mere fact of the mercury forming one of its constituents, therefore all that I can conscientiously say of this combination and keep them within my prescribed limits would be to state how the copper is prepared.

Take one troy ounce of pulverized sulphate of copper, add eight fluid ounces of warm water. This dissolves the salt promptly; take a piece of iron bar one-fourth inch thick by one and one-half or two inches in width, and from eight to ten inches long, thoroughly brightened by a bath of sulphuric acid, one part to three of water, then suspend the iron rod in the copper solution. The formation of solution of sulphate of iron and the precipitate of copper in fine pulp commences immediately. This process continues for several hours, and the copper pulp should occasionally be scraped off the iron plate into the solution by means of a stick. When no more copper precipitates, the iron plate should be removed, cleansed and dried, and is ready for use again.

The supernatant solution is of a yellowish green colour, and when reasonably cleared by settling, should be poured off. About three or four ounces of pickle (sulphuric acid, one part to three of water) should then be added to the precipitate and this frequently stirred with a glass rod. This is for cleaning and purifying the copper pulp, and should be done at intervals for several hours until no bubbles arise from the agitation. It does not do any harm to let the pulp

stand in the "pickle" for several days, but rather seems to improve it instead. When it is sufficiently "pickled," the acid water is poured off and the pulp residuum is put into a mortar and one ounce of mercury is added. The whole is then thoroughly rubbed up and amalgamation is prompt and complete. It is then washed repeatedly, and a small portion of bicarbonate of soda in one of the waters is considered very beneficial. After squeezing out the surplus mercury and triturating in the mortar again, the mass is ready to be divided suitably for use.

After the copper amalgam, then came the aluminium alloys; nearly every one had a new alloy of aluminium, and its superior qualities over all others were brought to our notice. The per cent. of aluminium in alloys is very small, at least so far as I have been able to ascertain. I have had one sample of alloy containing 2 per cent. of aluminium, which, when mixed with mercury, could not be held in the hand on account of the intense heat caused by the oxidization.

Nearly if not all of the oxidizable metals, when fused, have the power of dissolving to a greater or less extent the oxides formed by contact of the air with their molten surfaces: this is particularly true of alloys, especially those of a readily oxidizable metal with one which is less so. The metals being in a state of solution, a condition most favourable to chemical change, oxidization takes place rapidly. A striking illustration of the tendency of certain metals to unite with oxygen under such conditions may be observed in the case of an amalgam of aluminium, which, when exposed to the air, instantly loses its lustre, becomes heated, oxidizes rapidly, and is converted into alumina and metallic mercury. Water decomposes it rapidly with evolution of hydrogen, formation of alumina, and decomposition of mercury.

The same effect can be shown by rubbing a globule of mercury over the surface of a polished plate of aluminium with a piece of chamois or buckskin. The mercury unites after a short time with the aluminium surface, but almost immediately oxidization commences, with sensible evolutions of heat and the development of an efflorescent deposit of alumina on the plate, which grows visible to the naked eye.

There is one alloy to my positive knowledge that has aluminium bronze as one of its constituents, that is the pearl alloy. Whether

the introduction of a bronze into an alloy has a decided beneficial effect or not I am not prepared to say, it might, and again it might not. I am not going to argue that point here, for the field for discussion is too wide to admit of it at the present time.

In the fifteen years of my practice I have used a great many different alloys, and I think I have used most of the principal ones in the market in that length of time, besides a great many of the cheaper grades, and I think I have profited by the use of the latter more than my patients have; but my profit has not alone been one of a monetary value, for I have learned from sad experience that the *best succedaneum* is poor enough as compared with the structure of nature, but we are daily called upon to arrest the ravages of time and disease in the oral cavity, and we are left to be the judge as to the method of so doing, and the only way to arrive at a safe conclusion is by careful comparison and experience.—*Dental Review.*

NOTES UPON THE CHEMISTRY OF DENTINE.

By Charles S. Tomes, M.A., F.R.S.

The Salts of Dentine.—In a previous communication I mentioned that I had found that the percentage of lime salts in the molar teeth was somewhat higher than in the incisors and canines. In order to thoroughly test the correctness of this inference, four upper and one lower entire set of teeth (with the exception of two or three teeth that were carious) have been examined, making in all seventy-five teeth, and the difference has been found to exist in every instance. The fact may, therefore, be held to be fairly established, and the average, taking together all the incisors and all the molars examined, is :—

* Incisors.—71·2 per cent. inorganic salts.
28·8 per cent. organic matter and water.
Molars—73 per cent. inorganic salts.
27 per cent. organic matter and combined water.

In the case of three of the sets of teeth the dentine turnings of corresponding teeth of the two sides had been placed together, but in the other two sets each individual tooth has been examined, with

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* Dr. Black's figures reduced to percentage of *dry* dentine I find give 71·7 for incisors and 72·3 for molars.

the view of seeing whether Dr. Black is right in supposing that differences in chemical composition between teeth from the two sides of the mouth occur. It is difficult to prove a negative, but my experiments lend no support to this idea; teeth from opposite sides of the same mouth giving results very closely in accord, with the exception of a single pair, between which the discrepancy was so large as to strongly suggest experimental error.

Taking all teeth examined the percentage of salts is 71·9.

I am inclined, however, to think that Dr. Black is right in thinking that the percentage of lime salts is not the factor which determines the liability to caries, for in one set of teeth in which the wisdom teeth were barely in place, two bicuspids had been largely affected, there was incipient caries between many of the teeth, one wisdom tooth was badly decayed and the incisors were markedly striated transversely. Yet this set of teeth gave an average of 71·4 per cent. of salts, whilst another much worn dentition, quite free from any trace of caries, also gave 71·4 per cent. of salts; that is to say, both were ·5 below the general average.

Chemists make use of two methods of ascertaining the percentage of salts, both based upon the destruction of the organic constituents, and the comparison of the results of those two methods throws a light upon the chemical constitution of dentine. The most common method is to burn the dentine in a crucible; the other is to treat it with strong nitric acid and moderate heat till bubbles are no longer evolved, and then to evaporate to dryness, but not to heat to anything near redness. In order to get the best comparative results the dentine, in the form of turnings, cut with a spear head drill, is dried for six hours in a constant temperature oven, and the crucibles containing the dentine are incinerated in a muffle, all at the same time so as to secure perfect uniformity; the muffle has slits in it, and air is allowed to enter by not sealing up the door of the muffle tightly. In this way every tooth has received absolute uniformity of treatment. This method gives 71·9 as the average percentage of lime salts over the whole number of teeth examined. The nitric acid method leaves a perfectly white residue, but gives a higher percentage of salts, namely, 76·8 per cent. But if these crucibles be subsequently ignited in a muffle they again lose further weight, and the percentage of salts comes down to precisely the same as that given by the other method.

This further loss by ignition, seeing that the organic matter, as determined by tests for proteids, was wholly destroyed by the nitric acid, can only be of water in combination, that is to say, water which cannot be driven out at a temperature of 212 degrees. And this inference is confirmed by the converse method of dissolving out the lime salts and weighing the dried organic matter. By this latter process it is found that the organic matrix dried, and the lime salts separately dried and ignited, fall short by from 7 to 8 per cent. of the total weight of the dried dentine.

It is well known that tribasic calcium phosphate prepared by any wet process retains one or more molecules of water in chemical combination, which is not lost below a temperature of 400 degrees, and is only certainly completely expelled at red heat.

It seems, therefore, pretty certain that the calcium phosphate in dentine has water in combination with it.

The late Professor Hoppe Seyler believed that the lime salt in bone and enamel, and perhaps also in dentine, was a combination of calcium phosphate and calcium carbonate in equivalent proportions, somewhat analogous to the mineral apatite.

Apatite has the formula $Ca_{10}\ Fl_2\ (PO_4)_2$, and in some varieties of the mineral chlorine takes the place of the fluorine thus— $Ca_{10}\ Cl_2\ (PO_4)_2$.

Hoppe Seyler believed that the bone salt contained the radicle CO_3 instead of the chlorine, so that it would be $Ca_{10}\ CO_3\ (PO_4)_2$ or $3\ Ca_3\ P_2O_8\ Ca\ CO_3$; that is to say, three molecules of tribasic calcium phosphate and one molecule of calcium carbonate.

If this idea be true, the percentage of calcium carbonate in the ash should be 10·6. But, although I speak with reserve, because the analysis of small quantities of ash for carbonic acid is subject to some degree of error, my analyses do not give much more than half this amount of calcium carbonate.

The Organic Matrix of Dentine.—If the salts be dissolved from dentine turnings, or even from a block of dentine, by means of dilute nitric acid, it is possible by care to remove them (practically) without bringing into solution any weighable amount of proteid or proteoid substance.

The organic residue when dry is brownish yellow, horny, and translucent; its weight is, as before mentioned, short of the loss experienced by dentine on ignition. And as this resultant Collagen

is by chemists universally supposed to be the anhydride of Gelatine, it is almost certain that the combined water in dentine is combined with the lime salt, not with the organic matrix.

By prolonged boiling of Collagen derived from ivory in water acidulated with acetic acid it is dissolved, a shreddy, slimy-looking residue being left behind. Microscopic examination shows this residue to consist wholly of Neumann's sheaths, and these weighed after drying are found to constitute 3·5 per cent. of the Collagen mass, or 1·2 per cent. of the original dry dentine, an amount much larger than I should have expected. In their behaviour with reagents they correspond exactly with Elastin.

Roughly speaking, the average elephant ivory is composed of :—

Inorganic salts	58·
Combined water	7·7
Collagen	33·1
Elastin	1·2

However carefully prepared, both the Collagen and the Elastin retain just a trace of lime salts, but hardly a weighable quantity. As a mere suggestion, I would say that the difference between teeth of good or bad quality may possibly lie in the amount of combined water, in the proportion of calcium carbonate, in the nature of the organic matrix, in the proportion of Elastin to Collagen, or, finally, it may not lie in the dentine at all, but may be a difference in the enamel. But I am inclined to concur with Dr. Black, that it does not lie in the mere proportion of lime salts.—*The Journal of the British Dental Association.*

A CEMENT FOR USE IN MICROSCOPY.

It has long been known that glycerine and litharge make an excellent cement for many purposes, and the writer suggested its use in microscopy in the *National Druggist* as far back as 1884. Some months ago he had occasion to build some deep cells for opaque objects, and used the lead cement for the purpose. Up to the present time the cells seem to be all that could be wished. The following is the method of preparing the cement : Take any convenient quantity of litharge, and reduce it to an impalpable powder

by porphyrization. Place the powder in a crucible, and expose to a bright red heat for some time. Keep this powder in closely stopped vessels. When needed for use mix with sufficient anhydrous glycerine to make a paste, and with the paste quickly form your cells by the aid of a penknife and the turntable, using the latter as a potter's wheel is used, forming up the sides of the cell by gentle pressure from the knife blade. This cement hardens very rapidly, resists almost all fluids, even mineral acids, and does not shrink appreciably in drying. It is not affected by any degree of heat short of the boiling point of glycerine. It adheres most firmly to any surface to which it may be applied, and can thus be used for cementing almost all kinds of substances—metal, porcelain, glass, etc. Only a small amount of the litharge and glycerine should be mixed at a time.—*Microscopical Journal.*

TREATMENT OF THE DECIDUOUS TEETH BY MEANS OF CROWNS AND JACKETS.

By Louis Ottofy, D.D.S., Chicago.

. . . It is the dental profession, and not the laity, who are responsible for the generally accepted idea that children's teeth cannot be filled, or that they should not be filled, and I think it is time the profession remedy the error of which it is the power. The same treatment which will save permanent teeth will not always save deciduous teeth ; the conditions are so different that if the operator has not the time or ability, he will meet it by extraction. . . . .

As a result of the necessity for frequent refillings, each time causing a little more pain, and cutting away a little more of the tooth, and for the purpose of overcoming the many unsanitary and unwholesome practices resorted to, I have conceived the idea of saving the deciduous teeth by means of crowns and jackets.

In the case of incisors and cuspids of children it is difficult, as a rule, to introduce a satisfactory filling, especially at so early an age as two or two and a-half years. The preparation of the cavities is painful, the teeth are exquisitely sensitive, and the most sympathetically disposed operator's patience is sorely tried in doing something satisfactory ; hence, in the majority of cases, the result is a cement filling often hastily and improperly mixed, hurriedly introduced,

and perhaps permeated with moisture before a protection against it can be applied. The result is a repetition of the operation in a short time, sorely trying the abilities of endurance of the restless, wriggling piece of humanity, to say nothing of the increased sensibility occasioned by the repeated cutting away of what little tooth structure there is. How much easier to remove only the greater portion of decay, slightly separate the tooth from its neighbours by means of a sandpaper or other disc, and attach one of these jackets, without taking an impression, or carefully fitting it and cementing it into place.

For this purpose I use 22 or 24 k. gold plate 34 gauge, or platinum 38 gauge. The pattern is cut out, bent with pliers, pressed with fingers around the neck of the tooth, and the edges caught with a mite of solder and cemented into place. The deciduous teeth are usually of a shape readily adapted for the fitting of these crowns. The articulation quickly accommodates itself to the crown, by either the slight displacement of the crowned tooth or of its antagonist. Much of the work is done out of the mouth, and when done at the chair is a source of amusement and interest instead of dread and pain.

I have never taken kindly to the method of filling deciduous teeth by bridging the filling material across the inter-dental space, although I have been forced to practice it for want of any better means of retaining the fillings in place. In the case of molars, therefore, this practice offers many advantages. Usually it is best to take an impression in wax, modelling compound, or Mellott's clay, then with the Mellott's outfit dies and counter-dies are quickly made and a cap struck up. Frequently there is no necessity of shaping the crown, as usually it is unnecessary to extend the cap down on the crown, except for a short distance. It is sufficient if it extends far enough so as to hold it in place. Its purpose is merely to serve as a protection to the underlying cement. It is remarkable with what tenacity these caps will adhere, even in cases where it has been impossible to prevent the moisture from coming in contact with the cement before it has set. For these jackets and half-crowns I find pure gold most satisfactory.

The credit for the mention of this practice is due to Dr. W. W. Shryock, of Fort Wayne.—*Ohio Dental Journal.*

BEADED OR GROOVED VULCANITE DENTURES.

By scraping a groove across the palatal portion of the plaster model and along the buccal and labial lines of muscle attachments, to form a bead-inclosure will produce a supplemental chamber-like function of nearly the entire inner surface of the denture.

The result is a greatly increased retaining hold of the plate on the gums, especially noticeable in cases having flat and soft surfaces.

Partial dentures may thus be securely retained, and the simplicity of the process is hardly less remarkable than the successful result. It is only essential that the scraper shall be shaped and operated to produce a suitably smooth, narrow, half-round groove in the model, and follow previously studied lines along the palatal soft parts and at the merging of the muscles in the gums. The inclosures may be of any size or shape or number that a careful pre-observation of the character and conformation of the mouth may indicate. If experience proves that the beading is too prominent at any point, ready relief may be obtained by smoothly reducing the projection at that point ; but first allow time for the settling of the denture before taking off portions of the bead. In most cases, no "chamber" will be required other than the beaded inclosure, and this is a matter of considerable importance when a shallow vault and short teeth make a thin plate necessary for the proper production of speech.

In some instances an alternative cutting of grooves in the vulcanized plate may be indicated, and that can readily be done with a round or oval engine bur, taking great care to smooth the edges of the grooves. These are especially effective in lower dentures, which may thus be given a really adhesive hold in cases otherwise most difficult of retention. When grooves are employed, strict cleanliness must be earnestly enjoined, else the foul grooves will become a source of irritation, a defect not incident to properly formed beads.

An example of duplicate and triplicate bead-inclosures is shown in the plaster model, which exhibits a shallow vault having a hard anterior centre. The bead lines follow the soft borders of those depressions. A further reinforcement of the retaining function is effected by a posterior bead-inclosure just within the junction of the soft with the hard palate, as previously shown. The denture thus constructed will be found to be very securely retained.

If for any reason a "chamber" is deemed desirable, it can easily be made, after vulcanization, by deepening the bead-inclosure with an engine bur.—*Ohio Dental Journal.*

STERILIZED OLIVE OIL AS A LOCAL ANÆSTHETIC.

By Mons. Loup.

Chief of the Clinic at the Dental School of Paris.

You know that from time immemorial men have striven to discover a physical or chemical agent capable of abolishing pain during operations. It is in fact necessary to look a long way back into antiquity in order to find the employment of the Stone of Memphis, and of compression; nearer to our own time we meet with the use of ice, ice and sea salt (Amalis' mixture), and finally at the present day with a whole series of physical and chemical agents such as chloride of ethyl, chloride of methyl, coryl, anestile, and the local anæsthetic *par excellence*, cocaine.

All these agents have their advantages and disadvantages, but it is not necessary at shis moment to trace the history of each of them. Their qualities and defects, and their physiological action have been very well described by Dr. Sauvez in his inaugural thesis of 1893, and we will therefore limit ourselves merely to the statement of a few words of a general character.

Compression acts solely by stopping the circulation of the blood, and produces a local and transitory anæmia of the part to be operated upon, whence follows insensibility to pain by reason of nutritive failure in the sensitive nerve-threads.

Cold acts in nearly the same manner; it intercepts the sanguineous circulation, but after having dehydrated, by congealment, the water contained in the tissues to be operated upon, pushed further, it coagulates the fibrin, and the sanguineous globules. The phenomenon produced is always the same; local and transitory anæmia, apparent and temporary death of the nervous, sensitive extremities in the field of operation.

Cocaine, as has been demonstrated by Professor Dastre, is a general anæsthetic, possessing above all a local action.

Cocaine is a powerful alkaloid; in a relatively small dose it is a violent poison, against which we have to be on our guard on account of its toxic action upon the nervous threads with which it comes in contact.

Cocaine has its inconveniences, if only from the point of view of the healing of the wound, and of cellular reaction.

It is very evident that the healing process will not be so rapid with poisoned cells as with healthy ones.

With cocaine you will obtain different effects, according as you have made the injection into the cellular tissue, which lends itself admirably to diffusion (you will then have general accidents, and few local effects) ; or, if you have injected into the depth of the last entirely condensed tissue, which prevents in a great measure the extension of the intoxicating agent, you will then obtain more accentuated local anæsthetic effects.

It is not superfluous to add that temperament greatly modifies the sway of the anæsthesia ; a certain dose with one patient will produce a very different result than in the case of another.

In anæsthesia with cocaine there are two agents : one, the alkaloid, of which we have briefly seen the effects ; the other, the vehicle, which must not be forgotten.

Thus, this vehicle, whatever it may be (water, vaseline, oleo-naphthine, or any other), acts in different degrees, contributing to the anæsthesia in producing the anæmic phenomena cited above, by impeding momentarily cellular nutrition.

From all these anæsthetic agents we must withdraw the process of compression as regards our buccal practice ; which it would be difficult to carry out in the mouth.

Refrigerants are not always applicable owing to the region to be operated on, and the frigorific effects on the adjacent teeth, and even without this disagreeable action upon the teeth adjoining, we have met with patients who are unable to bear this cold sensation, followed by scalding.

The fear, although without much foundation, of mortification of the tissues is at all events possible ; it is necessary to avoid the sudden return of heat by rinsing the mouth with cold water. Finally, one must not employ coryl, or any other similar agent, when the thermo-cautery is to be used.

In general it would seem that the puncturing with Pravaz's syringe causes the least fear, and it is best borne by the patient ; but there are serious contra-indications as regards cocaine, with which we have to reckon ; characteristic anæmia, acute or chronic affections of the respiratory passages, debility, heart disease, pregnancy, or the period of lactation, and all conditions where we ought to be more than prudent.

It is certain that with these conditions, even should we employ one centigramme of cocaine, we should not risk a fatal issue ; but it is nevertheless true that there is some amount of risk, which is enough to make us a little perplexed.

In any case it not rarely happens, even with one centigramme, that some troublesome incidents are experienced with nervous, hysterical women, and to find patients who complain of a little dizziness, whirling of the head, etc., etc.

It is through the knowledge of the physiological action of these three classes of local anæsthetics, and considering that on the one side, if we range cocaine among the intoxicant agents, we can by virtue of its vehicle range it among the two classes studied above, that we have hit upon the idea, in other respects fully justified, of employing sterilized olive oil.

We do not pretend to dethrone cocaine, which without contradiction is the most powerful and surest local anæsthetic from the point of view of its analgesic action, but we wish simply to demonstrate that we can obtain an absolutely complete anæsthesia, and one without danger, without any contra-indication whatever, with sterilized oil, reserving cocaine for difficult cases, where we may consider an insensibility of longer duration is necessary.

We have no need, for the abolition of the sensibility of a region, to poison its nervous extremities ; it is sufficient for our purpose to deprive them momentarily of their sensitive faculties.

Starting with this theory, if we inject sterilized oil we drive out all the blood contained in the region to be operated upon, and if we have taken the precaution to make the injeccion into the body of the derma, into this dense tissue which resists the diffusion, we shall obtain a sheet of oil, which equally bars the return of the sanguineous wave which bathed and nourished these tissues.

Thus an anæmia is produced, determining an insensibility of all the nervous threads, and the operation is performed without pain. On the whole we obtain the same phenomenon as with compression and cold : we momentarily withdraw nutrition. Thus, without nutrition no movement, no sensibility, no life.

As to the injection we proceed as follows :—We make the puncture, not as indicated by Prof. Dastre, nor by Messrs. Isch-Wall and Sauvez, but we puncture the gum at the level of the collar at the depth even of the cushion surrounding the tooth, and we push our

needle in an oblique direction, sighting for the middle of the root and the dermal tissue. The quantity varies according to the subject.

If the tissue is very close, half a syringe full suffices ; in a contrary case we inject the whole contents of the syringe.

The number of the punctures also varies, and the operator must be the judge as to the number, just as with cocaine ; two generally suffice.

We obtain the oil by boiling it for five minutes and keep it in well-corked glass tubes.

The experience we have of this new agent is not great, and we do not yet possess many observations, but allowing the absolute innocuousness of olive oil injected into the tissues, we thought it would be well to publish our mode, so that experiments might be made.

The cicatrization is accomplished as rapidly as if nothing had been injected.

Here are a few of the experiments which we have made up to the present :—

1. Mdme. M., 22 years of age.—An upper left canine root. Injection of a half syringe full, Pravaz's ; dense tissue. Extraction painless. The root was a rather difficult one, and we had to go up high to remove it.

2. Mdlle. F., 20 years old.—Root of the second lower bicuspid, tissue relaxed. Injection : whole syringe full of sterilized oil. Extraction with elevator (pied de biche), no pain.

3. Mdlle. G., 18 years old.—Roots of the first upper molar right side, dense tissue ; four punctures were made. Injection : Pravaz's syringe, half full of sterilized oil ; a little pain at the third root.

4. Mdme. F., about 45 years of age.—Roots of the first upper right molar, tissue very condensed. Three parts of the syringe contents of sterilized oil injected. Extraction without pain.

5. Mdme. M.—Root of the first upper left bicuspid, dense tissue. Injection of half the sterilized oil contained in the syringe. Extraction without pain. In our clinic at the dental schools of Paris we have made two injections with sterilized oil.

6. Mdlle. X., about 25 years old.—First upper right molar. Injection of the whole contents of the syringe. Difficult extraction, lasting six to seven minutes ; no pain.

7. M. X.—First lower right molar. Injection of the whole syringe of sterilized oil ; a little pain during extraction.

You observe that the results are encouraging, but not wishing to rely solely on our experience, we should be glad if some of our friends would make experiments on our method.

We make the extraction almost immediately after the injection; this latter should give a large white patch to the surface of the tissue, for this coloration is the basis according to which we inject more or less of the liquid.—*Ash's Quarterly.*

THE DEVELOPMENT OF THE DECIDUOUS TEETH WITH CONSTITUTIONAL DISTURBANCES.

By R. B. Lees, M.D., D.D.S., Nashville, Tenn.

The nicety of that harmonious relation which ought to exist in development and growth should receive greater consideration than we have hitherto given it. That the baby teeth develop, grow, and are erupted without any special constitutional manifestation is a noteworthy fact in some cases. But I am sorry to say (especially in the cities) that this is the case in the fewest instances.

If nature has so nicely arranged these laws of growth and development in the one instance as to present the tooth without constitutional disturbance, the question naturally arises, Can we not in large measure have it so in many more, if not all other cases? The idea that prevails in society is big heads, little bodies, to the detriment of the child now and hereafter. It is an exceptional case to-day to find upon the streets of our cities a strong, healthy, vigorous infant or child.

There is but one solution to this most interesting question: More attention must be given to the diet, clothing, and exercise of the child before we may hope to have this condition changed or the teeth erupted in the normal way. Nor is this plea made simply on behalf of the deciduous teeth, but on the part of the permanent teeth also; for we must not lose sight of the fact that they (the permanent teeth) are beginning to form and undergo calcification long before the cutting edges of the temporary incisors make their appearance through the gums. It would seem, then, that the mother must be encouraged in the proper diet and necessary amount of exercise, in order that not only bone, muscle, and brain be properly developed, but tooth bone as well. The evil impressions of infancy and childhood are responsible for the poor condition of the permanent teeth. We seem to lose sight of the fact that, instead of one set of teeth in the infant's mouth but a

few months old, we have the germs of nearly all the permanent teeth, some of them quite far advanced, and some of which are beginning to harden. We have then a double responsibility with the parents of these infants and children. The necessity of the care of the body and mouth was never more imperative than at the present day, when weak constitutions, enfeebled digestion, and frail bodies are the order of things. Our work of education, so far as infants are concerned, is to be accomplished through physicians principally; that of the children through the parents. Is it not a fact, however, sad to contemplate that we as a profession are in large part to blame for the wonderful amount of ignorance that prevails, both in and out of the profession, on these most important subjects? The average dentist to-day is unfamiliar with the simplest facts concerning this subject, to say nothing of the manner of treatment to prescribe in a case.

Teeth should be erupted normally, and without producing such general disturbance of the system as is witnessed in so many cases at the present day. I do not deny nor fail to recognize that the evolution of the tooth is a physiological action, but I do say that it is remarkably singular that in the majority of cases we have at the time of the eruption of the teeth all of the signs of the system being generally shaken up. As a profession we need more light upon the subject. This will come as the result of close observation and study. If we could share the responsibility of these cases more with the physician, I believe that a better state of things would result to our little patients from the co-operation. I recognise that dentists generally are unfamiliar with this subject and the treatment to be prescribed; yet at the same time I must say that I believe that in many cases the physician is in no better condition, for the extent of ignorance displayed of the knowledge of the eruption of the teeth, both deciduous and permanent, is surprising.

The use of the lance in the hands of the ignorant practitioner of medicine in the depletion of the gums, and for an imaginary erupting tooth, calls for our solemn protestation; but we are in large measure to blame for this condition of things.

For the past few years it has been my good fortune, as well as pleasure, to see and examine the mouths of little patients in the effort to erupt their baby teeth. These little patients mostly reside in the mountains, away from the contaminating conditions which affect those who live in cities. In most instances their nourishment consists of the mother's milk. They are constantly in the sunshine and pure, fresh air, the result of which is that they erupt their teeth normally, and in nearly all cases without the slightest constitutional disturbance. Recently it was my pleasure to make some observations of a race of people who live an outdoor life and eat a frugal diet. Now what was the result of these observations? That the women gave birth to children without apparently any suffering or special discomfort, and within two days are engaged again in the daily routine work; that children erupt their teeth without the usual sickness and discomfort manifested in this country.

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NOTES ON THE TREATMENT AND FILLING OF TEETH.

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

(*Continued from page* 487.)

FILLING TEETH.

A description of the filling of teeth may be divided into a consideration of, firstly, the materials; and, secondly, methods of using them. As is well known, the materials employed are gold, tinfoil, amalgams, guttapercha, and the various white cements, or osteo fillings as they are often called. These latter are usually either oxychloride of zinc or phosphate of zinc. Gold is considered the best material for filling teeth if the conditions are favourable. Its successful use demands considerable knowledge and skill on the part of the dentist, and appreciation of the value of his services on the part of the patient. The dentist must be able to do the work and the patient must let him do it. Nervous, timid patients and all whose teeth are excessively sensitive are bad subjects for gold filling.

The cavity in the tooth after the decay is removed must be given a certain shape, little pits and grooves must be cut in the sound dentine to hold the gold firmly in place at the commencement of the filling and also to prevent its being bitten out "en masse" by the force of mastication. In addition to this, a considerable portion of the tooth must often be cut away to enable the cavity to be properly prepared, the gold properly packed and the edges left free. This cutting usually causes some pain. It is in the majority of cases easily bearable, particularly so if the patient understands the operation and has a sufficient appreciation of the value of his teeth to realise the advantage of doing his best to help the dentist by exercising self-control. Many patients are intolerant of the slightest pain or inconvenience. Some imagine it is quite unnecessary, and consider it is the correct thing to make as much fuss as possible. It is, however, absolutely necessary for the cutting process to be thoroughly and carefully carried out with scrupulous accuracy, otherwise the whole operation will be a failure. There is hardly any dentist who can do this satisfactorily when the patient is flinching and fidgeting, and telling him every few seconds that he

is "getting on the nerve," and asking continually how soon it will be finished, &c. Here and there may be found an operator of iron nerve and calm unruffled disposition, whom nothing disconcerts, and who can do "good gold work" under all circumstances, but he will probably have the satisfaction (?) of frequently hearing that although he is considered a remarkably skilful operator, the severity of his methods causes numbers of patients to forsake him for less thorough but more humane practitioners.

The dentine is sometimes excessively sensitive, and even if the patients can screw themselves up to bear the operation, its proper performance may cause an amount of suffering and shock that, particularly in the case of those of delicate organizations, it is better to avoid. Fortunately, these excessively tender teeth are not met with every day, and in contradistinction there are some patients whose teeth can be freely cut into in all directions (avoiding the pulp) without causing them the slightest pain.

An experienced dentist readily ascertains the temperament of his patient, and it is distinctly advisable and of the greatest benefit to his patient to work accordingly. It is useless to so worry a patient to fill one tooth, that he or she acquires a dread of the dental chair, and can never be persuaded to submit to another operation, gradually allowing all the the teeth to become decayed. Whether a patient's teeth are really very sensitive, or whether he or she is simply intolerant of slight pain or even inconvenience, has practically the same effect in deciding the dentist that it is inadvisable to use gold. In the former case it is much more humane to use other materials, although they may not last so long, and in the latter, as already explained, there is every risk of the work being imperfectly done and the result consequently unsatisfactory. Therefore, the first requisite, if gold is used, is "a good patient." The next consideration is a healthy mouth, and by this is meant, in this connection, one in which the teeth in general do not appear to be decaying rapidly (presuming, of course, that the patient takes care to keep the teeth clean and well brushed). It is practically impossible to satisfactorily test the fluids of the mouth with the object of ascertaining whether or not they are in a condition to cause great or continued destruction of tooth structure.

To do this with any probability of arriving at accurate results, the tests would have to be applied frequently, and continued for a long time and at regular intervals all through the twenty-four

hours of the day and night. This is impracticable, and therefore the judgment of the dentist in regard to this matter must be based on observation and experience and experiment, and with regard to the last it is often wise, where there is any doubt, to fill two or three teeth with gold and the others with more temporary materials, and then, if the teeth filled with gold appear to be "standing well," to replace the temporary fillings with gold as they become dissolved or worn away.

If a well made gold filling fails to preserve a decayed tooth, it is simply because the tooth is again attacked by decay. It is a curious fact, but one that will have been often observed by dentists of experience, that in many cases the more temporary materials are attacked and disintegrated by the oral fluids—although, until they are very much dissolved or worn away, the tooth itself escapes—while on the contrary, the gold is able to withstand all assaults and apparently in revenge the tooth structure around it in many cases soon becomes decalcified. It is considered that if the teeth appear to be of poor structure (viz., do not appear to be dense) it is inadvisable to fill them with gold, with the exception, however, of teeth that have distinct chalky patches or defects running to or in the immediate vicinity of the edges of the cavity, the present writer is of opinion that if all other conditions appear favourable, this is not in itself a sufficient reason. It is far more a question of the corrosive nature of the fluids of the mouth (presuming the patient is a good one, and the tooth not affected with distinct defects). Strong looking teeth and healthy mouths are usually found together, but it will have been in the experience of many to note how rapidly the strongest teeth will sometimes decay.

It is also, as a rule, inadvisable to use gold if a tooth has recently ached, or if a pulp has been exposed, or if any diseased condition has been recently treated. The force used in packing the gold may set up irritation in these cases, and it is always well to be cautious. It is very annoying to have spent a considerable time on a gold filling and then shortly afterwards to be compelled to remove it owing to a recurrence of some previously diseased condition. It is far wiser to fill such cases temporarily for a year, and then, if everything appears satisfactory, to refill with gold. The main point to be considered by the dentist, providing the patient is a good one (apart from diseased conditions), is the probability of the tooth lasting a long time if filled with gold. It is no use putting a

filling which under favourable circumstances might last twenty years, in a tooth that will probably only last two, and even when everything appears favourable, the dentist, if skilled and conscientious, will take every precaution to prevent further decay taking place, for beyond the fact that it will in itself resist the action of all the fluids of the mouth, no matter what their condition may be, and that if skilfully and carefully worked it will not wear away or chip at the edges, he knows there is nothing in the gold that will help the tooth to resist decay. He will in many cases enlarge the cavity so that the edges where the joints between the gold and the tooth are made can be kept clean and free from the collection of food particles, which by their fermentation and consequent acid reaction might cause a recurrence of decay at these parts, and by being brought out just to where they can be readily seen and reached, admit of being quickly and easily repaired should decay again take place. He will be careful to grind out all little roughnesses and defects from the edges of the cavity, so that there will be no weakness or imperfection in the joint to invite an attack of the enemy. He will in fact feel that he is using a material that will last if the tooth will, and therefore he will take pains to enable the tooth to resist as long as possible. No one can prophesy how long a gold filling will last in any individual case, but if the conditions are favourable, the majority last sufficiently long to fully justify the time, care and expense entailed by them, and the dentist who inserts many gold fillings must necessarily be skilful and extremely painstaking—qualities which ensure his patients getting full justice done to them in all his operations.

Amalgams.

The next most durable material in itself for filling teeth is amalgam. It is often called platinum cement, or gold alloy, or silver filling, and in the olden days rejoiced in the name of "Mineral Succadeneum." As is well known the basis of the majority of the alloys which, mixed with pure quicksilver forms an amalgam, is tin and silver ; a small proportion of gold is often added, as is also platinum, and sometimes other metals.

After melting together the different metals and pouring them into an ingot mould, the resulting mass of mixed metal is reduced to fine filings or shavings, and is then ready, after careful sifting, to be

mixed as required with the quicksilver. Small pieces of the resulting paste are introduced into the cavity in the tooth, where it soon sets, and a filling is thus produced that is very hard, and resists the action of the fluids of the mouth.

The advantages of this material are ease and rapidity of introduction, and, as above mentioned, hardness and insolubility in the oral fluids.

Its disadvantages are that, like gold, the tooth cannot be saved at the expense of the material, and decay may attack the enamel surrounding the filling; that the surface of the filling usually becomes unsightly, owing to its turning more or less dark, generally varying from a dirty grey, or slate colour, to inky blackness; and, worst of all, that it shrinks slightly, and by reason of this shrinkage the edges of both the material and the tooth become frequently chipped and broken by the force of mastication, and that decay again takes place in consequence thereof. Many makes of this material are advertised never to shrink, and never to change colour, and we are told that they may even be used in front teeth. With regard to this latter assertion, some years ago I experimented on front teeth with four of these so-called white alloys, and, as in every case, three of the four turned quite black, and the fourth became slate-coloured, my confidence in these assertions has been shaken, and I am not inclined to make further trials; while, as regards shrinkage, although this may vary somewhat in different alloys—and the method of working has also something to do with this—I have always observed more or less shrinkage and curling up at the edges in all alloy amalgams that have been in the mouth for about two years. In certain cases that I have had an opportunity of watching, I have noticed practically no apparent shrinkage at the end of six months, slight shrinkage at the end of a year, and the usual curling up of the edges in from eighteen months to two years. I am inclined, therefore, to think that this gradual change must be due to very slow, but very sure evaporation of the quicksilver at the temperature of the mouth, and that tests made out of the mouth are valueless unless similar conditions to those found in the mouth are reproduced as far as possible.*

* Since the above was written the experiments of Dr. Black have been published, and the defective edges which appear some considerable time after the insertion of amalgam fillings are shown by him to be due to pressure of mastication causing flow of the metal.

Notwithstanding its defects many teeth have been preserved for many years by amalgam fillings, and if, as is usual, it is confined to cavities not exposed to view, its dark colour is no disadvantage. It is not in itself as good a material for saving teeth as gold (owing to shrinkage and chipping of its edges), providing the conditions are favourable for gold, but as it is inserted in a plastic condition, and can be literally squeezed into any depression, or round any corner, the severe cutting necessary for gold is avoided, and a certain amount of pain and inconvenience is spared the patient. Of course, a retaining cutting is necessary when amalgam is used, but it need not be done with such mathematical accuracy ; for with gold the pits and grooves must be made exactly in certain positions, not only for retainage, but to enable the filling to be built up bit by bit. It must therefore be allowed that amalgam is superior to gold for filling many teeth at the back of the mouth for all patients who are sensitive or nervous, or who cannot endure prolonged operations.

All other things being equal, it is not as good a material for filling weak teeth as gold, for in these cases the chipping of the edges is peculiarly disastrous. With regard to its use in mouths where decay seems to be rapidly going on, I believe it would hold much the same position as gold, as regards saving the teeth, if it did not shrink. This defect places it in my opinion (other things being equal) below gold. In these cases, however, speaking generally, the use of either gold or amalgam, *per se*, is better avoided.

Copper amalgam, which consists simply of pure copper and quicksilver ready mixed, and which is softened for use by heat, does not appear to shrink or chip at the edges. It can be placed in a tooth in a very plastic condition, and will set very hard. If a little soft dentine is left in the cavity, it will be permeated by the copper salts, and sterilised, so that as long as the exterior of the tooth and filling remains intact no decay will progress in the interior. The soft dentine will be stained a very dark colour. It will be seen, therefore, that it possesses certain valuable properties. They are, however, more than counterbalanced by its defects. Its colour, although black, is not of much moment ; it will not discolour a live tooth if all the soft dentine has been removed—at least, I have never seen this—but will turn a dead tooth very dark. It wastes away on the surface, and, in some cases, rots, or becomes dissolved at the

cervical edge. In fact, except that it is more durable, it behaves in these respects very like a phosphate filling. The general wear soon causes the contour of approximal fillings to be lost, food to become wedged between the teeth, and extension of decay to take place in consequence, while the cervical wasting, when it occurs, increases the trouble.

Owing to its hardness, it is extremely difficult to cut out, and this is often necessitated for the above reasons.

It can, however, be used with great advantage in many crown cavities and fissures in the bicuspids and molars (particularly for young patients), and for cavities on the sides of molars and sometimes bicuspids, where owing to the extraction of the adjacent tooth, the filling is perfectly free and can be easily repaired when necessary. A cavity can be very rapidly filled with copper amalgam, and as the surface soon becomes smooth from wear there is no necessity to spend much time in finishing the filling.

If its use is confined to the above-mentioned cavities, including buccal and palatal surfaces of molars, and occasionally bicuspids, it will be found to give great satisfaction in many cases, particularly if the teeth are sensitive and the retainage doubtful, and the mouth too wet to admit of the use of osteo, or alloy amalgams with an osteo lining, and it is desired to dispense with the rubber dam.

(*To be continued.*)

FRACTURES OF THE JAW.*

By W. F. Forsyth, Junr.

Mr. President and Gentlemen,—

The subject of fractures of the jaw is of exceptional interest to dentists, not only because a broken jaw is one of the gravest conditions that we are called upon to treat, but also since such cases fall within the province of dentist and surgeon alike, and the dentist's aid is often requisitioned for the necessary mechanical treatment.

This injury, being usually the result of a degree of violence quite beyond the ordinary wear and tear of everyday existence, is

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

met with mostly among the lower classes, who are either exposed to such accidents from their work, or run occasional risks in a Saturday night brawl.

Fractures of the upper jaw being of the greater rarity, it will be convenient first to consider those of the lower jaw.

The lower jaw is formed at an early period of life. It is in fact the second bone to be laid down. The greater part is formed from the fibrous tissue investing Meckels's cartilage, but a portion near the symphysis, and also the condyle and part of the ramus, are developed from cartilage. At birth the bone consists of two halves, united by a fibrous symphysis, in which ossification goes on during the first year.

Observations on the development are unusually difficult, owing to the early deposition of the nuclei (sixth to eighth week). My object in alluding to these facts is mainly to point out that, owing to its early date of formation, the question of the seat of fracture is not complicated by them.

The lower jaw is at once seen to consist of the body, rami, and coronoid and condyloid processes. It is a bone of very strong appearance. When one looks at the whole skeleton, the arch of the lower jaw does not by any means give one the impression of fragility. The coronoid and condyloid processes, however, especially the former, strike one as being a much more likely place for the occurence of a fracture than the body.

But the protection by muscles of these processes, and their position in the jaw, make such an event one that is rarely seen.

In the young the body of the lower jaw is, with the exception of the petrosal, the densest bone in the skeleton ; but in old age it becomes exceedingly porous, and often so soft that it may break easily.

There are many places in which the bone may be fractured. The most common situation is the body of the bone, in the neighbourhood of the canine fossa.

We may also have fractures through the symphysis, just behind the wisdom tooth, at the angle, and of the condyle and coronoid processes.

Fractures of the jaw may be either simple or compound.

A *simple* fracture occurs when the ascending ramus is broken.

A *compound* fracture is always the result of a break in the horizontal ramus ; so that all fractures are compound which occur in front of the wisdom tooth.

The reason for this is obvious: whenever a fracture injures the alveolar border the mucous membrane of the gum must be torn, thus rendering the fracture compound. The direction of the fracture is generally oblique, but at the symphysis it is sometimes vertical. Horizontal fractures may be met with when the alveolus alone is involved. Comminuted fractures may likewise happen, and Poland records a case where a fracture occurred in five different positions, the cause being a kick from a horse.

The injuries producing fractures are:—

(1) Kicks from horses. (2) Blows from the fist or boot, etc. (3) Falls from a height. (4) Gunshot wounds. (5) Use of Dentist's key. (6) Passage of vehicle over jaw. (7) And lastly, Gross mentions a case where an old man fractured his jaw whilst coughing.

When a vehicle passes over a jaw, generally the ramus is injured; but there is not such a great displacement as one would think owing to the deep situation of the bone, and because it is supported on each side by the masseter and internal pterygoid muscles.

Gunshot wounds generally cause great displacement, and as a rule, not only the lower, but a considerable portion of the upper jaw is severely injured.

Falls from a height fracture the neck of the condyle. In all cases of this accident this has been the cause.

Kicks from horses, and blows, etc., may injure any part of the bone, and so no definite place can be mentioned.

The most common place for a fracture is undoubtedly the body of the lower jaw, Hamilton recording 52 cases out of 55 in which the body was implicated; and, from statistics, the fracture generally occurs in the region of the canine tooth. This is probably due to the great length of the socket of the canine tooth, and so, consequently, the bone in that situation is not so strong as in other parts. At or very near the mental foramen is the next most common situation. Heath mentions that in 32 cases of fracture 20 were either at, or in very close approximation to, this foramen. Fracture at the symphysis occurs mostly in children, but cases are recorded where men of 60 years of age have fractured this part. The ramus is not nearly so liable to be fractured, owing to its position and muscles, which protect it. There are very few cases known of fracture of this part. The condyle and coronoid processes are rarely fractured alone. When a fracture occurs in this situation

another fracture will usually be found at some other part of the bone, so making matters more complicated.

The symptoms are generally the same in most cases, and are well marked. The patient comes with his or her hand holding the jaw, complaining of pain ; but sometimes cannot speak at all, this inability being a typical sign. There is unevenness along the base of the jaw, and irregularity of the teeth, with mobility and crepitus when the parts are handled. The crepitus can be felt by gently moving the fragments together. The patient is conscious of pain and of slight grating on pressing the jaw, and often can scarcely open his mouth. There is a tendency to increased salivation, and this often has a bloody tinge when the mucous membrane has been torn in the case of a compound fracture.

The irregularity of the teeth is best seen by the bite, which is of course abnormal. The teeth sometimes are a guide to a fracture, as usually they are either loosened or broken off, and it often happens that the fracture occurs in this spot. When a fracture of the processes has occurred, it is not easily diagnosed, as the patient does not complain of a great amount of pain ; and it is only by very careful investigation that one discovers where the fracture has occurred. In simple fractures, the smaller fragment is liable to be displaced by muscular action, as it is drawn outwards and a little forwards, so as to overlap the larger fragment. This is accounted for by the action of the temporal and masseter muscles, especially the latter. In double fractures, the displacement is greater since the muscles below the chin tend to draw the central loose piece downwards and backwards towards the Hyoid bone. When the neck of the condyle is broken, that process is often much displaced by the action of the external pterygoid muscles. This accident is distinguished from a one-sided dislocation by the jaw being displaced to the same side. In dislocations the jaw is displaced to the opposite side.

Complications :—Unfortunately there are a great number of complications arising from fractures of the jaw, and often, just as you think that your patient is making a good and quick recovery, one of these complications arises, and delays the case considerably.

(1). *Wounds of the face* only occur when the fracture is compound. Of course they must be dressed and kept clean, or else their healing will take considerable time, and might lead to disfigurement.

(2). *Hæmorrhage*, both primary and secondary, has occurred, and been of serious consequence ; but as a rule it is very slight, often only occurring from laceration of the gums. Owing to the elasticity of the inferior dental artery, this is not often injured, and so hæmorrhage of a serious kind is very rarely heard of.

(3). *Dislocation or fracture of the teeth* is not unfrequently met with, owing to the violence of the injury required to produce a broken jaw. Great care must be taken to see that the teeth do not fall between the edges of the bone. Erichsen mentions a case where this happened, and so union was delayed. Teeth very often are loosened. They should not be removed, as sometimes they are a support to the splint, and also will probably become firm and useful.

(4). *Injury to the base of the skull* has occurred. This has usually happened when there has been a very severe blow, or fall from a great height.

(5). *Paralysis, or Neuralgia*, which arises from injury received to nerves, especially the inferior dental. As a general rule, no injury to the nerves occurs, and Boyer explains this by the fact that "the greater part of these fractures take place between the symphysis and the mental foramen, by which the nerves find their exit."

(6). *Abscess and Necrosis.* As the fractures are compound into the mouth, it is most difficult to keep the seat of fracture free from septic infection, and the consequence of this is a certain amount of suppuration goes on. Generally the suppuration happens at the seat of fracture, the pus escaping into the mouth. The suppuration may spread to the alveolar portion, and so cause necrosis of a part of the alveolus ; but sometimes the pus will accumulate, forming abscesses of different sizes, which usually point below the jaw. Owing to this portions of the lower jaw may become necrosed. I believe, in the treatment of necrosis, that any efforts to assist nature are usually harmful. The blood supply of the bone is so good that the sequestrum will almost invariably come away of itself without difficulty.

(7). *Dislocation.* This is a very rare occurrence. Only a very few cases are on record of fracture complicated by dislocation of the condyle from the glenoid cavity. The fracture having occurred would tend to prevent the dislocation, as the leverage would be interfered with.

(8). *Salivary fistula* may arise from a compound fracture, or, in the case of a simple fracture, in which an abscess occurs and bursts externally.

(9). *Irregular union.* When the fracture has been much displaced it may be difficult to get it into its proper position, and so there may be an irregular union of the bone, which may be inconvenient in after life. This does not occur so much in single, as in double fractures; for the central portion of the jaw is greatly displaced by the action of the muscles. It can be remedied by sawing through the bone at the seat of malformation, and resetting the fragment in its proper position.

(10). *Ununited fractures.* Fractures of the lower jaw unite with great rapidity, although one may have so many difficulties to contend with. In fact, no bone in the body is so unliable to false joint as the lower jaw, as shown by Morris, who records out of 150 cases—

48	occurred	in	the	femur.
48	,,	,,	,,	humerus
33	,,	,,	,,	leg.
19	,,	,,	,,	forearm.
2	,,	,,	,,	lower jaw

Non-union is met with as a result of careless treatment. But a case is on record of a man whose fracture united although he refused to be treated. In this connection Bryant mentions the case of a child, who did not make any recovery until the bandage was removed.

(11). *False joints.* When bony union between the fragments of a broken bone has failed to take place, the fragments may be united by fibrous tissue in two ways: either by the fractured ends being held together by ligamentous tissue, or a ligamentous capsule is formed, and is lined by a smooth membrane, which secretes synovia. When false joints occur, these are often of great inconvenience, especially in the body of the bone, as the patient cannot masticate properly.

Treatment.

Various splints are used for maintaining the fragments in position, and providing immobility. The simplest is a guttapercha

splint, which is held in position by a four-tailed bandage. The guttapercha must be slightly heated and moulded to the jaw, and should be lined with chamois leather, with holes in it to allow of evaporation ; and the parts are best dusted with some dusting powder, to prevent decomposition. This must be seen regularly, as the bandage slips, and the splint often requires readjustment. This splint is most useful when there is no displacement, when the fracture is about the angle of the jaw, and also in horizontal fractures. In most cases interdental splints are required. Of these there are four kinds, which are generally requisitioned :—(1) The Hammond or Wire splint ; (2) Hayward or Kingsley splint ; (3) Gunning splint ; (4) Hern or modified Gunning splint.

To Apply a Dental Splint.

The operator must take a model of the upper and lower jaws. This is usually most painful, and for children it is best to give an anæsthetic. Wax is the best material for taking the impression, as it can be used very soft, failing this stent, but it must not be allowed to harden too much. When the models are cast, the lower one should be sawn in two at the seat of fracture, and the two parts held together in their normal position, so as to make a correct bite with the upper.

Hammond Splint.

This splint is made by bending soft iron wire as neatly and accurately as possible to the teeth, and joining the ends by soft solder. When it is ready to be inserted into the mouth (the fragments of course having been placed in their normal position), it is kept in position by being bound down by binding wire in the following way: the wire must be passed from *without over* the *top of the outer bar* of the splint, then passed *under* the *inner bar*, returned *over* the *inner bar* and brought out *under the outer one*, and the ends twisted together under the bar.

The ligaturing of the teeth is most difficult, and Mr. Newland Pedley has invented two pairs of forceps for passing the wire and holding it. Not only do these save a lot of trouble, but also prevent traumatic inoculation from the fingers being pricked by the binding wire.

Before applying the splint, it is necessary to remove all the tartar around the teeth and to get the teeth as clean as possible.

The great advantage of the Hammond splint is, the patient need not wear a bandage, which is always most cumbersome, and he can masticate his food, and keep his mouth clean by the use of various mouth washes. A mouth wash must always be given, and is to be used as frequently as possible. Condy's fluid is perhaps one of the best, as it is cheap and efficient. If astringents are likewise required, sulphate of zinc may be recommended. The Hammond splint is suitable when a fracture occurs in a mouth having firm teeth, and in severe cases of horizontal fracture involving the alveolus of two or three teeth.

It should not be used, however, in a downward displacement.

The next splint of importance is the Hayward or Kingsley.

This is a vulcanite cap, fitting over the teeth very loosely, and into each half an iron wire is inserted, so that they lie outside the mouth. They should not be too thick (about $\frac{1}{8}$ of an inch), and reach as far as the angles of the jaw. Two points or tags are soldered on to the wire, one near the front to prevent the bandage slipping forward, and one at the back for fixing the bandage where pressure is required about the angle. Into the cap some softened guttapercha must be moulded, and when the displacement has been reduced, the splint should be forced into position. A pad is placed under the chin, and a bandage fixes them all together.

This form of splint is usually used for children, when the teeth are not firm enough to permit of a Hammond, or in a downward displacement, or where there are few teeth standing.

The great objection to it arises from the fact that the wires do not allow of the patient sleeping on his side ; but on the back.

Gunning Splint.

This splint, which is but rarely used, is made by vulcanite caps, joined together for the upper and lower jaw. A space is left in front, so that the patient can receive his food through it. These caps should be filled with guttapercha, and a tight bandage should be applied.

There are very few cases in which this splint can be used, as it is so cumbersome ; but it is usually applied when there is a fracture of the upper and lower jaw together.

Hern Splint.

This splint is a modified form of the Gunning, and was devised by a late member of our staff. It consists of a vulcanite cap covering the teeth and alveolar border of the lower jaw, blocks or pillars being made for the articulation of the upper teeth, in which guttapercha is inserted.

This splint is put in in the usual way, but Mr. Hern prefers a skull and chin cap to a bandage.

The advantages claimed by Mr. Hern for this splint are :—

(1.) The upper teeth are not covered over, so that the patient can cleanse his mouth and keep the teeth clean. (2.) It can be adjusted quite easily. (3.) It is not very heavy. (4.) It can be made to articulate with the upper teeth by means of guttapercha.

The most suitable cases to use this splint are :—

(1.) In edentulous cases. (2.) Where there is a fracture behind the last molar, or ramus of the jaw. (3.) Where there are no firm teeth in any fragment.

There are very many more splints one might describe ; but I do not intend to enter into detail with them, but will name them briefly :—

(1.) Wedges of cork sloping to a point and four tailed bandage. (2.) Wedges of guttapercha introduced warm into the mouth, so as to become moulded to the teeth and gums, as advised by Hamilton. (3.) Mutter's clamp. (4.) The very ingenious but rarely practical method of Dr. Angle. (5.) Lonsdale's splint, suitable for fractures between the incisors. (6.) Wiring of the bony fragments. (7.) Ligaturing the teeth with silk, which is not satisfactory, as often the teeth are loosened, and irritation is set up in the gums. (8.) Thomas's splint, for compound fracture, by drilling the bone on either side of the fracture, and fixing the fragments by means of a thick pliant silver wire.

There are many disadvantages to the use of splints, and, briefly, these are :—

(1.) The dribbling away of saliva. (2.) Great weariness from propping open the jaws. (3.) Owing to the difficulty of keeping the mouth and splint clean. (4.) Closure of the mouth, leading to suspension of speech and mastication.

Case of Fracture of the Upper Maxilla.

Fractures of the upper maxilla are so rare that I have only one case to show, kindly lent me by Mr. Storer Bennett.

The patient, a man of 23, had a very severe fracture, caused by the explosion of a chemical engine. There was very great displacement, and the antrum was severely injured.

A vulcanite plate was used, and wired to the teeth.

The patient wore it for six months or so; the fracture united satisfactorily, and, as will be seen from the model, the displacement was almost rectified.

Time has not permitted me to amplify many of the details of great interest to which allusion has been made, but if in this somewhat cursory view of the subject I have raised points which will excite a good discussion, my object has been attained.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The First Meeting of the Session was held on the 4th ult., Mr. David Hepburn (President) in the Chair.

The Minutes on the previous Meeting having been read and confirmed, Mr. H. Bambridge, L.D.S., 27, King Street, Great Yarmouth, was proposed as a non-resident member.

The President announced that the following gentlemen had signed the obligation forms:—Messrs. W. Jarvie, Brooklyn, U.S.A.; E. H. A. Mackley, Norwich; J. W. Tomlinson, St. Leonard's-on-Sea.

The following gentlemen were ballotted for, and duly elected members of the Society:—Messrs. A. W. Hoffman, L.R.C.P., M.R.C.S., L.D.S., Eng., and J. Sim Wallace, M.D., B. Sc.

The President said he had very much pleasure in bringing forward a recommendation made by the Council. It was customary occasionally to confer one of the few honours they had at their disposal upon old members of the Society who had served the Society well and had retired from practice. Mr. Balkwill had found it necessary to retire from active work, and also from the membership of the Society. The Council recommended that Mr. Balkwill, in consideration of his many services and long membership,

extending as far back as 1861—very nearly to the foundation of the Society—should be elected an honorary member. The resolution was carried by acclammation.

The LIBRARIAN announced the following additions to the Library:—"Dental Materia Medica and Therapeutics, 4th Edition," by James Stocken, revised by Leslie M. Stocken and J. O. Butcher; presented by the Authors. "Guy's Hospital Reports"; "The Transactions of the Royal Medical Chirurgical Society," and the "Calendar of the Royal College of Surgeons of England" in exchange.

CASUAL COMMUNICATIONS.

Mr. MAIN NICOL said the two cases he had to speak about were both more or less interesting; the one in a purely scientific sense, and the other in a more clinical sense. The first was a case of ptosis, associated with, and apparently caused by, a dental lesion. It occurred in a young lady, aged 25, who in June last consulted him for severe unilateral facial neuralgia. She had suffered intermittently for more than a fortnight. from attacks of pain commencing in the biscuspid region and extending backwards to the angle of the jaw, upwards to the temple, and downwards to the neck, so that, as she described it, the whole side of her face ached. The pain was usually at first slight, eventually becoming indescribably acute. The seizures varied in intensity and duration, with uncertain intervals, and were most erratic in their onset. What chiefly attracted attention was the half closure of the right eye with dilitation of the pupil, and flushing of that side of the face. The patient stated that in one of these neuralgic seizures more than usually severe, the pain compelled her to close the eye and that she had been unable to open it fully since. The condition of the left eye was normal. An examination of the teeth revealed only three small fissure cavities in the surfaces of the right upper and lower third molars; in two of these cavities probing brought on the neuralgic pain. They were intensely sensitive, and excavation was only possible after the injection of cocaine hypodermically into the surrounding gum. The cavities were then filled with oxyphosphate. The patient reported herself on the following day as much better; three days later she was completely recovered, the lid and pupil having recovered their natural mobility, and no recurrence of pain had occurred. Fourteen days ago she reported herself as being quite free from pain and

ocular trouble. Taking everything into consideration he was inclined to the view that it was a purely functional hysterical condition, although the medical attendant stated that the patient was not particularly neurotic and had never shown any neuromimetic tendency.

Another case was one in which the maxillary tuberosity was fractured during the extraction of the second upper molar. Ten months ago a medical student, aged 20, consulted him with reference to the left second upper molar, which had been the cause of considerable pain. It was greatly broken down, the pulp projecting as a polypoid granulating mass, while acute periodontitis rendered any manipulation painful. Nitrous oxide and oxygen having been administered, an attempt to extract the tooth was made, but unsuccessfully. On a second trial the tooth was taken hold of extra-alveolarly and removed only with great force. Considerable bleeding ensued, but ceased without any special treatment. Subsequent examination revealed extensive vertical fracture of the superior maxilla. The posterior fragment gave the sensation of being united to the main portion of the bone above. It was mobile in every direction. Crepitus was very distinct, the patient himself detecting it when swallowing or touching the fragment with his tongue. There was backward displacement to the extent of about a quarter of an inch. The roots of the tooth were united into one mass by pathological cementum. No attempt was made to ascertain if the antrum was opened. The treatment consisted in the application of a splint and the frequent use of antiseptic mouth washes. The subsequent course was uneventful ; some deep seated tenderness gave rise to a suspicion of suppuration in the maxilliary sinus, but this did not occur. One or two minute sequestra were spontaneously extruded between the ninth and twelfth days, and on the eighteenth day the splint was removed. When seen three weeks ago union was perfect and apparently osseous.

Mr. F. J. Bennett asked if enquiry was made as to the probability of influenza being the cause of the first case mentioned by Mr. Nicol. It might seem far-fetched, but he thought it would be found that a great many of these obscure cases could be fairly traced to that cause. He had two similar cases in the summer, and they both yielded to anti-pyrin, getting perfectly well without any local treatment whatever. It was quite possible that the flushing of

the face, the unilateral neuralgic pain and the ptosis might well be put down to influenza. At any rate it was a thing well to keep in mind, so that in the event of other methods failing they might try some such drug as anti-pyrin, given in ten grain doses at first, and then 5 grains every half hour until the pain was relieved. If the heart's action was at all weak a teaspoonful of brandy given every half hour would counteract any depressing effect of the anti-pyrin.

Mr. ALBERT believed that Mr. Nicol was perfectly correct in attributing the cause to hysteria, the dilitation of pupil was sufficiently good evidence of that, but he would ask whether there was a possibility as to its being a case of temporary diphtheritic paralysis.

Mr. VANDERPANT asked whether in the case of a tooth such as that described, it would not be advisable to apply the extracting forceps and split it. He thought in the case mentioned by Mr. Nicol if the tooth had been split the roots might have been removed without fracture of the alveolus.

Mr. MATHESON related a somewhat similar case in his own practice to the second one described by Mr. Nicol. In that instance the fracture occurred in the extraction of the sixth year molar. The patient was a boy about twelve, and as the second molar was coming down he wished to make more room for it. The sixth year molar was not a good tooth and had to be removed. Being extremely firm it was extracted under gas. It came away, but it was found there was a fracture of the maxilla. The case corresponded almost exactly in appearance to that mentioned by Mr. Nicol. The boy gave a sudden spasmodic movement just as he was applying the greatest force that could be safely applied, and it was just then that the fracture occurred. Gas being again administered he was able to press the fragment into position. It went very comfortably into its place and seemed to be so firmly settled that it was not thought necessary to put on a splint. The boy was at school and was told to come again if he had any trouble. He did not see him until the end of the term and then everything was perfectly quiet and safe, and he could trace no history from the boy of there having been any trouble. This was satisfactory, but it showed how even in extracting a tooth so far forward as the sixth year molar one must be prepared for an occasional occurrence of that kind.

Mr. NICOL, in reply, said in the case of the young lady he had made enquiries of her medical attendant, but he could give no

history of influenza that season. With regard to the possibility of diphtheritic paralysis, there was nothing at all corresponding to that. With reference to the other case he was sorry he had not the tooth to exhibit, but he did not think splitting it would have been an easy operation. It would certainly have taken far more trouble, and possibly would have done quite as much harm as the extraction.

Mr. Boyd Wallis presented a series of models showing supernumerary teeth; also a model of the case of a boy who suffered from a growth on the posterior nares. He reminded the Society that a few months ago Mr. Harding gave a casual communication upon perchloride of mercury. No discussion then took place, and he should, therefore, like to mention one or two points. In the south of France it was the custom to embalm the bodies of foreigners prior to their removal for burial elsewhere by injecting into the arm an aromatic fluid containing a strong solution of perchloride of mercury. By this means the body was perfectly preserved, both as to antisepticity and colour. A body which he had assisted to embalm he saw some three months after the process had been carried out, and the result was entirely satisfactory. This led him to test perchloride of mercury in the treatment of teeth, and for this purpose he had no doubt as to its value. Unfortunately, its use was often followed with acute pain, but this he had always found to gradually decrease and pass away. It was objected that as it was a powerful coagulent of albumen, it was therefore useless for their purpose. It certainly did coagulate albumen, forming a mercuric albumenate, for it was quite evident that when used for embalming purposes it had the property of permeating the tissues to an extraordinary extent. The results obtained with the perchloride treatment of the teeth was further evidence of this, for it was not at all uncommon to find in from two to ten days after its application to dead teeth intense pain followed, showing that whether coagulation had taken place or not, the mercuric salt had penetrated the tooth. The other objection was as to discolouration of the teeth supposed to follow its use. He had certainly seen discolouration succeed its application, but was this due to the perchloride, or was it the natural sequel to a dead nerve? He had a number of specimens, which he had tested in solutions of perchloride of various strengths for different periods of time, from two to many months, and they did not appear to have changed

colour in the least. One only containing a filling had turned green, probably from the formation of chloride of copper by the union of the mercuric chloride with the copper of the amalgam. Perchloride had the advantage that its antiseptic power was not destroyed by admixture with organic matter. The double cyanide of mercury and zinc was less irritating, and was a powerful antiseptic, one ten thousandth part of the salt having been found to preserve blood serum free from organic development, in spite of inoculation with septic fluid. Where severe pain was already existing, he treated the tooth in the first instance with iodized phenol, with a little cocaine and menthol added. Another preparation perhaps worthy of notice was the biniodide of mercury.

Mr. J. J. H. SANDERS (of Barnstaple) exhibited a form of palatal scaler, which he had found of some little use. The handles were roughened and larger than the old pattern, and the instrument was very much shorter from the handle to the blade. It had the advantage of giving a firm grip and bringing the point of the instrument nearer the fingers, so that they had the thumb and the third and fourth fingers on the teeth. He also exhibited a finishing file, which has some little improvement over the American pattern. It was made thinner, so as to enable the file to pass between the teeth which were not very much divided, and the angle was a little varied, so as to meet the case of teeth which were irregular. He had found it very useful in the case of irregular bicuspids where it was otherwise difficult to get at a distal filling.

The PRESIDENT then delivered his

INAUGURAL ADDRESS.

GENTLEMEN,

In occupying the chair of the Odontological Society of Great Britain this evening for the first time as your President, it is not my intention to deliver to you a lengthy introductory address. Indeed, I would willingly forego the ordeal altogether, but, bending before the inevitable, I crave your indulgence for a few minutes.

At a recent banquet given by this Society, Sir William Flower, whom we have the privilege of numbering amongst our honorary members, made pleasant reference to the hereditary principle displayed in our list of presidents, and it is a remarkable fact that in thirty-nine presidential years, no less than six sons of former

presidents have been chosen to fill the chair. Another point of interest in our presidential list is the fact that four gentlemen have been twice elected to office after considerable intervals, so that the links with the past have been thus further strengthened and maintained. History also at times repeats itself. It fell to my father, during his presidential year, to represent the Society at the funeral of Mr. Arnold Rogers, of honoured memory, who was so largely instrumental in bringing this Society into existence, and who ruled over its destinies with such fostering care during its earlier days; and to me, your present President, came my first, and I trust, saddest official duty of representing you, when the great father of our profession, Sir John Tomes, was laid in his last resting place. This is not the time or place to speak of the mighty work done by him. We, as members of this Society, whilst mourning his loss, have only to feel grateful that he was spared to a ripe old age, that he was able to see in great measure the results of his unostentatious but never-ceasing labours, and that he left us crowned with all the honours that a grateful profession could bestow.

In the memoir of this great man which has recently appeared in the pages of the "Journal of the British Dental Association," we trace his guiding spirit throughout all the onward steps of our professional progress, and let us hope that even a fuller history of his unrivalled career may yet be forthcoming to quicken and encourage those who continue to carry on the great work in which he took so active a part, and to inspire all the future members of our speciality with the full dignity and responsibility of that profession of which he was so bright an ornament.

As the older friends of the Society pass away, and no less than sixteen of our former presidents, with many honoured original members, are no longer with us, the ranks of the Society have been filled with not only a second, but I may almost say even a third generation of dentists, and to those of the original stock who remain it must indeed be gratifying to see the Society founded by them on so sure a basis, ever increasing and prospering, and becoming, year by year, more and more firmly established amongst the scientific societies of the land.

In the decade preceding the formation of our Society, weary and disapointing, vague and unsatisfying must have been the efforts of those high-minded practitioners who realised the burning necessity

of some steps being taken for the consolidation of the profession and the future education of the dentist.

The natural reluctance of the College of Surgeons to take to itself a speciality little practised, less appreciated, and for the acquirement of which no recognised educational system existed, not unreasonably suggested to the minds of many that a solution of the difficulty might be found in organising a separate institution, which should be to dentists what the College of Surgeons was to surgeons. A few there were who considered that a medical or surgical degree, with a little special technical knowledge picked up subsequently haphazard, summed up the needs of any who desired to practise the speciality at the same time ensuring a certain degree of respectability. But luckily there existed those who saw further into the future, who realised from their own dearly bought experience the full needs, educational, ethical and political, of the dentist; who believed that, while special education and training of a comprehensive character was an absolute necessity, at the same time association with an established medical or surgical body was the only means by which dentistry could be safely raised from its then chaotic condition, and firmly established, as it deserved to be, as an integral portion of the great healing art.

The struggle between opposing factions was a hard one; but happily for us the wiser heads, although in the minority, prevailed. After many and mature deliberations the Odontological Society was established in 1856, and soon, by force of reason, won over even its most stubborn opponents; then all worked together for the common weal. One of the earliest undertakings of the Society was the foundation of the Dental Hospital of London and London School of Dental Surgery. It suggested a curriculum in which prominence was given to the requisite training for the attainment of special technical experience and the necessary manipulative skill, combining with these a sufficiency of anatomical, surgical, and general medical knowledge. Thus prepared, the College of Surgeons was once more appealed to, and this time not in vain.

The history of the granting of a Royal Charter, which empowered the Royal College of Surgeons of England to institute a department in dental surgery in the year 1859, is too well known to dwell upon, but we must ever feel proud to recall the fact that our Society sowed the good seed that has since fructified so richly.

It is indeed impossible to dissociate the Odontological Society entirely from dental education and political progress, but in the phenomenally rapid evolution of which it was the germ, other organisations have developed, whose peculiar province it is to watch over these things. The Society, therefore, has leisure to quietly pursue its own ends.

It has done a great work in the past and it has a great work before it in the future ; indeed, in one way it is capable of exercising even a wider influence than any other existing dental institution. One important feature is the fact that it is the chief medium by means of which odontology is brought into immediate contact with kindred sciences. Again, it forms a common debating ground for vexed questions on points where general and dental pathology and practice meet, as many invaluable papers by leading medical men read and discussed at our meetings can testify. The interchange of our publications with those of learned societies at home and abroad is a feature also which must not be overlooked.

That the Society might do something in the way of endowing research is a point I refer to with delicacy. On the question of its desirability I have no doubt in my own mind, but we must not lose sight of the fact that although a wise and careful policy in the past has enabled us to accumulate a small reserve fund at this epoch, we know that ere long a large demand may be made upon it. Our home is but temporary, and although our child, "The Dental Hospital of London," has up to this time been able to treat its parent with leniency, there is no saying what may take place when the present premises have to be abandoned. I, therefore, during my term of office, shall feel bound sacredly to harbour our resources, none the less hoping that in the near future the Society may be in a position to expend adequate sums for the encouragement of investigation and research, and also for the still further improvement of our unique museum, and the extension of our library.

Meanwhile, I believe we shall not lack material on which to base our discussions, for new pathways of experiment and inquiry are daily unfolding themselves in the ever broadening plain of modern dental science, and we may rest assured that the voluntary work which has not failed us in the past will continue to be our portion in the future.

There are, however, lines of research which cannot be carried

through without considerable outlay—vexed questions, needing for their solution the laboratory and its appliances; questions which might be worked out by young enthusiasts, of which our profession claims not a few, possessing the time and the ability, but lacking the means, and it is in this direction that the Society will do well ere long to turn its attention and lend its aid. In doing so it will but be following in the wake of older societies, which have already found such a course expedient and useful.

Since the last meeting of the Society, the world of science has lost two of its greatest lights—Pasteur and Huxley. The stupendous and revolutionising work of the former will probably be more fully realised by future generations than it is by ourselves; but with the latter, Professor Huxley, we are in closer touch, for he was a keen odontologist, and, moreover, an honorary member of our Society. To this great man it is proposed, under the auspices of the Royal Society, to promote a national memorial—a project which this Society, of which he was so distinguished a member, will, I am sure, be proud to support.

I have referred to these two distinguished scientists because I feel the lesson of their lives is one which all those who cultivate the pursuit of knowledge, even in the humblest way, may well take to heart.

As your chosen President for the year, my time and services, such as they be, are entirely at your command, and with my able secretaries, helpful council, and your never-failing support, I have no fear but that the work of the Session will be profitable and useful, not only to ourselves, but also to the profession at large.

The discussion on Mr. CUNNINGHAM'S Paper on

"THE IMMEDIATE REGULATION OF TEETH,"

read at the July meeting (the Paper will be found, with illustrations, in the DENTAL RECORD for June and July) then followed.

The PRESIDENT said a communication had been received from Mr. W. Hern, who expressed his regret at being unable to be present, and sent models of one of the few cases of instanding front teeth he had treated by the immediate method. The teeth of the little patient which were immediately regulated had been tried by the heat test since the operation, and had responded at once, thus proving the vitality of the pulp. Although he would deprecate

immediate treatment in most, or even many of the cases of instanding teeth, inasmuch as they could be regulated in a less risky manner by other methods, yet he thought that many of them saw cases in which they were perfectly justified, under certain circumstances, in adopting the immediate method in correcting the deformity. If the patient was operated on before the teeth had fuly erupted, and there was no downward dislocation of the tooth to be moved, the risk of killing the pulp was, in his experience, a small one.

Mr. KIRBY mentioned the case of a patient, over thirty years of age, in which an eminent dentist had taken some considerable trouble to reduce by mechanical means a deformity caused by an instanding lateral, but without much success. She had heard of the operation of luxation, and was extremely anxious to have it performed upon herself. The case was not completed beyond the model being taken. The model showed the cut going completely down the alveolus almost to the extreme root of the tooth, and the tooth and alveolus altogether forcibly luxated outside the bite. In such a case he should say the probabilities were that there would be no necessity to put splints to retain the tooth in its place. It would go into position with a very small amount of force, and would be retained by the bite, which would prevent the tooth growing inwards again. If the operation was carried out there could be no doubt that it would be a success. The worst that could happen would be the death of the pulp, but the probability was that that would not happen.

Mr. J. H. BADCOCK had tried two cases since the last meeting. The first patient, a woman, aged 27, came on September 3rd. On the right side the teeth were rather crowded. The right canine was inside the bite of the lower tooth. There was a badly decayed lateral incisor paining her very much. That tooth was extracted. Having no convenient instrument at the time for making a saw cut, the rest of the operation was put off. The following week, having injected in front and behind the canine a little over a quarter of a grain of cocaine, he, with a circular saw, divided the alveolus between the canine and the central, and between the canine and the first bicuspid on the outside. He endeavoured to do the same on the inside, but, owing to the position of the instrument, could not work so well there. With the forceps shielded with tinfoil the canine was then moved into position. The patient, though rather nervous and sensitive, assured him that she

felt nothing whatever of the sawcut, but the pain of moving the tooth was much the same as in extraction, perhaps not quite so severe. He believed it could have been done painlessly if he had been able to inject more cocaine. Having done that, the tooth was tied with silver wire to the adjoining teeth. For the first three days the teeth were very sensitive, especially the central, which had the wire tied round it. The wire was removed, and since then the tooth was retained in position simply by its position outside the bite. The tenderness soon passed off, and there was no sort of trouble from the first except the tenderness caused by the wire. A report about the case sent in last week stated that the tooth was alive, almost firm, and perfectly healthy. The wound in the gum had healed up. The patient said the tooth was a little sore for the first week, but no inconvenience was felt after that. When he last saw the patient himself three weeks ago the tooth was very nearly as firm as the other teeth. The next case was that of a boy with two outstanding upper canines, two first bicuspids affected, and on the right side an instanding second bicuspid. He gave gas, removed the two first bicuspids, and at the same time brought the second bicuspid out into line. That was tied with wire in the same way, attaching the wire to the canine, then on the inner side of the second bicuspid, and round the first molar. There was no pain or inconvenience. He could not eat on that side of the mouth for a few days, but otherwise the tooth had done perfectly well. The operation was done about a fortnight ago. The tooth was not firm, but he had no doubt it would be very shortly. As far as one could tell the tooth was alive, and there was no trouble, not even from the wire. On October 25th the tooth was reported to be slightly loose, but it was alive and in good position.

Mr. CUNNINGHAM said, knowing that Mr. W. B. Paterson has had some experience in this operation, he was very anxious that he should be present. Unfortunately he had been unable to come, but he had enclosed some notes, leaving it to him to use them if he thought fit. He certainly thought fit because they were not all successes, and in a new operation they must face possible failures as well as successes. Mr. Paterson's notes were as follows:—"Immediate regulation of teeth. Hospital Cases. Feb. 1895. Girl. 22 years. Right lower second bicuspid. Crown at right angle to arch pointing towards tongue and indenting it. Adjoining first molar carious to gum

level and periostitis present one week. Treatment. —Extracted molar, using free inward motion to expand alveolar. Levered away septum at back of second bicuspid with fine elevator. Pulled up second bicuspid to vertical with forceps (blades sheathed in lead). The alveolar walls very firmly squeezed together. Second bicuspid in new position, did not articulate above by thickness of visiting card. A temporary splint of Stent's composition used until vulcanite plate made. Patient seen week by week for six weeks and discharged with tooth firm and no pain in mastication. Patien reported herself in six months. Tooth firm, colour normal, no pain or discomfort in mastication, but no alteration in the articulation observable. Space still a visiting card thickness.

"Lower Bicuspid Cases. Two other cases in patients, aged 25 and 27. Similar modus operandi; extracted first molars, etc., etc., (1894). In first of these cases bicuspid root fractured in the process of pulling up to vertical position. Tooth when vertical did not articulate by thickness of a sixpence. I saw tooth afterwards for one week, painful slightly. My colleague, Mr. R. C. Ackland, saw it three weeks after and reported little pain, firmer, but an inclination to revert to old position on removal of splint. Patient lost sight of afterwards (my holidays at time).

"1895. The third case of bicuspid regulation was a failure, and after nine days' trial tooth removed. Suppuration and slight necrosis present. I have an upper lateral case now in progress, fairly promising.

"Remarks on your paper and my cases :—

1. Too early to discuss such work.

2. Unless the aveolus is softened by preceding periosteal inflammation there is risk of fracturing the tooth in the regulating movements.

3. Here forcep pulling won't suffice to bring tooth into place always.

4. Splinting necessary.

5. Consideration of bite before operating and afterwards."

Since reading the paper he (Mr. Cunningham) had had the opportunity of operating in a lower case, of which he exhibited the models. It was not a very typical case showing any great utility in the operation. It was a case of a lower jaw with the lateral incisors outside the arch, a matter really not of any great importance, but

still there was a possibility of future difficulty, and as it was so simple an operation he thought it was worth while doing. In endeavouring to extract the lateral incisor, there being no opportunity of taking hold of it in the conventional way, it did not surprise him to find that it was fractured somewhat low in the socket. He incised the alveolus on each side of the tooth and then, taking the guarded forceps, pulled the incisor forward. The models showed the tooth in its splint, tied up, and simply ligatured, and a second model showed that the gum had now completely healed over the fractured root in the anterior part of the alveolus, partly owing, he thought, to the more than usual vigorous way that the case was dealt with. He had brought with him a pair of Dr. Bryant's forceps. Dr. Bryant had adopted the method of sectionising a portion of the alveolus and instead of trying to separate the tooth from the alveolus he believed it to be a better operation to try and carry the tooth with a portion of the periosteal and osseous attachment as well. He (Mr. Cunningham) had never had an opportunity of testing the apparatus, but in certain cases no doubt it would work well. Dr. Bryant was especially a supporter of the attitude taken by Mr. Spokes on this question. The Americans had also adopted this method of operating ; they spoke with the greatest enthusiasm of the success which had attended their results in experimenting in this direction, but gave no percentage of failures. He regretted that he was not able to furnish the photographs shown on the previous occasion, as they had been sent abroad. So far as he was personally concerned he had more confidence in the operation than ever before.

Mr. F. J. Bennett had not had an opportunity of practising the operation, but, as developed by Dr. Cunningham, he regarded it as a distinct advance on the earlier method. The introduction of the saw cut was distinctly scientific, and the fact of holding in view the importance of keeping intact the periosteum and the vascular supply to the teeth was another great advance. Then as to the importance of taking a model beforehand, and doing a preliminary operation on the model ; proceeding in that way they were quite sure that the bite was correctly adapted, and were perhaps relieved of difficulties, such as had been mentioned which might otherwise follow. He hoped that they would keep an open mind in the matter, and not be eager to condemn an operation which might have a great future before it.

Mr. MATTHIESON said that Mr. Cunningham, in reading his paper, spoke of the difficulties he had met with from the buckling of the saws that he used. He would like to ask what was the diameter of the saws he now used, and whether it varied.

Mr. ALBERT thought that such cases as those adduced could scarcely be pronounced to be successes until a period of at least two years had elapsed.

Mr. LLOYD WILLIAMS said, while he should be very loth indeed to attempt to condemn an operation simply because it was new, he would venture to offer one or two criticisms upon Mr. Cunningham's very interesting communication. He was sorry that the operation had been treated in that discussion more from the mechanical than from the surgical and pathological point of view, as he would have liked to have heard a few more details from the other side. New operations came in from time to time. They heard a good deal not long ago about transplantation. A good deal of noise was made about it at the time, but, as far as he could understand, it was not an operation which came to stay, and he personally had never seen a case. Two dangers in the operation now before them had been pointed out—one, that they might possibly fracture the tooth, and the other, that possibly the pulp of the tooth might die ; either of these was a serious matter, especially in the mouth of a good-looking young lady, whose friends perhaps magnified the beauty of their daughter or friend rather more than the dentist was apt to do. It was not, however, to these two points that he wished to call attention, but would rather refer to one or two things which had not been touched upon. First of all there was an absolute danger of septic infection ; this was a point which they dare not lose sight of, and if any serious surgical trouble were to arise in consequence of this operation they would certainly repent that they had not adopted perhaps a longer but certainly a much safer method. Mr. Cunningham had introduced a new operation, at all events in name. They had heard of plastic operations, but had now been introduced to "plaster" operations. One thing that struck him in connection with these plaster operations—and the models were very interesting—was that the contour on the alveolar surfaces had been very carefully restored, *not* by nature, but by the hands of the gentlemen who had manipulated the plaster. Did Mr. Cunningham think that *nature* was going to restore the contour of these alveolar

surfaces precisely in the same way? Take, for instance, a tooth which has to be moved with its surrounding alveolus one-eighth of an inch, which was not a very extreme case; the alveolus presented might not show any very great progression on its outer surface at that point, but if they were going to move that surface one-eighth of an inch in a slice, as it were, beyond the contour which adjoined it, he should like to know how it was proposed to fill up the gap, smooth over that, and make it into a fresh contour? The same remark would, of course, apply to the inner surface. This was, of course, a point which Mr. Cunningham would be able to clear up, but it was one which ought not to be lost sight of. With regard to the fragments themselves, there was one point which was made more interesting from the fact that Mr. Nicol, in a casual communication that evening, had ventured to proclaim the very heterodox pathological opinion that the union of a fragment which was fractured was a bony one. Now he (Mr. Lloyd Williams) had always been taught that union by bone never took place in the upper jaw. It was a point which had interested him for a great many years, but though on the look out for specimens which would prove that this was or was not true, he had never come across a single case confirming Mr. Nicol's statement. He had had the opportunity of treating a few cases of fracture of the upper jaw, though they were not very common, and had always been of opinion that there had been no new bone thrown out and that they did not get bony union. Mr. Cunningham would, no doubt, be able to give an opinion as to whether he thought that these fragments united simply by fibrous union, as they had always been taught to believe, or whether he thought, with Mr. Main Nicol, that true bony union did take place.

Mr. Sidney Spokes said nothing had been advanced in the discussion against the little operation he had mentioned at their last meeting. Of course, a possible danger of fractured teeth with regard to the minor operation existed, but no such case was yet on record. He had performed the operation in several other cases since the last meeting, moving altogether 16 incisors. He had not attempted any more canines, but he was sure it was a very simple thing to move the incisors. As to the after success of the course, his cases were not sufficiently old to be tested after two years, but so far as he could see there was not the least doubt that the teeth were all alive and flourishing. He produced some models.

Mr. W. R. Humby wished to say a word in defence of what Mr. Cunningham had called the "classic" operation. Mr. Kirby was willing to risk his professional reputation in connection with an operation which had only at present been done in plaster, and had stated that an eminent dentist had failed in an attempt to regulate by the mechanical method. Whoever had failed ought not to have done so, and, in his opinion, none of the cases which had been mentioned were such as could not have been regulated by the so-called classical method if properly applied.

Mr. A. E. Baker asked if Mr. Cunningham would move anterior teeth inwards as well as anterior teeth outwards.

Mr. Cunningham said, as he had pointed out in his paper, that was an operation he had never yet done, but was dying to try: he had thought it all out, and on the basis of his past experience had reasonable hopes of success. He regretted that the operation had been discussed rather as a mechanical than a surgical one; he submitted that it was rightly described by Dr. Bryant as the "*Surgical* Treatment of Irregularities," whereas the older and practical method was the mechanical treatment. The dangers mentioned were a fractured tooth and a dead pulp. Mr. Sidney Spokes had forgotten the fact that in one of his operations on children an incisor was fractured, this no doubt was a possible danger, and it was a point on which they must be careful. The operation must not be done in a careless and unscientific way. As to the death of the pulp, though it were the prettiest girl Mr. Lloyd Williams had ever seen, if she had an instanding canine interfering with mastication, if by a saw cut of the alveolus they could bring out the canine and free the bite from its wrong position, even if the pulp should die he could fill the tooth, and with that devitalised canine and proper root canal treatment it would be a better tooth than the living tooth displaced and instanding. He did not depart from that position, and he did not shirk the question of the admitted danger. He had said nothing on septic infection, but he had described the precautions taken to avoid it. He admitted its possibility, in fact, it was one of the things that he feared, that some dentist would perhaps be led to proceed to this operation in cases were teeth were incrusted with tartar and all kinds of complications: That was not the way in which to perform the operation; a man had no right to degrade his work by doing it in that way. He

must first of all clean the mouth, and only perform the operation when it was in a proper condition. He had not the requisite knowledge to reply to the question proposed as to its being a fibrous or a bony union. He did not know anything about it, but his impression was that there was bony union. With regard to the contour question nature was no doubt the great artist in plastic operations, and they had to leave very much to nature. Mr. Paterson had spoken about the bite being short by the thickness of a visiting card and of sixpence. They could not of course ensure absolute articulation, but the thickness of a visiting card was not a very vital point. With regard to the circular saw, the one he had ($\frac{7}{8}$ths inch), was really not deep enough to sectionise the alveolus as one would like, and if it was increased to $1\frac{1}{4}$ inches there would be much greater benefit as to buckling. Mr. Kirby's suggestion was very valuable; it was not absolutely necessary to use the circular saw at all, they might have a frame saw, which would affect the purpose equally well. Of course it was perfectly evident that an $1\frac{1}{4}$ inch saw must be firmer than a $\frac{7}{8}$ths inch saw, and, therefore, it would not go so readily in betwen the teeth as the fine saw, but he believed it would go fairly well. Mr. Humby had referred to the classic operation. They could not get over the fact that the regulation of the teeth by the older mechanical means had sometimes failed, and failed at an enormous cost to the patient. Here came in a new operation, and without wishing to press it as a method of treating *all* irregularities, he put it forward as a new operation enabling them to treat cases which hitherto they had not been able to treat successfully.

The usual vote of thanks concluded the meeting.

DENTAL STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

Ordinary General Meeting of the Dental Hospital Students' Society, held on Monday, November 11th, the President, Mr. F. J. Bennett, in the chair.

The following gentlemen were admitted as members of the Society :—Messrs. W. B. Woodhouse ; S. W. Jarne, and G. W. Connor.

On casual communications being called for—

Mr. PADGETT said that he had found it stated, in a well known text-book on Dental Surgery, that "cases of necrosis of the teeth, where the fangs protrude through the alveolar plate and gum, giving rise to ulceration on the contiguous surface of the cheek," are found only in the temporary dentition. Consequently, he thought that the following three cases might be of interest, inasmuch as they showed that a similar condition sometimes occurred in the permanent dentition :—Case 1 is that of a woman, aged 24, who came to the gas room to have the necrosed root of a first upper bicuspid extracted. On examination it was found that the apex was visible, owing to the absorption of part of the outer alveolar plate and overlying gum, and that the contiguous surface of the cheek had become slightly ulcerated owing to the irritation caused by the rough exposed portion of the root. Case 2 is that of a woman aged 35. It resembles case 1, except that the condition arose from a permanent upper lateral, and that the contiguous lip was not ulcerated, but presented a small growth which fitted into the rough excavation. Case 3 is that of a girl, aged 18. Here the condition arose from a necrosed right upper permanent central, which had been the seat of a chronic abscess. An attempt was being made to save this tooth, the exposed apex having been excised and the root treated and filled. Mr. Dunlop said that he had undertaken the treatment of case 3, but he did not think that the root would ever become sufficiently firm to stand a pivot.

Mr. W. S. NOWELL presented a model showing gemination of left lower temporary central and lateral, occurring in a girl, aged 4.

Mr. TORPEY showed models of a case in which the lower permanent canines had erupted and assumed the place of the first bicuspids, which were absent from the series. There was no history of the extraction of a tooth.

Mr. DUNLOP referred to a case of gemination of an upper left central and lateral, which he had brought before the notice of the Society last May. Two or three days ago he had seen the boy again. He had now six upper incisors; on the right side the supplemental incisor was between and in front of the central and lateral; whilst on the left side the central and lateral were geminated, and another incisor was present between these and the situation of the canine.

Mr. WOODHOUSE recorded a case of alveolar abscess situated over the lower jaw, but arising from an upper tooth. The patient was a man, aged 23, who came up to the hospital with a swelling about the size of a pigeon's egg situated on the right side of the lower jaw, just in front of the masseter muscle; pus was exuding from the summit of the swelling. On looking into the mouth there was no tooth in the lower jaw on that side to which the swelling might be attributed, but in the upper jaw there were some carious stumps. On passing the finger along the inner side of the cheek, a hard fibrous cord about $\frac{1}{4}$-inch diameter could be felt running from a carious root of an upper molar down to the region of the swelling. The situation of the abscess was peculiar for one arising from a tooth in the upper jaw. He also recorded a case of a girl, aged 11. On the right side of the lower jaw there was a firm septum of apparently healthy tissue, connecting the side of the cheek with the side and summit of the alveolus, in the situation of the bicuspids, which could apparently be felt underneath the tissue as a hard lump. The patient only complained of some discomfort on eating. She was not aware how long the state of affairs had existed, and gave absolutely no history of any trouble with her temporary teeth to account for the abnormality. No change had taken place during the last six weeks.

The President then called upon Mr. W. F. Forsyth, jun., for his paper on "Fractures of the Jaw." (See p. 533).

Mr. J. F. Colyer, after describing some interesting cases of fractures of the jaws that had come under his care, said that in these cases, having discovered a fracture on one side of the jaw, it was always necessary to be on the look-out for another fracture on the opposite side. He also remarked that, in cases of pain in the region of lower wisdom teeth with a history of a blow or injury, one might reasonably suspect a fracture of the angle of the jaw.

Mr. D. P. GABELL said that he thought that the four tailed bandage did not offer sufficient resistance to be of much use in the treatment of a fractured jaw. The remainder of the discussion was postponed till the next Meeting.

The next Meeting would take place on Monday, December 9th, when Mr. Stanley Colyer would read a paper on "Alveolar Abscess and its Complications." The proceedings then terminated.

THE DENTAL RECORD, LONDON: DEC. 2, 1895.

ON SUCTION CHAMBERS.

ARE suction chambers in plates for edentulous uppers advantageous or not? It is almost impossible to dogmatically answer the question, though it merits consideration. The pressure of the atmosphere being, roughly speaking, fifteen pounds to the square inch, and the size of a plate being hardly ever less than four square inches, and generally more, if perfect suction were obtainable such a plate should be able to withstand a displacing force equal to sixty pounds. At first glance it would seem that nothing like this amount of force is ever applied to such a denture, and, doubtless, no such amount of direct downward pull ever is. But from the extraordinary force which the muscles moving the jaws have been shown (notably by the late Dr. Patrick) to be capable of exerting, it is certain that the force of the side to side movement, during the grinding of food, must be very large. Such power being applied usually to one side only at a time, and to the grinding surfaces of the teeth, therefore, at a distance from the gum margin of that side, which forms a fulcrum, we have to do with a lever of the first order, in which the weight is represented by the opposite side of the plate. Hence, the tendency whilst grinding food on one side is to displace downwards the other side of the plate, and this with some considerable force; but, because in levers of this kind the effect of the force applied is directly proportionate to the length of the arm on which it acts, the amount of this force would be variable, and depend directly on the length of the upper teeth. The weight of the denture is as nothing compared with this displacing force, yet in suitable cases, by paying attention to a number of details which need not be mentioned now, and by getting as perfect suction as possible, these levers are counterbalanced, and the

denture is kept steadily in place. But this suction is only "as perfect as possible." It can never be anything like fifteen pounds to the square inch, and for the following reasons: First, for perfect suction we must have perfect fit. Will anyone contend that the fit we obtain is at best anything more than relatively perfect? Secondly, the base to which it is fitted must be a fixed and not a changing base. Thirdly, the exhausting agent must be sufficiently powerful to remove all the air. This we do not believe the tongue can do. On account of the imperfection of our mechanism, more marked in one case than in another, various devices are adopted with the idea of increasing the power of suction. Amongst these are chambers, with or without discs. To take first a chamber alone—how can this act? Will it improve the fit? How can it? Will it increase the power of the exhausting agent? On the contrary, it will, by giving increased air space, increase the work required to be done. Nor can it affect the base, otherwise than by causing a hypertrophy of the mucous membrane, because its sharp edges act as an irritant, and because pressure over the neighbouring part would necessarily cause the blood to run more freely to the piece not pressed on. These theoretical considerations lead us to the conclusion that such chambers do not directly increase the amount of suction. It is, however, alleged that, though they may not do so directly, they assist by lifting the plate away from the hard central portion of the palate and allow it to press more closely home at the margins. This must obviously depend on the firmness of the margins. In some edentulous mouths the margins are at least as hard as the centre of the palate, and if stumps be present more so. Certainly if this be the object of the chamber it should be of an entirely different shape to that which it usually is, and depend not on the artistic ideas of the maker but on the shape of the hard surface off which it is supposed to lift the plate. To our mind there is far more to be said in favour of a chamber fitted with a disc. Here we have a soft elastic

structure, which will readily adapt itself to the surface of the mouth, and so over this area at least we are likely to get perfect suction. But, leaving out of count the fact that this disc generally soon swells up, becoming too large for the chamber, and otherwise worn out, since this would at best be an indication for its constant renewal, there are the further disadvantages that such a disc, though giving fixity at one spot, would not give immobility to the piece at large; and, moreover, the strain and irritation of that particular piece of mucous membrane over which the disc lies is likely to cause a chronic inflammatory process of an undesirable nature. Hence we are of opinion that the use of suction chambers and discs, though time-honoured, is one, the advantages of which are not very apparent.

News and Notes.

Mr. W. Francis Mellersh, L.D.S.Eng., has been appointed Hon. Dental Surgeon to the Thames Ditton Cottage Hospital.

Mr. John A. Biggs, L.D.S., Glasgow, has been unanimously appointed Dean of the Dental Hospital, Glasgow, in room of Mr. J. R. Brownlie, L.D.S., Eng.. who has resigned.

At the recent Dental Examination of the Royal College of Surgeons in Ireland, Mr. John Stanton (Dublin), having passed the necessary examination, has been admitted a Licentiate in Dental Surgery of the College. The next examination, is fixed to take place on Monday, February 10th, 1896.

There will be a Practical Course on Crown Work at the Institute of Dental Technology, 4, Langham Chambers, W., on Mondays and Thursdays, 7—9 p.m.; Saturdays, 4—6, commencing Monday, November 25th to Saturday, December 21st. The course will include both demonstrations and practical laboratory work, in which each student will execute similar cases to those demonstrated by R. P. Lennox, Kirk Davenport, and C. Browne-Thomas, under the direction of the Principal, of whom particulars may be obtained.

THE Edinburgh Dental Students' Society held its first ordinary meeting of Session 1895-6 on the evening of November the 11th, in the Board Room of the Dental School. Mr. Malcolm, L.D.S., the President, introduced Mr. E. Oswald Fergus, L.D.S., of Glasgow, who demonstrated a method of root treatment recommended by Dr. Callahan of Cincinnati. One hundred and thirty personal cases were quoted, seventy-five of these being tabulated on printed sheets kindly supplied by the lecturer. The treatment consisted of cleansing the canals with a 40 per cent. solution of H_2SO_4, immediately followed by a saturated solution of bicarbonate of soda, which produced a strong effervescence. An interesting discussion followed, the lecturer and the Dean taking part. On the previous Friday, the Annual Invitation Smoking Concert was held in the Imperial Hotel, Mr. Frederick Page, L.D.S., an assistant surgeon, in the chair. The students again proved themselves excellent entertainers. Messrs. R. W. Markham, J. W. Bell, Norris Stewart, Nash, Horne, and Routledge being specially applauded. Many lay and professional friends assisted, and altogether the evening was one of the most harmonious ever held by the Society.

THE following account of the death of a patient during the administration of nitrous oxide is taken from the report in the *New York Herald*.—Mrs. Flora Joseph, twenty-two years old, living with her husband, Henry, at No. 418, East Eighty-second Street, went to the office of Dr. Richard Woolf, a dentist, at No. 315, East Eighty-sixth street, on October 7th, to have four teeth extracted. Dr. Woolf did not remember having seen her before. She did not give her name, but explained that she came on the recommendation of Mrs. Steinhardt, of No. 146, East Eighty-ninth Street. The dentist did not ask her if she had taken anæsthetics on previous occasions, but proceeded to give her nitrous oxide gas. He extracted four teeth and then noticed that the woman had ceased to respire. He quickly called his assistant, Mrs. Faber, and together they loosened the woman's garments, depressed the upper part of her body to produce a rush of blood to the head, and sought in other ways to restore her, but without success. Then Dr. Woolf administered ammonia, and also pearls of amyl nitrite by inhalation, gave her hypodermic injections of whiskey, chloride of cocaine and also

one-twentieth of a grain of strychnine, but none of these produced any effect. Dr. Wolff then called in Dr. Frank Churchill, who lives next door, and together they sought to restore the woman, but in vain. Dr. Wolff afterwards said he believed she died while he was extracting her teeth. Dr. Wolff immediately sought some person who could identify the woman. After going to Coroner O'Meagher, who lives at No. 427, East Eighty-fourth Street, and notifying him of the death, he sought Mrs. Steinhardt, but she was not at home. Then he remembered that her brother, Henry Joseph, lived at No. 418, East Eighty-second Street, and he went there, thinking that he might be able to identify the dead woman. Joseph was not at home, but other persons living in the apartment house to whom Dr. Wolff spoke, declared in answer to his description of the dead woman's appearance, that she was Mrs. Joseph. They consented to view the body, and fully identified her. Dr. Wolff then suddenly recollected that he had treated Mrs. Joseph's teeth in 1893, and had given her gas, which produced no ill effects. The woman's husband was notified, and reached the dentist's house later. He was overcome by the news of his wife's death. Coroner O'Meagher gave a permit for the removal of the woman's body to her late home.

THE NATIONAL DENTAL HOSPITAL AND SCHOOL.

The Annual Dinner and Distribution of prizes took place on the 22nd ult., at the Holborn Restaurant. Sir Dyce Duckworth presided, and was supported by Sir Crichton Browne, Mr. Christopher Heath, Drs. Coupland, Bradford, Barlow, Omerod, Spencer, Messrs. C. S. Tomes, J. Smith Turner, J. Howard Mummery, F. Canton, Morton Smale, David Hepburn, the staff, and a goodly number of past and present students and friends.

The toast of "The Queen" having been duly honoured,

The Dean (Mr. Sidney Spokes) made a brief report. The number of students averaged 40. About the usual number had presented themselves for examination, with about the usual result. In May six went up and five passed; at the recent examination four out of six passed. Two of their men had gone up to Edinburgh to take the L.D.S., not because they feared the London examination,

but because they could take the examination in two stages, the Dean commended this fact to the consideration of the educational authorities in London. The changes on the staff had been very few.

Sir Dyce Duckworth then presented the prizes as follows :—

Dental Anatomy—(Medal), S. F. Rose; (Certificates), T. E. Sugden, W. Sunderland, H. J. Relph. *Dental Surgery*—(Medals), H. W. Moore, E. A. Wheeler, A. E. Relph *Dental Mechanics*—(Medal), W. E. Hill; (Certificates), H. W. Moore, W. Jones. *Dental Metallurgy*—(Medal), H. W. Moore; (Certificate), H. J. Relph. *Dental Materia Medica*—(Medal), C. Fox; (Certificates), E. A. Wheeler, W. Jones. *Histology*—(Certificate), R. Halliday. *Operative Dental Surgery*—(Medals), H. J. Relph, H. W. Moore. *Entrance Exhibition*—(Value £15), H. V. Tattersall. *Stuaents' Society Prize*—W. Jones.

The Chairman, in proposing the toast of the evening, "The National Dental Hospital and College," dilated on the advantages which the hospital and school enjoyed in their new and well equipped building, and passed on to consider the changes which had come over the dental branch of his profession during the last five and twenty years. Advances had been made which could only be described as little less than extraordinary, and in his opinion they were to be mainly attributed to the passing of the Dental Act of 1878. Things were now organised and a fair field lay before the rising generation; but, nevertheless, it must be recognised that there were still some ugly spots, and the ugliest spot was constituted and caused by those who advertised in an unfair and extravagant form. It was a matter which had come before the General Medical Council, but it was a very difficult matter to take hold of. It was to be accounted for by a very large number of men being admitted to the profession as practitioners before the passing of the Act, but were in fact little better than artisans, not gentlemen. The powers committed to the General Medical Council by Act of Parliament with regard to these discreditable advertising practices were sadly limited, but it must be remembered the Council was a judicial body, it could not go out into the streets and bring in the delinquents, they must be brought before the Council, and if they were brought with evidence of improper conduct they would undoubtedly be dealt with as they deserved. The position of the profession then had enormously improved, for his own part, it was his rule to

recommend students to enter the whole profession by taking the double qualification where possible, he could not but believe if this were done the dental branch of the profession would be largely benefited ; but still he knew the examinations for the L.D.S. diplomas were such as to inspire confidence on the part of the public, and represented an amount of knowledge that would have been very astonishing 30 years ago. The public, credulous though it was to an enormous degree, was beginning to see that a man with real knowledge and scientific attainments was not the kind of person to debase himself by resorting to those unworthy methods of advertising to which he had referred. It was sad and pitiable at the end of this nineteenth century to see how a paper—which he never read—was espousing the cause of these advertisers, who he understood were organizing themselves and flaunting their defiance of those who were charged with the welfare of the profession and the safeguarding of the public. They need only go on a little longer when some of those in power would most assuredly cope with them. In conclusion he would say to those who were still *in statu pupilari* he had lived long enough to see that the men who in early life fixed their aims high were the men who attained the highest pinnacle, while those who were in a great hurry to get money fell very far behind, so much so that, looking for them, he had not been able to find them. They must be hopeful and cheerful, and with the three necessities to success—a good stomach, a good head, and a good temper—they would succeed. He could not wish more for the National Dental Hospital than that it should continue to produce men trained in the best traditions which would give them the *cachet*, and the right to deal with some of the tenderest subjects that could come up for consideration. He gave them the toast of "The National Dental Hospital and College," coupled with the name of their Dean, Mr. Sidney Spokes.

Mr. Sidney Spokes, in responding, said that although the Chairman had described the General Medical Council as a judicial body, he ventured to think it might be regarded also as a authoratative body, inasmuch as any manifestations of opinion which it might see its way to make would be of extreme weight. With respect to the subject of advertising, to which Sir Dyce Duckworth had alluded, it would seem that discreditable though these practices were, a

recent case before the Courts showed that it was not absolutely necessary to resort to advertising in order to entrap the public; all that need be done was to look into the hat of one's customer; the principals in the Strand barber case had very properly had justice dealt out to them, but had they formed themselves into a limited company it was probable they could have made a very good defence. This brought him to a point which he meant to emphasise, viz., the necessity of amending the Companies Act so that what was wrong in the individual should not be right in a company.

Sir J. CRICHTON-BROWNE proposed "The Past and Present Students," and in doing so said, to an imaginative mind there was always something moving in looking at a band of recuits, young men ready to enter the battle of life, and gradually pressing forward full of high hope and courage; and there was also something moving in looking at a band of veterans, who had already taken some part in the conflict of life, and, bearing the scars of many victories, came back to the scenes of their youth. To-night they had both the recruits and the veterans, the past and the present; the past grasping the hand of the present in friendly grip, and both looking into the future with confidence. There was a daily increasing need of the dentist amongst them. It was a lamentable but absolute fact that among all civilized nations dental caries was spreading portentiously. At one time every British mouth had thirty-two teeth, "white as milk and big as knuckle bones," but now alas it was too often an ugly array of British stumps, "brown as coffee and brittle as glass." As our ironclads were our first line of defence to our shores, so our enamelclads might be said to be the first line of defence which secured us against disease and constitutional debility in various forms. It seemed to him that the demands for dental assistance were enormously increasing, and they must be prepared to meet that demand. He had been struck, by an account he had read in the *Times* a day or two since, with the industry and energy displayed by the people of Japan. They were vieing with us in the production of dentical and surgical instruments of every description, and in the streets, not amongst the wealthy alone, might be seen the golden traces of the dentist's art, indeed, he felt inclined slightly to paraphrase the words of Solomon and say—

"Go to Japan thou sluggard,
Consider her way—and be wise."

He would like to say one word on the subject of fees. He thought the scale of dental charges might be widely and popularly known. A patient ought to know fairly what cost he was going to incur. He did not forget that the education of a dentist was an expensive and long education, and he quite admitted that every labourer was worthy of his hire; they were entitled to a fair and proper reward, but nevertheless he would urge upon them to make definitely known what their charges were. He thought that many a sufferer was deterred from going to the dentist, not so much by the fear of the extraction of the fang as by the fear of the extraction of the fee.

With respect to the association of hair-dressing with dentistry, it seemed to have occurred to some ingenious soul that as the teeth and hair were both cuticle appendages, they might very properly be dealt with together (laughter), and so barbers—rapacious, fierce, uncrupulous barbers—had taken to teeth scaling (renewed laughter). This, no doubt, was very ingenious, and it seemed a principle which lent itself to very great development; as hair-dressing naturally led to dentistry, he would suggest that boot-making naturally conducted to gout as it affected the big toe, and people might, therefore, shortly dispense with the services of eminent physicians, and relegate the treatment of gout to the disciples of St. Crispin—(laughter)—while sufferers from cerebral disease would go to their hatters to have their cases diagnosed (laughter). Really the gullibility of the public was one of the most painful features of the present time. It was almost more painful than the rapacity of the rascals who played upon that gullibility. It could not be too widely proclaimed that teeth scaling required a skilled hand, and that irreparable mischief might be done if it was conducted in the manner of the hairdresser. He had detained them too long, and would conclude by giving them the health of the Past and Present Students, coupled with the name of Mr. W. R. Humby and Mr. H. J. Relph.

Mr. Humby responded for the Past Students, and Mr. Relph for the Present Students.

Mr. Maughan having proposed "The Visitors,"

Mr. Christopher Heath, replying, said he should date the progressive movement of dentistry a little further back than the Act of '78. He would rather say that it commenced when the College of Surgeons recognised the dental profession as part of the surgical profession. To the late Sir John Tomes they owed

the movement which culminated in the Act, but if the profession had not risen to the occasion, and first the seniors, and then the juniors, presented themselves to the College of Surgeons for examination, he ventured to say that the Act would never have been passed. The College of Surgeons was proud of the Dental Licentiates.

Mr. GEORGE CUNNINGHAM proposed the health of the CHAIRMAN, who, in responding, referred to the question of the desirability of admitting women to the medical and dental professions. In his judgment, women were totally unfitted for the activities of a profession like theirs, nor were they in the least suited for the practice of dentistry. The average woman was not endowed with the force of muscle and bone necessary for the performance of many operations, and they did not want one class of women for a certain class of practice. In conclusion he could only express the great pleasure and gratification it had been to him to preside.

The remainder of the evening was pleasantly devoted to music and recitations.

Review.

THE DISEASES OF CHILDREN'S TEETH, THEIR PREVENTION AND TREATMENT. A manual for medical practitioners and students. By R. DENISON PEDLEY, M.R.C.S., L.D.S.Eng., F.R.C.S.Edin. Published by J. P. Segg & Co., London, and by the S.S. White Dental Manufacturing Co., Philadelphia.

Within the limits which the author has laid down for himself, this is a good and useful book. Being intended chiefly for medical practitioners, there is no attempt to deal exhaustively with the subject, and the topics selected seem upon the whole wisely chosen. We think, indeed, that there is more than the medical man needs to know for the purpose of actual practice, and that in the interest of his patient, as well as well as of himself, it would be desirable to restrict himself to theoretical knowledge in some directions. The patient would receive far better treatment if the general practitioner

does what is needed to alleviate immediate pain, and then hands the patient over, at a convenient opportunity, to a dental specialist. Take "Irregularities of Children's Teeth" (Chapter 6), which comprises somewhere about a quarter of the book; much of this is excellent, though necessarily incomplete, and, being incomplete, we are not of opinion that the practitioner is placed by this book in a position to treat irregularities of the permanent teeth to the best advantage. Let him by all means do his best for those to whom further advice is impossible; but we venture to think that others should, though may be at inconvenience, attend a specialist. To instance a case we need only to quote the treatment given for overcrowding of the permanent teeth: "Should one, two, or three of the first permanent (6 year) molars be carious, the four molars may be extracted with advantage; but if all the teeth are sound, the middle tooth of the seven ought, as a rule, to be chosen . . . . the first bicuspid." Now it is quite possible in carefully selected cases this treatment may be admirable, but when there is so slight an irregularity that simple extraction of the first molars will cure it, then the gap left by removing the first bicuspid may possibly not close up, a somewhat serious matter in a girl. Indeed, we do not understand the author's preference for extracting a first instead of a second bicuspid, and we do not notice any opinion given as to the extent of decay which would justify the extraction of the first molars, a course to which the author is obviously adverse.

The effect on the permanent of the too early, and too late, extraction of the temporary teeth is fully and well dealt with, though we do not agree that when the permanent canines appear "above and in front of them, while sound and firm, the temporary canines should not be extracted until a reasonable time has been allowed for the removal of their fangs by natural means." Surely, it would be better to extract the temporary canines at once, so that as soon as possible, and while high up above the arch the permanent ones may turn and drop backwards into their place. This regard for the feelings of the child, with which we have every sympathy, is somewhat at variance with the following quotation: "In some jaws when the incisor teeth are in proper position they are crowded. The laterals will infringe upon the temporary canines. The latter should not be removed to give

more room *unless they are carious on the side nearer the permanent laterals.*" (!) Why not fill? If the practitioner cannot do this, then he most certainly should not practise dentistry.

In Chapter 1, dealing with the structure of teeth, we notice the following sentence, "In other cases in which the proportion of organic matter present is still larger, the enamel may be observed to be brownish in colour." In connection with the discussion due to Dr. Black's paper, on the percentage of lime salts in dentine, it would be interesting to know what grounds the author has for the above statement.

There is a great deal in this book which may be read with great interest by dental surgeons, notably Chapter 7, on "The Hygiene of the Mouth." This, from our point of view, is by far the best portion of the book, and can be read with profit by all. Interesting, too, is the discussion as to whether rickets affects the teeth. The author's observations that the teeth of rickety children are not more than usually prone to caries, supported, as they are, by theoretical considerations, is an important addition to our knowledge. We should have been glad to have had some opinion from the author on the influence of mercury in small doses on the teeth. This drug is so widely given in occasional doses to children for constipation, etc., that if small doses, such as are present in Steedman's powders caused honey-combed teeth we should expect such teeth to be almost universal.

It is regrettable that the book has not been revised with that care that should distinguish a book from a magazine article, but the printer's errors now to be observed will doubtless disappear in a later edition.

ANSWERS TO CORRESPONDENTS.

INCOGNITO.—If unregistered "the assistant" would obviously be an illegal practitioner, but if registered there could be nothing illegal in carrying on the practice provided he did not personate the deceased person.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

To the Editor of the "DENTAL RECORD."

DEAR SIR,—Mr. Grayston in his introduction to "Notes on The Treatment and Filling of Teeth," speaks of the difficulty of writing anything new and interesting on the subject, and although this is true in the broad sense, still I think we each have some little dodge or wrinkle which is not known to all our brethren. In this first paper of Mr. Grayston's I am able to annex the use of ice on wool formed by the chloride of ethyl spray. Now many who read these articles will have some little speciality not worth writing about by itself perhaps, but still valuable, and I propose that for the future, after reading the paper for the month, we each send a post card containing any hint likely to be of use, and that these short paragraphs (they should be made as short as possible) be printed at the end of next month's paper, I enclose one as a specimen, and remain,

Yours faithfully,

D. M. D.

ERRATA.

ON line 13, page 487, of our last issue, "From two to four grains to the one of . . . ." should read "From two to four grains to the ounce of . . . ."

On page 486 of same issue the illustration of Fig. 1 was inadvertently omitted.

FIG. 1.