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THE PRACTICAL VALUE OF CHEMISTRY IN DENTISTRY.*

By H. C. WETMORE, D.D.S., St. John, N.B.

MR. PRESIDENT,—It was not without certain feelings of reluctance that a few weeks ago I consented to write a paper for this joint meeting of the Dental Societies, caused by consciousness of my own inability to treat my topic in a comprehensive and scientific manner, as well as by a knowledge that lack of idle time would render it difficult for me to give any subject proper consideration.

Events which have transpired during the last two or three years, as well as certain experiences which it has been my lot to encounter as a member of an examining board, have been the means of firmly impressing upon my mind that certain of the subjects found on the recognized "list of studies" of our colleges do not apparently receive that attention and consideration at the hands of the teachers, and consequently of the pupils, which they would seem to merit.

Probably if a class of matriculants were given the curriculum of studies required to be taught by a Dental College, and asked to indicate which to them appeared as of the most and which of least importance, whatever might be their opinion as to the former, there can hardly be any doubt that Chemistry would almost invariably be named as the latter.

For a study so fundamental to almost every branch of dental science, to me it would appear that too great a prominence could

* Read before the Maritime Dental Association, September, 1898.

hardly be given it by those engaged in its teaching, or that too much time and labor could be employed on it by those engaged in its study. If we are to draw our conclusions from the evidence at our disposal, we should conclude that certain of the colleges, supposedly reputable, either make their teachings of it of a very meagre and superficial nature, or they admit to their classes students of insufficient mental calibre to receive and digest such instruction as is imparted. Possibly the error may lie in both directions.

To be more explicit: Were matters otherwise, we would hardly expect a graduate of a "recognized" dental college, who had obtained his degree but a few weeks before, to define "*an element*" as "*the smallest part of matter*," or that another who had also been able to write D.D.S. after his name but a month or so, but from a different college, to define it as, "*that part of a substance in a true or pure state.*"

While to the casual observer Chemistry does not appear to occupy the same prominent position in our daily practice that is accorded other branches of dental science, to the initiated it is of equal importance, in that it is more or less directly connected with them, and in that it forms to a greater or less extent the foundation upon which each of the others is erected. And it is extremely difficult to understand how a college examiner could consistently recommend any student for graduation in *Materia Medica*, *Dental Pathology*, *Metallurgy* or *Operative Dentistry*, whose knowledge of the very rudiments of chemical science was utterly lacking as in such cases as the above mentioned.

It would make a paper of this nature entirely too cumbersome to attempt to indicate wherein Chemistry has a practical relationship to all the various branches of dental science, even if time permitted, consequently I will confine my remarks to its relation to that particular branch, without which the dental profession could never have begun its existence, namely, its relation to dental caries and to the methods of its prevention and arrest.

Apart from its scientific value, it forms an interesting chapter of historical study to trace the advent of chemical science into the causes furnished by the various writers at different dates for dental caries.

One need revert only about one century into dental history to learn that at that time caries was considered as being the direct result of inflammation, and as bearing a striking resemblance to necrosis of bone, or mortification of soft tissues. It is also of interest to learn that at this period writers were a unit in supposing that the initial stages of caries took place in the *dentine*, and from there the inflammation extended, causing death to all the adjacent parts.

The first divergence from this view was when certain writers

maintained that sometimes caries began upon the surface of a tooth, and the inflammatory theory then partook of a dual nature, and caries was described as being of either external or internal origin. Not until the year 1830, or almost in recent times, was this theory questioned; and almost simultaneously Harris of America, Robertson of England, and Regnard of France, proved by experiment and clinical experience that it no longer was tenable. A few years later Robertson published a "Treatise on the Human Teeth," showing causes of their decay and means of preservation, in which he advanced the theory that caries was the result of chemical disintegration of the tooth substance, and denied the agency of inflammation. This destruction was accomplished, he contended, by the action of an acid which was generated by decomposition of alimentary particles, or of fluids of the mouth suffered to lodge about the teeth. Three years later Regnard published a somewhat similar work, in which he contended that caries was accomplished by an acid generated by decomposition taking place at the very point where its effects were shown.

We must bear in mind that at the time these authors wrote the best of human thought and intelligence, as well as the deductions from all observations except their own, were diametrically opposed to their theory (a theory which all the labor of intervening years up to the present time has hardly been able to demonstrate). And their writings appear the more remarkable since, at that time, the laws of fermentation were very little known, and they had not means of confirming their suppositions by experiments made either by themselves or by others.

It was curious to notice that once the chemical theory was advanced, how prone many men were to run to the opposite extreme, and assert that if acids caused decay they would necessarily, from their general distribution, act upon all parts of the teeth, instead of attacking only particular parts. Black in his writings, which were founded upon his own experimental results, says: "I may say that the acidity or alkalinity of the general fluids of the mouth or of the food plays but a small part in the case, provided these reactions be not in such degree as to modify materially the act of fermentation taking place in the out-of-the-way points about the teeth. The teeth may decay when the fluids of the mouth are habitually acid, or when they are habitually alkaline. The condition governing the beginning and progress of decay is neither of these, but is dependent directly on the lodgment of substances at particular points and their fermentation with the production of an acid. It is in this manner that caries has its beginning, and its progress is maintained by the continuance of this act of fermentation."

Perhaps no one person has thrown as much light on the pro-

cesses of fermentation as exhibited in the early stages of caries as Prof. Miller, of Berlin. He, in a very extensive series of experiments, most carefully planned and executed, was enabled to establish truths which heretofore could be held but as conjectures.

In the first of these he established the initial stage in the chemical theory, namely, that saliva, to which has been added a sterilized organic body as starch or sugar, will become acid in four or five hours, indicating the splendid opportunity organisms of the saliva possess in the mouth during certain periods of the day or night, particularly the latter, to uninterruptedly propagate and exert their destructive influence on the surrounding teeth. It was already known that an active unorganized ferment ptyalin already existed in the saliva, but Miller demonstrated the organism producing the acid to be very different in its nature and properties; that it was an organized ferment, and was perfectly capable of sustaining and reproducing itself in a suitable pabulum. To determine the nature of the acid produced by this process of fermentation was a problem of no great difficulty, and a few experiments proved what was already conjectured, that it was no more than the ordinary ferment, lactic acid.

More important to the development of dental science was the demonstrating of artificially produced decalcification and caries in a sound tooth, by placing it in a suitable pabulum: a solution of beef extract and cane-sugar, which after being sterilized was infected with the fungus already referred to, thus proving the correctness of the chemical theory. With these agents, fungi, and a suitable soil on which it may feed and luxuriate, aided indirectly by a uniform temperature, moisture and free oxygen, it requires but a very superficial knowledge of the nature and habit of fungi to comprehend how an acid, their product, will almost invariably be found, not necessarily in the entire mouth, that may be alkaline, but in spaces adapted for the lodgment of food particles, in the fissures, sulci and interdental spaces of the teeth.

We do not wish to be understood as stating that lactic acid is the only acid, or even the only destructive acid, of the oral cavity. The acidity of the mucus secretion is well known, and while it does not possess decalcifying properties to the same degree as lactic acid, it assists very materially the destructive influence of lactic acid in cavities bordering upon the gum margin, if indeed it is not the sole cause of decalcification in such cases.

Other fungi than the one we have been considering are also to be found in the secretions of the mouth, Black having recognized as many as twenty-two varieties, and whatever their influence may be, it appears evident that so far as caries is concerned they are not particularly harmful.

Having established the fact that caries is to a certain extent

the direct result of the action of ferment acids on the teeth, it becomes us next to ascertain how we can scientifically most effectually combat their influence, or prevent their production; and secondly, how we can prevent already decalcified dentine from further or complete destruction.

By thorough, repeated and systematic cleansing of the oral cavity and teeth we may so diminish the amount of fermentable substance as to very much lessen the production of acids by fermentation. This is so evident that comment is unnecessary. By a repeated application of alkaline substances one may to a very considerable extent counteract the decalcifying action of acids before extensive loss has been sustained. While, by a proper and intelligent use of antiseptics, we may destroy the organisms themselves, or at least render them inactive. It is this method which is specially applicable in the stage of caries following decalcification, and the one which at present we are considering.

Even here we must constantly bear in mind that a previous thorough cleansing is indispensable. There is no solution, alkaline or antiseptic, applicable to the human mouth which will penetrate between the teeth, or to the bottom of fissures or cavities, when these are filled with food or other debris, in sufficient quantity to have an appreciable effect upon either acid or organism; so that before any washes can be expected to accomplish anything whatever, must first come a thorough use of tooth brush, tooth pick and floss silk. To furnish formulæ is not our object in this paper, but the primary object in writing any medical prescription is to first ascertain the cause of the ailment, get at the first principles of the disease and combat and, if possible, destroy them. Reasoning from what we know of the more prominent causes of caries, an antiseptic, effective in its workings, yet of a nature which would cause no injury to the delicate tissues of the mouth, with which it must be brought in contact; and if possible, of alkaline reaction, would appear to combine the properties essential to the case.

Where caries has progressed it is naturally next to impossible, in many cases, in the preparation of cavities to remove all of the affected dentine, and in such cases it is desirable, as far as possible, to insert fillings which are not only antiseptic at the time of insertion, but which will continue to permanently exercise antiseptic influence. Of the filling materials most commonly used most are antiseptic at the time of insertion, but gradually lose their antiseptic properties.

Old fillings of phosphates are found to possess but a slight antiseptic power.

Old fillings of gold and tin combined have also a slight antiseptic power, and old amalgam fillings, when not containing copper, have very much less, if in fact they can be said to have any at all. But if they contain copper the result is very different, it

has then a very marked continuous antiseptic effect; the salts permeating the dentine of the teeth so filled, and rendering it (the discolored dentine) decidedly more powerfully antiseptic than any of the other filling materials. It, however, has its disadvantages. But what we would like to impress is the importance of a knowledge of the chemical effect of the ingredients, upon organisms and truth structure, of the amalgams we use, and make our selections to meet the requirements of our individual cases, even though some other varieties may be represented as being "just as good," and can be furnished by a rival house at a somewhat lesser cost. Any reliable house ought to be willing to furnish the formulæ of their amalgams if they expect intelligent dentists to employ them in their practice.

We will refer to but one other instance of the practical value of chemical science to the dentist in his professional duties, the chemico-electric effect of the various metals more commonly placed in the oral cavity in either operative or prosthetic operations. Electricity at the present time is occupying such an important position in the various departments of dentistry that it is difficult to comprehend how a course of dental study could approach completeness without including a fair treatment of its more common principles and application.

Leaving to inventors its usefulness as a power furnishing agent, either for the revolving of a wheel or driving a medicine through a tissue, we will confine our attention to some of the simpler phenomena of galvanism as they come to our attention in our daily operations.

We aim to be a progressive profession, and if we are to continue a recognized profession we must continue to be as progressive as our brothers in other walks of life, and as progressive as the age in which we live. We have all observed phenomena in our operations when both gold and amalgam have been employed, which, without some knowledge of the laws of galvanism, would be rendered impossible of explanation. Observation teaches us that normal truth structure is a non-conductor of galvanic current, while with dentine badly deficient of lime salts, or decalcified by the aid of oral acids, the conditions become the reverse and render it highly conductive and electro-positive as compared with either gold or amalgam. It would be as unreasonable to expect no electric disturbance when these metals were used in proximity to dentine in such cases, as it would be to expect that a copper or carbon plate immersed in a cell containing all the other elements for a galvanic current, should produce no result. In the case of a gold or amalgam filling loosened, the effect is frequently so pernicious that after its removal further operations must for the time being be suspended, allowing the tooth to regain to some extent its normal status.

Kirk says that even in the selection of metal for clasps too great care cannot be exercised, that either silver or gold clasps on a plate of the same metal are apt to be much more injurious than when they are made of a metal different from the plate. That in the first instance the tooth forms the positive and the plate the negative elements of the battery, while in the latter the tooth is left entirely out of the circuit, and what galvanism does exist is simply between the metals of the plate and clasp. It is also a recognized fact that when it becomes necessary to insert a filling under a clasp, an amalgam filling will prove more effective in arresting the progress of caries than an equally well manipulated gold. In most mouths under these conditions, electrical action would manifest itself, and the method which would leave the tooth out of the circuit, as the gold and amalgam would do, would most assuredly protect it from the evil influence of galvanic action. Electro-chemical action in the oral cavity will be found to be greater during the night than the day, on account of the increased acidity of oral secretions during that time. Apart from this greater opportunity for the acids of fermentation to accumulate, the mucus secretion which is slightly acid in reaction, is greater during the night, while the neutralizing effect of the salivary flow, which normally is alkaline, is practically lost, as the amount of saliva secreted at that time is greatly diminished. Ample reasons, it would appear, are thus furnished for the careful removal of all clasp dentines, or other metal appliances, when practicable, before retiring.

Other instances might easily be added, but enough, we consider, has been submitted to warrant us in concluding that a course of dental chemistry, whatever it may include, would be far from complete if it did not embrace the simpler laws and principles of galvanism; notwithstanding this, the evidence appears to prove the contrary; were it otherwise we would hardly expect a man fresh from college, with the teachings of three years received still clear in his memory, to furnish the following comprehensive description of a galvanic cell: "*A galvanic cell is composed of two substances; one is copper, the other is the other.*"

THE EDUCATION OF THE DENTAL SURGEON.*

By FRANK WOODBURY, D.D.S., Halifax, N.S.

I am aware that many differ widely from some of the opinions contained in this short paper.

All will, however, agree at the outset that, everything else being equal, *the man of highest culture is the best man.* It matters not

* Read before the Maritime Dental Association, September, 1898.

whether he has acquired it at the university halls, or by economy of his spare moments, the scale turns for the man of actual culture.

Before the days of dental boards and dental laws every man was a law to himself. The standard of preparation for his life-work was left to convenience, taste, or, perchance, force of circumstances.

We are building to-day on the foundations laid by our fathers in the profession, and we may fittingly make obeisance to them for the magnificent things they accomplished for us ; but notwithstanding all that, I believe we are building on a foundation that never should have been laid.

I grant you that they moved from the blacksmith and barber shop to the office—transformed the tooth-puller into the dental surgeon, and provided colleges where the science and art of dentistry are systematically taught.

It was an immense stride, but, from our point of view, we cannot help but regret that the stride was in the wrong direction. It was a mistake. It was out of harmony with the fitness of things.

A preliminary requirement should have been a *course in a medical college*. Dentistry is a specialty in medicine *by right*.

The contributions that dentistry has made to medical and surgical science are not a few, and there is no reason why it should not stand shoulder to shoulder with other specialties, and immeasurably better than it does, except that its men are not medical men, and dentistry is a separate profession in practice if not in theory.

The added knowledge, the broader outlook on pathology and therapeutics, the larger privileges in surgery would have been of immense value to the practicing dentist.

You may say that dentistry is recognized as a specialty in medicine. It is so declared by every code of *dental ethics*. We recognize it all right, but you will agree with me that it receives scant acknowledgment from the medical profession.

The ophthalmologist, aurist, and many other "ists" have full recognition, but when was the dental fraternity honored with an invitation to enjoy the sessions of a medical convention, much as they might add to the interest and be benefited thereby? The reason is not far away. Dentistry is looked upon as a distinct affair, with no practical connecting links.

And why, gentlemen, does not the degree of D.D.S., or D.M.D., or L.D.S. carry as much prestige as M.D. ?

It is somewhat owing to ignorance of the scope of the curriculum of the Dental College of to-day, but largely because the standard of matriculation and the college course of the dental student has not been equal to that required from the student of medicine.

The Dental College has not required as high a standard of matriculation ; the professional course is not recognized as being

as thorough nor as long as that of the well-conducted Medical College; also because of having a separate degree, dentistry is naturally placed by itself and takes a different level.

We claim that the specialty of dental surgery should stand by the side of all other specialties in medicine, untrammelled, and receive full recognition as an integral part of the great medical whole.

This would have been the case had the Dental Colleges been post-graduate schools for our specialty. Dentistry would then have taken its proper and recognized place years ago, and all the bitter fight would have been saved.

We venture to hope that the evolution is in progress; indeed, there are signs of it on every hand.

The dental degree should by no means be abolished. The specialty has so much that is distinct and unique, that it well merits special recognition. It has a pathology, therapeutics, and *Materia-Medica* of its own. Its manipulations are complicated and delicate. No specialty *needs* so much preparation as ours.

The medical man does know something of the eye, ear, throat, and any of the other specialties, but he knows *nothing* of dentistry. "Where is the medical man who is not a dentist who can stand at a dental chair and operate five minutes with credit to himself or comfort to his patient?"

There is no department of surgery where more delicacy of touch is needed; none where such a variety of appliances are necessary; none where more scientific diagnosis and treatment are required.

The whole outfit of the general surgeon is not as complicated and elaborate as that of the dental surgeon. A special degree should certainly be retained, but I do think it should express the full size of the field of our specialty, as is generally understood by the terms Stomatology or Oral Surgery.

If I am correctly interpreting the signs of the times, the feeling is growing that the two degrees belong together. The public demands oral surgery from the dentist now, and may (with the number rapidly increasing) feel that they need and must have the general medical and surgical training, and the privileges that accompany it.

The professors in the Dental Colleges feel the need, and a majority of them write M.D. as well as D.D.S. The Dental Colleges feel the need of close contact, and the best schools of dentistry to-day are either departments of universities or are affiliated with medical colleges, and having arrangements whereby both degrees may be secured at a minimum loss of time.

At the last meeting of the National Board of Dental Faculties, a resolution was offered and tabled for discussion next year, which

proposes to add another year to the Dental College course. This is adding at the wrong place.

As far as I have been able to gather, and I have taken some trouble to be informed, the idea of a longer course is not so much to add to the lectures on special dental subjects as to give opportunity for those studies that are included in general medicine and surgery. Why, then, if this be so, and the time is to be spent pursuing these subjects, should not the dental student of the future have the recognition that comes from a medical degree? A resolution looking toward a medical degree as preliminary and necessary for the student of dentistry would be more to the point, and much nearer the ideal.

The public are demanding more and more from the dental surgeon. The profession is looking in the direction indicated in this paper. Higher qualifications are demanded from students every year. State and Provincial Boards are raising their standards. As combined in the National Board of Dental Examiners, they are stimulating the colleges to better things, and to-day the general trend is turning in the direction of medical training as a preparation for the specialty of oral surgery.

This paper is short. It has been my purpose to only touch the subject in order to introduce it and give time for a discussion.

IS IT NECESSARY OR EXPEDIENT TO EXTRACT THE DECIDUOUS TEETH EXCEPT WHEN A PERMANENT TOOTH IS ERUPTING IRREGULARLY?*

By J. S. BAGNALL, D.D.S., Charlottetown, P. E. Island.

The point to which I especially desire to direct your attention, and upon which to obtain, if possible, an expression of opinion, is embodied in the question, "Is it ever necessary or expedient to extract the deciduous teeth except when a permanent tooth is erupting irregularly?"

In the early months of my practice a case was presented to me of a child, about three years of age, having his superior molars decayed even with the gums. There was much inflammation about the remnants of the teeth, so much so that the boy was unable to masticate his food, or to sleep properly.

Under these circumstances, I considered action imperative, so had ether administered and removed all of the roots. The soreness soon disappeared and the little patient, relieved from his intense suffering, progressed favorably.

* Read before the Maritime Dental Association, September, 1898.

Some two years later two dentists persuaded the parents of the child that the extracting of the teeth had destroyed the germs of the permanent teeth, and that consequently the boy would never have any. Later, at the time the teeth might reasonably be expected to appear, one of the aforesaid dentists declared that it would be necessary to cut into the gums freely quite often to enable the new teeth to force their way through, and when these appeared in due course, as I always maintained they would, he took the credit of their production. On the other hand I considered that if the teeth could penetrate through the bone, the gum would certainly give but little resistance. Every intelligent dentist whom I conversed with concerning the case agreed with me that the new teeth would certainly come in all right ; but I could find little written that had any bearing upon the subject, and so had nothing authoritative to show the anxious parents, who are exceedingly intelligent, and whose fears I desired to allay.

This case, which I have cited at length, tended to make me more observant of the process of shedding the deciduous and eruption of the permanent teeth, and, as a result of my experience, I have made it a matter of practice, when a child is brought to me with an aching deciduous tooth or teeth, if all means at my disposal fail to relieve the trouble, and the little one can neither take sufficient food without suffering, nor rest at night, to administer ether if necessary, and remove the offending tooth or teeth, the slight danger of such extraction interfering with the legitimate expansion of the arch being, in my opinion, a minor one. In the cases so dealt with my youngest patient was fourteen months old. The upper central and lateral incisors were badly decayed, the gums were swollen, and he seemed to be suffering very much. After the removal of the four teeth the little fellow developed normally, and at the usual time the permanent teeth came in as satisfactorily as if nothing unusual had happened. My second youngest patient was seventeen months old. I extracted his upper central incisors, and seven months later I removed the two laterals. This boy is now about four years of age. At this date I can only say that he was freed from suffering and is developing satisfactorily ; but I trust in due time to be able to report that his permanent teeth have appeared.

In every case of removal of the temporary teeth that has come to my notice, all of the permanent ones have erupted, and only in one case was there not space enough for the new tooth. It was a superior left second molar. The boy is now in his tenth year, and, if the crowding still continues, I will use force to overcome it. Here is a cast of the mouth. This was a tooth that I tried very hard to save, but after the death of the nerve and filling of the cavity a discharge of pus set up, the tooth became quite loose, and, on

extracting it, I found the peculiar absorption so well described by Prof. Peirce, of the Pennsylvania Dental College.

Further, my observations of the absorption of the deciduous teeth leads me to the conclusion that whenever the permanent tooth in its progress fails to involve the foramen, no absorption takes place, and unless the temporary tooth is removed its eruption is retarded or takes place out of the true line of the arch.

Here is a cast of the mouth of a boy about fifteen years of age. The first permanent molar had been extracted and a second bicuspid erupted in the vacancy, leaving a firmly-rooted second deciduous molar between the two bicuspid. I have more than once extracted a second deciduous lower molar which had remained in the mouth much beyond the average time and found a second bicuspid crown pressing directly where the posterior root had been. No absorption whatever had taken place in the anterior root. I have with me a good specimen of such a tooth.

Twice I have found the lower bicuspid erupted almost horizontally and pressing against the tongue, with no absorption in the temporary teeth. How many times have we seen, when extracting a tooth to prevent an irregularity, or rather to let into place a tooth erupting out of its proper line in the arch, a thin tapering partially absorbed root, plainly showing where its successor had, as it were, slipped by, and only partial absorption had taken place.

This leads me to enquire, are there not times when it is judicious and even necessary to extract the deciduous teeth in order that the eruption of the permanent ones may not be retarded or diverted by non-absorption of the roots of the former?

Here is a cast showing the two left lateral incisors of the upper left side in the mouth of a boy fourteen years of age, the permanent tooth occluding so far back that it shuts inside the lower teeth; the permanent tooth on the right side, from which the deciduous tooth was missing, being regular. Had the deciduous tooth been extracted this irregularity could have been prevented.

It is worthy of note that this mouth had seven deciduous teeth all firmly rooted. There are many such cases of the cuspid teeth erupting either inside or outside the regular line, which, in my opinion, might always be prevented by the removal of the first or temporary cuspids. Cases are quite common where the cuspids are present outside of the line, and we find the four cuspids, especially in the upper jaw, necessitating the removal of the two inner or deciduous ones. I have here a cast of such a mouth, but perhaps it is so common as to be of little value.

Here is another cast of a mouth of a lady about forty years of age, with the upper left cuspids both deciduous and permanent

with the lateral incisor missing, and on the right side there also appear to be two cuspids. The lady says that about ten years ago the second or further back one grew down, inside of a small tooth which she had extracted, and gradually fell into line.

The most marked case I have had is that of a young man about twenty-one years of age, who had two badly decayed upper deciduous cuspids ; and, being convinced that teeth are sometimes detained from making their appearance by the non-absorption of their predecessors' roots, I removed the then incumbents and, ere long, both my patient and myself were delighted to find two worthy successors putting in an appearance. This was about three years ago.

Here is a cast of the mouth at the present time showing two perfect cuspids.

This cast represents a portion of the mouth of a person about thirty years of age. Two teeth had been extracted some six months ago, and a permanent cuspid is now erupting. Both bicuspid are missing ; whether the two teeth recently extracted were the bicuspid or a bicuspid and deciduous cuspid, I am not able to state, as I have only recently seen the mouth.

A lad, sixteen years of age, was in my office in July, who has his upper cuspids and three molars still firmly rooted, only having lost one deciduous molar. In the lower jaw all of the deciduous teeth had been replaced by the permanent ones. While I anticipate that his permanent set will soon be completed, I am of opinion that it would hasten matters to extract the five deciduous teeth, but hesitate to do so lest such action should be deemed unjustifiable meddling. Had the mouth of my little patient, over which there was such a tempest, not erupted his upper bicuspid until past sixteen years of age, it certainly would have been very unfortunate for me.

In view of the facts which I have just cited, and being convinced that many similar ones must have come under the notice of those whom I have now the honor of addressing, I would ask for a general expression of opinion upon the points thus raised.

PYORRHŒA ALVEOLARIS. PERSONAL EXPERIENCE IN TREATMENT.*

By W. GEO. BEERS, L.D.S., D.D.S., Montreal.

What we positively know about the pathology of pyorrhœa alveolaris might cover half a sheet of note paper. What we positively do not know would fill folios. Our investigations are like a

* Read before the Maritime Dental Association, September, 1898.

deep dive into a dark sea, knowing nothing of the bottom, and uncertain of rescue; and while the regulation "twenty minutes" ought to suffice to tell all I know of my own experience in treatment, it would take hours to relate explorations in the realms of pathological speculation, and the many discoveries made of one's own etiological ignorance. We make a step towards knowledge when we discover and confess our ignorance, and perhaps one's frankness in this direction may be a little inspired by the feeling that his friends are in the same plight. Somebody said that while caries is the most prevalent disease in existence, there are more teeth lost by pyorrhœa alveolaris; but we have no statistical proof that this is true, and I am disposed to accept it as one of those hasty and epigrammatic statements, which pass too current entirely because of their catching phraseology. We cannot assume that all teeth that are "lost" are lost legitimately. There are more illegitimate deaths than births. It is quite safe to suggest that thousands of teeth are "lost" by ignorance on the part of the patient or malpractice on the part of the dentist. It needs no extensive experience to assert, that the large proportion of "lost" teeth in the establishment of the quack dentist, are like lost souls that have none but themselves to blame for their damnation.

We need no statistical proof to declare that the diseases which attack the soft and adjacent structures of the mouth, especially those intimately connected with the alveoli, are more difficult to treat, and more likely to recur, than those which attack the teeth themselves. The force of resistance (*vis medicatrix naturæ*) aid the soft structures; it is entirely absent in the hard, unless in the very exceptional and limited cases of arrested caries. Yet there is a limit to the tolerance which the soft structures exhibit, and when that limit is passed we observe irretrievable recession of gum, alveolar margins, entire destruction of the sockets and pericementum. There are a hundred questions which might be referred to, but however we may speculate on the etiology of this disease, I venture to express my belief, that if we can take care of the gingival line, where the enamel and cementum join, or, in brief, of the gum tissue at the immediate neck of the tooth, the rest of the gum will largely take care of itself. In modern dental practice the abuses of the free margin of the gum are as daring as they are dangerous. It was not so in the olden time. The wisdom which only comes by experience, is entirely absent in the army of young enthusiasts who revel in rubber dam, ligatures, clamp wedges, and who rush into the operating arena with all the devices of the dental engine, with its rapidity of movement and the many abuses with which it is charged. Overhanging fillings, the nidus they make for debris pressing on the interproximate spaces; the numerous mechanical injuries inflicted on the gingival line by clasps, un-

finished margins of vulcanite pressing on the interproximate spaces so as to make deep pockets and ultimate gum recession—these are very ordinary exciting factors in bringing about the first stage of pyorrhœa. The interdependence of the teeth and gums is imperative. The teeth will be retained in the socket, it may be for years, but it is never forever. The gums will tolerate an immense amount of mechanical and surgical abuse anywhere better than at the gingival line. Why is this? Because the soft glandular-like epithelium—though it is not a glandular structure—which lies at the neck of the tooth, is composed of more delicate cells than elsewhere in the gums; its fibres are more intimately connected with the cementum; the cementum is thinnest as it reaches the neck of the tooth, and the peridental membrane depends for its tense hold on the roots upon the integrity of the fibres of the pericementum which unite with the cementum at the neck.

I believe there are constitutional predisposing causes of pyorrhœa alveolaris, but in searching and speculating in that direction, it is wise to search carefully for causes closer to view. We see mouths not only after or during illness, but in good health, which are human cesspools. The origin of a good deal of pyorrhœa alveolaris is no more obscure than the origin of a good deal of typhoid. Many people will tolerate more positive filth, and more pyogenic bacteria in their mouths than they would on their feet.

The etiology of caries is no longer a speculation; that of pyorrhœa alveolaris is entirely so. We know that it is a perversion of normal physiological action; that it is a deviation from the normal standard of health of the parts concerned, constituting a distinct disease that may end in the death and loss of the teeth. But we are not agreed as to whether or not it is infectious, local, constitutional, or both. It is a much named disease, whether it be called Rigg's Pyorrhœa Alveolaris, Suppurative Inflammation, Phagedenic Pericementitis. Is it due to salivary or sanguinary calculus, or both, or fungi, or bacteria? Is it wholly or in part due to traumatic inflammation? Is it a local expression of a systemic condition, and located in the mouth because of a predisposition of the gums, the pericementum and the alveoli? Is it a primary or a secondary lesion? Is it never present, excepting in a depraved state of the nervous system? Is it associated with gout, rheumatism, Bright's disease, locomotor ataxia, uterine troubles, and other constitutional complications; the excessive use of salt, or alcohol, which causes increased secretion of uric acid? Is the calculus uric acid? Is it connected with catarrh of the mucous membrane of the nose or pharynx, rachitis, tuberculosis, scorbutis, scrofula, chronic constipation, exanthematous diseases, malaria, diabetes, tabes dorsalis, dyspepsia, syphilis, anæmia, chlorosis, repeated pregnancy, bad air, bad food, hygienic neglect? Or will

some Boston prophet arise, who will tell us that it and all other oral troubles are due to the presence of amalgam, as in the middle ages, earthquakes, tempests and epidemics were ascribed to the devil or the Jews. With all this bewilderment in etiology, how can our treatment be based upon anything better than empiricism? If the etiology is obscure, how can treatment be scientific? We must just console ourselves by feeling our way in the dark, and taking the consequences until some one lets in the light. Something must be done for our patients. The true cause of many a disease is obscure, but physicians do not despair and let the patients die if they can help it. Neither are we to abandon to the forceps, if we can help it, conditions we cannot explain. Not even because we are sure of this much, that extraction always cures. So does the guillotine forever cure migraine.

Before leaving this part of the subject, I would like to ask you to obtain Dr. W. C. Barrett's "Oral Pathology and Practice," just issued, in which the question is carefully considered.

It is a well-known fact that there are general diseases successfully treated, the causes of which are as unknown as that of pyorrhœa. It is nothing to boast about that this has and can be done; it upsets our theories and teaching in the recognition of disease and its proper treatment.

I like Dr. Barrett's division of the disease into three conditions: the first entirely local, due to local irritation; the second distinguished by the nodular deposits on the root, and the formation of pockets; the third, due to, or coincident with, a depraved constitutional condition. The first is an advanced condition, of simple gingivitis; slight periostitis confined to the gingival margin, and the edge of the alveolus, demanding gentle brushing, massage with the finger. As a regular mouth wash for this condition I prefer tincture of pyrethrum. The pyrethrum root may be left in the best alcohol for a week. It is, I think, the best astringent we possess. It is well to remember that there is a time in this disease when it may be easily arrested, and that there is a time when it is too late. It is well to remember also, that by over-treatment we may actually produce to order acute inflammation from the simple irritation. So far as instrumental treatment is concerned, if there is no salivary calculus, a good deal of wholesome neglect is advisable. There is nothing the matter, in this stage, with either the root or the alveoli.

I might repeat everything that has been suggested in the way of treatment where the disease has all the pathognomonic characteristics; but, to be as brief as possible, let me suggest a few aphorisms. Keep the mouth and your hands and whatever you use perfectly aseptic. Whatever drugs you use be sure they are pure. You must needs work a good deal in the dark, but get all the light

possible, both in diagnosis and in operating. A drug that is useful may be abused by over-use so as to become a positive irritant. Iodine and aconite in the incipient stage of inflammation will retard the circulation and stimulate lymphatic action, but used to excess, as it commonly is, it is a destructive poison. Alkalies in any form should not be used, either by the patient or the operator, because they precipitate the salts of common tartars. In secondary treatment, and, in fact, all through, be careful not to disturb granulations which you have been trying to produce. Do not operate oftener, as a risk, than three days of each week ; some rest is as necessary as some operating.

Before beginning the removal of serumal calculus, be as sure as possible just where it lies. There may not be any. I have seen acid conditions, in pregnancy, etc., when salivary calculus for the time is dissolved and disappears. As to whether or not this occurs where the calculus is serumal, I do not know. Massage the gum with the finger to make it bleed, if it will ; sometimes lance ; sometimes use a leech. Relieve venous congestion as much as possible before scaling. There is an object in manipulating the gum margins so as not to wound them any more than they are already wounded. I begin my diagnosis for the nodules of calculus by explorers I have made for the purpose, using a diagram of the roots to mark the parts upon which it is deposited. My pocket-hoes and scrapers I have had made so as to adapt them as possible to the contour of the roots. Square hoes and scrapers are not the best. I have had these made in duplicate of platinum-iridium so as to use them when the sulphuric acid is injected into the pockets. Some authorities object to the use of chemical agents to dissolve the deposits, and favor trichloroacetic acid to soften them. I venture to believe what is considered an objection, viz., that they may cause a slight dissolution of the surrounding bone, to be advantageous, within proper limitations. Pure sulphuric acid is less destructive than dilute. Dip a wooden point in pure concentrated sulphuric acid ; fill the pockets. You can see the advantage here of having the concave platinum-iridium instrument. Aromatic sulphuric acid dissolves dead, not live bone, but I believe we overlook the condition of the contiguous alveolar wall, which I always scrape more or less. The dental engine, to my mind, is risky, unless to curette the alveolar border where it is necrosed. If it is necrosed, the surgeon's maxim should be remembered—" cut beyond the dead line." I have had some opportunities to examine the alveolus and teeth *post mortem*, and hope to report later. If anyone else has had a like opportunity, I hope they will report before I do. I think the condition of the porous alveolar wall in pyorrhœa alveolaris has been somewhat overlooked. The nodules

on the root may be removed, but their effect on the pericementum alveolus is serious.

For many years the use of sulphate of copper, packed into the pockets twice a week, and allowed to remain for ten minutes each time, has been in favor in England. I swear by it. It contracts spongy gums and makes scaling easier. Its action involves less loss of tissue, while its curative powers are very marked. It does not blacken the teeth like nitrate of silver, or act on them like acids; it does not spread over more surface than desired, like chloride of zinc, caustic, potash, and other such remedies. It causes little pain. Other caustics check granulation. Use bicarbonate of soda as a rinse, and pack it on top of the sulphate before rinsing. Protect the lips with an old napkin.

I have purposely avoided saying a great deal that might, and perhaps ought to be said, about peroxide of hydrogen, etc., and as I wish to leave room for somebody else to say something, I will say no more.

TABLE OF FILLINGS.

By F. B. NOYES, D.D.S., Chicago.

From a study of the table on the following page it is evident that the alloys manufactured and sold by the dental manufacturing houses are not what they ought to be or what they can be made. Thus far attention has been given simply to the composition of the alloy, and that, too, with especial reference to the properties of color and easy manipulation, regardless of shrinkage and expansion, except as measured by very crude tests. The effect of annealing has not been understood at all, and for that reason it is difficult to find two samples of the same alloy from different offices that will give the same shrinkage-expansion action. This has led to much of the confusion in the matter of amalgams. It is necessary not only that the composition of the ingot be correct and always the same, but that the filings be properly and understandingly treated after cutting, and that every lot be tested before it is put on the market.

The work of Dr. Black proves beyond question that amalgams can be made that will not shrink, and that a large number of formulæ are possible, giving somewhat different working properties, but the formulæ must be confined within a narrow range; and when the filings are cut the work of manufacture is not over: they must be understandingly and properly tempered and tested before they are sold. This will never be done until it is demanded by the profession.

ORIGINAL COMMUNICATIONS

INSERTED BY THE MEMBERS OF TORONTO DENTAL SOCIETY FOR DR. BLACK'S CLINIC BEFORE THE ONTARIO DENTAL SOCIETY.

No.	MADE BY DOCTOR.	NAME OF ALLOY.	TYPE.	MOVEMENT IS POINTS.	MICROSCOPIC.	REMARKS.
1	G. V. Black	Fellowship	Z	Ch. 11; Ch. 1	Very slight crack	This was an experimental sample annealed a long time.
2	F. B. Noyes	Frost white (Dr. Kester)	N	Ex. 11; Ex. 4	Perfect	3 weeks old, not annealed, coarse cut.
3	T. B. Willmott	Silver (21; tin 22; copper 5)	A. E.	Ex. 4	White crack	Annealed, fine cut.
4	"	"	H	Ex. 21	Perfect	No excess of mercury in packing.
5	"	Robertson's	C. F.	Ex. 21; Ch. 11	Slight crack	Bottom packed dry, top moist.
6	"	"	C. M.	Ch. 1; Ex. 21; Ch. 11	White crack	Packed with square smooth end, soft.
7	H. Clark	James	D	Ch. 11	"	" rotary motion, dry.
8	"	"	C. O.	Ch. 2	Very slight crack	" rather dry.
9	G. A. Swann	Phillips	Q	Ch. 3; Ex. 11	Distinct crack	Mortar, medium, dry, rotary.
10	"	Dawson	R	Ch. 4	"	8 months old, in hand, dry, rotary motion.
11	"	Barck	H	Ch. 5	"	" mortar and hand, very dry, rubbed in.
12	C. E. Parsons	Alba	O	Ch. 5	"	" " soft pieces.
13	"	"	N	Ch. 3; Ex. 3	Very slight crack	" " mortar and hand, very dry, rubbed in.
14	Capon	Splendid	G	Ch. 5	Wide crack	Instrument heated, surplus carried off by gold.
15	"	Half Splendid, half James	M	Ch. 4; Ex. 4; Ch. 1	Marginal not good.	Cut June 21th, 1896, became loose in tube.
16	H. J. Keed	Globe	A. J.	Ch. 2; and lost	Wide crack	Same ingot, fresh cut, not annealed.
17	"	Same ingot.	C. E.	Ch. 4; Ex. 1	Slight crack half-way around	" " and annealed.
18	"	"	S	Ch. 9	Wide crack all around	Mortar and hand, rotary, slight excess.
19	A. J. McDonagh	Barck	A. R.	Ch. 8; Ex. 1	"	" packed vertically, no excess.
20	"	Dawson's White	A. G.	Ch. 3	"	"
21	"	Barck	C. G.	Ch. 3	"	"
22	C. H. Waldron	James	A. H.	Ch. 5; Ex. 13	Slight crack	Fresh, not annealed.
23	"	"	F	Ch. 11; Ex. 3	"	Same as above, surplus removed with dry filings.
24	"	"	T	Ch. 2; Ex. 1	"	" " washed in alcohol.
25	"	Recovered from scraps.	I	Ch. 6	Wide	"
26	J. F. Adams	James	A. A.	Ch. 2; Ex. 31	Margins broken	Mixed in hand, dry.
27	"	"	W	Ch. 2; Ex. 5	Very slight crack	Three weeks old, very wet.*
28	F. D. Price	Price's	P	Ex. 11	Above all around	Six months old, not annealed.*
29	A. E. Noyes	Sterling Refined	A. Z.	Ex. 6	Margins broken	Re-annealed twenty minutes in boiling water.
30	F. B. Noyes	Alba (6 weeks old)	K	Ch. 4	Distinct crack	Packed dry, rubbed in.
31	W. C. Truiter	Mellean White (1 month)	A. F.	Ch. 2; Ex. 4	Very slight crack	Mortar and hand, packed moist.
32	H. E. Falton	Dawson's White	E	Ch. 2; Ex. 4	Slight crack	" dry as possible, surplus rubbed off.
33	G. S. Martin	"	A. B.	Ch. 2	Distinct crack	" and hand.
34	F. J. Ross	Splendid (3 months)	T	Ch. 6	"	Old hard pieces mixed with it. Pieces size of small wheat grain; surplus rubbed off with channels.

* This formula must be incorrect.

Note—Ch., Contraction; Ex., Expansion; Point, one ten-thousandth of an inch.

Proceedings of Dental Societies.

THE NEW BRUNSWICK AND NOVA SCOTIA DENTAL SOCIETIES,

HELD AT DIGBY, N.S., SEPTEMBER 1st AND 2nd, A.D. 1898.

THURSDAY, September 1.

Meeting called to order at 9.30 a.m., by Dr. G. K. Thomson, President of the Nova Scotia Dental Society.

Moved and seconded that Dr. McAvenny, of St. John, be appointed chairman of this meeting. Carried.

Dr. A. W. Cogswell was nominated by Dr. J. M. Magee as President of the Association, seconded by Dr. F. A. Godsoe. Carried.

Dr. H. C. Wetmore was nominated and elected to be Secretary-Treasurer of the meeting.

Dr. Woodbury mentioned the fact that the officers elected are merely elected for the present meeting, and Dr. Cogswell replied that that was the understanding.

Dr. MURRAY, of Moncton, N B., moved that we have a Maritime Association to meet alternately in the three provinces, to be held every two years.

Dr. COGSWELL remarked that this matter was discussed at yesterday's meeting, and it was thought not advisable to elect officers permanently, and therefore they propose not to do that at the present time.

Dr. G. K. THOMSON moved as follows :

Whereas, the members of the Dental Association of the Maritime Provinces deem it desirable to meet annually for the purpose of holding clinics, reading and discussing papers and scientific subjects relating to dentistry, and feel that they can work to much better advantage for those purposes as one body than separately, it is therefore

Resolved,—That the members of the Nova Scotia, New Brunswick and Prince Edward Island Dental Associations do hereby organize themselves into a body to be known as the Maritime Dental Association, which shall be separate and distinct from the above mentioned Associations and solely for the purpose of the social and intellectual development of the profession of dentistry in the Dominion of Canada.

Dr. MURRAY withdrew his motion, and seconded the motion of Dr. Thomson.

Dr. GODSOE suggests that a report of the sentiment of the different societies on this subject should be given as to their wishes to form a Maritime Association. On behalf of the New Brunswick Society, at the request of the Secretary, he stated that the New Brunswick Society deemed it advisable that a Maritime Association be formed between New Brunswick and Nova Scotia, and, if at all possible, to get Prince Edward Island to get it to do so. That said Association meet every two years.

Dr. COGSWELL asked to have the Secretary of the Nova Scotia Dental Society give the views of that Society on the subject. In place of the Secretary, Dr. Woodbury replied as follows: The resolution passed by the Nova Scotia Dental Society yesterday was to the effect that we are in favor of the idea of joint meetings of the Maritime Dental Associations; we deem it desirable that a meeting should be held in 1900 in New Brunswick, that we considered it was not advisable to organize at this meeting because it would give plenty of time to see the effect and the working of our union meeting next year at our provincial meeting, and to see if it would act injuriously to our own provincial interests. If it is going to kill our Provincial Association and make that represented only by a few it would be a great pity.

Dr. MAGEE suggested asking each man present if he would be willing to join an association for this purpose.

Dr. GODSOE explained the idea of the Nova Scotia Dental Society was to hold another joint meeting before such an association was formed.

Dr. WOODBURY moved as an amendment to the resolution of Dr. Thomson, That this meeting recommend that the organization of the Maritime Dental Association be postponed until 1900; that a joint convention be held in New Brunswick at that date; that these joint meetings be known as the Maritime Convention of Dental Surgeons.

Seconded by Dr. MCAVENNY. Carried.

Dr. COGSWELL introduced to the meeting Dr. Melotte, of Ithaca, N.Y.

DR. MELOTTE'S ADDRESS.

In the language of Emerson I may say, "I better know than all how little I have gained, how vast the unattained." I feel as if the tide almost had gone out and I am like a little barque stranded in this great beauty of scenery about me.

This subject of supplying the partial loss of teeth, as perhaps I will concentrate upon that more than anything else, is a deep subject, there are so many different ways, ideas of reaching different points, that perhaps, after all, I can give you only a hint now and then, only the result of discoveries I have made. I have

been battling with this subject of dentistry for forty-one years, and to become at all known more than ordinary is to load a man with great responsibility. I have tried to make preparation for such meetings as yours and have prepared this model which is carved with wood, a half section of the lower jaw, and a bridge has been made to supply the loss of several teeth from first bicuspid to second molar. I may say the first bicuspid and second molar have been used for anchorages. The molar has been trimmed down. I have a tooth that represents the normal condition of this tooth, and you see it is leaning forward. The difficulties that are met with are, straightening the leaning tooth and dressing it down upon the sides, so as to make it possible to form a band to enclose the tooth and make a proper anchorage. Anchorages are very important in bridge work, and if they are carelessly prepared and greater strain comes upon the abutments or anchorages than they will stand, the teeth are often weakened and destroyed. I don't know that I can do more than talk about this, and at another sitting with you I may endeavor to show you in clinic some of the methods I bring into use. A long bridge on one side where the opposite side has no opposing forces often results in the destruction of the bridge through too great stress, and will sometimes cause bridge work to be discarded by those who have attempted too much.

I do not stand before you as having always succeeded in bridge work. I have had very many failures, and yet those very failures have been stepping-stones to attaining a higher standard in the work.

Supplying teeth by gold removable plates or bridges is often better than permanent bridges. In speaking of these cases I will try to describe to you my method of treating a tooth which has no occluding tooth above. We will say the occlusion goes forward of this molar. In such a case it would not be necessary to grind away the cusps of the tooth, and it would be very easy to make a cap of gold for the tooth. Suppose my cuff is the band I am to form. My manner of forming a band is to wrap a piece of gold about the tooth. I am not in the habit of taking measurements, but by the eye I judge the length which I must cut my gold to form the band, and pressing it over the tooth to close it up and model it. Then, allowing it to lap, I join the piece of gold at this point (illustrating the upper edge), leaving the balance open so that it is less rigid in after work of fitting. Instead of soldering I weld the gold at this point by using borax either rubbed on a slate and applied with a brush or enough taken on tweezers to coat the surface. Then with a blow-pipe bring up almost to melting heat the portion that laps, thus fusing the surfaces so that they unite.

This method of welding gold I got from Dr. Bing, of Paris, some eight years ago when I was there. At first I considered it more of a novelty than of practical benefit, but in the welding of bands in the past five or six years I have not used any other method. I have not used solder because solder is very apt to leave the part at the joint more rigid and stiff. Having welded I press it down until it whitens the gum, taking it off and trimming where necessary from time to time until at last, having fitted it to the gum, I complete the welding.

We will say the fitting has been perfect around the margin of the gums and the part extending above the cusps is now to be taken into consideration. Fill the inside of the band resting above the summit of the cusps with plaster with a small spatula such as is used in mixing fillings, being careful to exclude air. This will ensure a perfect impression of the cusps and inside of the band. After the plaster is set remove the plaster and band, hold it over a lamp in tweezers and dry it slightly to get rid of excessive moisture, and pour in a small quantity of low fusing metal, fusing at 212, metal that you begin to know as Melotte's fusible metal. When the metal is thoroughly congealed I then remove the plaster which reveals the cusps cast in this fusible metal. You are looking down upon the cusps in this cap. Now with the shears trim the part of your band extending above the height of the tooth down to the level of the summit of the fusible metal cusps, on the little cast, upon the inside. Then with a file or corundum wheel bevel or grind the surfaces to a thin edge. Then with a burnisher or hammer, being careful not to mar the fusible metal, it is contoured. Having contoured and brought the edges of the fusible metal down to a level with the outer edges a little wax may be used to more perfectly contour and make smooth and uniform the edge that extends over on to the fusible metal. You will see this model here represents the cusps with the band extending around and bevelled over. Now take an impression in the moldine of the surface extending just above the line of the cusps, and having melted the metal after putting on the little rubber ring over the moldine in the cup pour in fusible metal as cold as it will run well. Have it cooled down almost to the congealing point and fill the ring with the fusible metal, making quite a thick cast—perhaps in thickness half as great as that of the width of the little rubber band.

It is very important in manipulating this metal you should not pour it too hot if you wish to get a perfect cast. After your metal has congealed and is cold enough to handle take the ring and metal off and then take the rubber ring off with the metal and pour cold water on it until it is perfectly cold if you want to make a counter-die. Having this metal perfectly cold and wet, you all

know it would not do to pour zinc or lead on to zinc that was wet, and as it melts at 212 it is below the point of steam heat, therefore you can pour this molten metal on to the cold metal without generating steam. Now it would almost seem as if this could not be done without the adhesion of the two casts, and it is only by having the metal perfectly cold and wet that it can be accomplished. Now stir the metal (I use a ladle of cast iron, perhaps not as thick as a plumber's ladle, but thick enough to retain the heat sufficiently to keep it liquid so that you can stir until it is almost granular) until it begins to thicken up, and that is the point where it should be poured, if you want to produce a cast without having the two adhere or fuse together. If you are very careful, you will produce a die and counter-die from the same model without any difficulty. Still, if you stick the first one, and have been careful in removing the die from the moldine, you can cast a number without any trouble. If the cast sticks, the die and counter-die stick together, you can make another without taking a second impression, or it is very easy to smooth off the moldine and take another impression if you should make a miss.

To obviate the necessity of making a counter-die, about two or three years ago something came to me which I think is a great saving of time. Soft pine cut into little blocks are very convenient for use instead of a counter-die held endwise of the wood over the metal, first laying the piece of the gold over the face of the die. One blow of a good heavy hammer, perhaps three times the weight of an ordinary claw hammer, on this wood will serve as a counter-die. You can get perfect swaging with the wood, as perfect, I think, as a counter-die, and you save fusible metal adhering to the gold. If any fusible metal adheres to the gold you must be very careful to remove it with pumice-stone or in some other way. If you do not, in heating, it will unite with the gold and destroy its usefulness because it is composed of tin, lead and bismuth, and great care must be used. The wood shortens the process one half. Having swaged the gold for the cap, the next thing to do is to try it on to the gold band which holds the fusible metal cusps to see that it fits perfectly, putting it on where it belongs, then mark it. Now take the gold band containing the fusible metal, put it into a big tablespoon and boil the fusible metal out. It will melt in boiling water sufficiently to permit you to scrape out every particle. If you have put the cap you have swaged on you will find it fits. Now put it into the soldering pliers and tack it or unite it at some one point. After that, if you feel it is necessary, fill it with investment material and complete the soldering. In my own office, with skilful manipulating of the blow-pipe, I can complete the soldering by laying it without investing it in one of the corrugations of the pad (using the mouth blow-pipe). Cut

away with wheels and files and corundum wheels until you have sufficiently smoothed it, put it on to the tooth, and if you have proceeded rightly and according to this description, which is more or less imperfect, it ought to fit perfectly under the free margin of the gum as it did before you found the cap. To know how to do a thing it is necessary to see it done. This gold, we will say, is No. 29. I do not think it advisable to use anything less than 29 gauge.

I have shown you how to make a cap, and out of the mouth to a certain extent. To take impressions and make a band from an impression is something I do not practise, yet there are some who undertake to make bridge work entirely by casts. I know models are sent to men who make bridge work, and the finished work is delivered to the operator ready for setting. I have heard of successes in that way, but can only wonder that success can be attained. I wonder men do as well in the absence of patients as they do. I know in making partial and full sets it is done and those who do the work exhibit great skill. The results are sometimes wonderful, but I do not recommend the making of bridge work upon casts alone. If caps were formed and impressions taken I might finish the work from that stage.

Having described this method of making that one kind of abutment, which is, I will admit, one of the easy things, we will take another feature of the case and see what we would do providing there was a slight occlusion. I have presented a difficulty here for the sake of more accurate description. Suppose the upper tooth occludes like that (shows model). Before proceeding to make the cap, as I have told you, grind down these cusps equal to the thickness you want to supply, in order to give sufficient grinding surface. Grind that away with a corundum wheel equal to the thickness you want to add. I believe in having sufficient thickness, even more than might be thought sometimes necessary, because there is enormous pressure sometimes used upon bridge work, and the caps are very easily ground through in the act of masticating. Proceed with fitting your band around the tooth, then filling it with plaster in the same way as explained before, and have your patient bite into it. When your cast is made you can calculate the amount of thickness you may put on by putting it in the articulator. To get perfect articulation is saying a good deal. I have a way of articulating teeth that to me gives me perfect results, so as it is not perhaps the ordinary way of proceeding, it might be as well for me to pass on to the manner of taking a bite.

In parenthesis I will say here I once heard Dr. Barrett, of Buffalo, say at a meeting given to a section of dentistry at Berlin before the International Medical Congress, that there was no

American art in the dentistry, no English art, no German art, but it was dentistry, and each and all had contributed to make the dental profession what it is. Dr. Evans was there, and while he did not reply to him he afterwards was very wrathful to think that Dr. Barrett did not acknowledge there was American art in dentistry, distinct from all other dental art, as there might be an art in painting, an Italian art, a German art, a French art and all that. I do not know but what Dr. Barrett was nearly right; each people have contributed to make dentistry what it is. (Showing model.) A great many Americans could produce stronger teeth than many other teeth that are used—but this is a digression.

This moldine I shall make use of in trying to give you an illustration of taking a bite. We will imagine the cap has been made, the anchorages have been formed. The anchorage for this molar and for this bicuspid have been formed, and we are about to consider the matter of taking an impression which I always take in plaster. You know if this molar leaned forward to any great extent there would be a dovetailed space, and when you come to take plaster out it might break and compel you to make another attempt in order to get a cast which would be sufficiently accurate for you to build a bridge between these two abutments. Fill in with quick setting plaster between these two points, and I will use this moldine now instead of plaster. I fill in between these two points, making the core here to prevent breaking in removing the impression. Direct the patient to bite up, to close the mouth. In closing the mouth we shall get an imprint of the upper teeth in the plaster, the mouth remaining closed until the plaster sets. *When it is quite hard direct the mouth to be opened, and then with a knife or spatula remove the ragged edges of the plaster.* It may be taken out, trimmed and put back. I do that very often, but you can trim it away in the mouth, leaving the imprint of the upper teeth in the plaster.

Now give it a coat of liquid vaseline, or you may soak it, using castile soap, or varnish it. Fill your impression tray with quick setting plaster and take an impression over the whole, over the core which is now in place containing the imprint of the upper teeth. Take an imprint just as you would have taken the impression if you had not filled in this core. Now remove the impression and with it the core may come out. If not, remove it and put it in its place. If the caps come out all the better, if not take them off and put them in proper places. We are looking down into the impression and we see the ridge, about as you look upon this illustration, and we look down into the caps. This represents very nicely the core. The imprint of the teeth is out of sight, imbedded in the impression. Putting a tack or pin into the caps so as to prevent them from breaking away when the cast is removed

from the impression you are now ready to consider another very important point.

We see we have an impression of the anterior teeth, which is quite necessary. It is not necessary to have the teeth so perfect on the opposite side of the mouth, but if you can get them so much the better, that is, the crown surface of the teeth on the opposite side of the mouth. Before pouring plaster into the imprint of the anterior teeth I use fusible metal, which is a departure from the usual method. But before this I put an ordinary pin into the cuspid and into the central, cutting off about one-half the pin, leaving the pin projecting, further on you will see the utility of it. With a small quantity of fusible metal pour in and fill the teeth up to the gum line, stopping there; and as soon as the metal congeals and is fairly cold varnish the other portions of the cast and proceed to fill in with investment material; after that is perfectly hard you remove your cup carefully and then begin to cut away, and you will see as you cut away your impression, you come down to fusible metal tips or cutting edges of the teeth and the great object of which is to save defacing the teeth. If they were plaster it would take you a long time to cut away and remove the shell impression from the teeth, but you can be quite careless in cutting down because your knife will come in contact with fusible metal and it is very easy to remove the plaster from it. Cutting the impression away you come down to the imprint of the upper teeth in the plaster core as it was before you took the impression; there it is on the plaster model. The caps are in place and all the anterior teeth are here represented by fusible metal down to the gum line; below that it is your ordinary investing material. If you had taken wax and got a wax bite and laid it aside you could not put it on the plaster cast as perfectly as this because the case is now part of the model.

The next thing is to get an imprint of the crown surface of the upper teeth. Take an impression tray and fill with quick setting plaster and take simply the crown surface and cutting edges of the anterior teeth. Do not undertake to get a full impression, simply the crown surface of the teeth for an articulating model of the upper teeth in plaster. Having obtained that, dry the cast slightly to remove the excessive moisture by means of a blow-pipe or holding over a Bunsen burner. Have fusible metal melted and pour into the impression of the upper teeth. Pour the metal quite cold and in two minutes it will be congealed and hard so that you can put it under the faucet and remove at once. You could not get a cast from a wax impression of the upper teeth as quickly as you can that. Having obtained a perfect cast of the upper teeth in fusible metal, place the metal upon the cast, the upper teeth, the molars and bicuspid into the imprints made by

the natural teeth on this core. If the bite was perfect, the occlusion was perfect, and this cast must be perfect, it could not be out of the way the two-thousandth part of an inch. It must be perfect if you proceeded perfectly as in running the scale. Place the occluding casts in position so you can put them into the articulator and get a perfect occlusion of the teeth for the supply or dummies. That is to me one of the very very important things in extensive bridge work, because to have now and then a point of contact instead of perfect occlusion of the teeth will cause destruction to the bridge, I don't care how well it is made. I have bridge work in my own mouth, one piece of which has been in eight years, and another I have had for about twelve or thirteen years, which has done good service. I have seen pieces of bridge work taken out of the mouth exhibited as failures, and it was not fair to the system or to the men who made them to say they were failures. People learn to eat after a little with bridge work, and they forget the teeth are artificial. The crushing force produced in masticating food is something terrible. We do not realize how much strain these teeth are put to in masticating.

I only wish that each one of you who is hungry for knowledge about bridge work could be in my own office and follow me there where we are practising my system ever since I discovered this method of running teeth with fusible metal in making models. I will attempt to describe a case where teeth are missing from the upper jaw. We will say a cuspid and a lateral are to be supplied. We cap this bicuspid for anchorage and make an open-faced band for a central which is a difficult tooth to make a band for on account of its shape. It is very much easier to make a cuspid openface. We will say there is nothing but a root and a cap is put upon the end of the root. There are so many things to be thought of and spoken of in relation to the banding and capping of roots and putting in the retaining pins, enlarging and making the anchor pin, that I hardly know where to begin and where to stop. Having formed these anchorages any way you please, if I used porcelain I should make an anchorage crown and place it in position before taking an impression for supply between the two points; I should fill in with plaster between those points the same as before. If there were any natural teeth to be represented on the model those would be poured with fusible metal, then in cutting away the impression I would come down to the fusible metal teeth and there would be no danger of defacing. It is a good plan to represent in fusible metal all the teeth that would ordinarily be represented in plaster. Have all the teeth that are to be anyway used in locating the supply teeth, or for occluding purposes, represented in fusible metal. I think if you try this you will find it a great advantage.

I might say something about the preparation of the root for a band preparatory to making what is ordinarily termed a Richmond crown. It is very necessary that the root be trimmed in such a way as to admit of having the band go well up under the free margin of the gum and fit the root accurately, and it is necessary to have the end of the root ground, giving it the proper slope, so that in putting your porcelain crown on you can locate it with reference to the antagonizing teeth.

The preparation of the root is very important. You must take that into account and must not let it escape, because imperfectly fitting bands are lacking in firmness. Where they are too thin is one of the great causes of single teeth coming away, and it is very important where we use a root in bridging to have bands made of gold sufficiently thick and a perfect fit. I had a piece of bridge work in my office made by Dr. Charles P. Grant, who made a very extensive piece of bridge work and attempted something that I hope has not been attempted very often since, that of making a full upper bridge permanent on two cuspid roots, saddling the ridge in the molar region. The doctor claimed the discovery of the matter of making saddles, and I guess he was one of the discoverers and possibly might have been the first. I have wished sometimes no one had ever discovered the matter of making a saddle to supply teeth on the back with any number of the anterior teeth as anchorages because I think they are weak, the pressure of the saddle on the gum is very great, and no matter how strong you make the attachment of the saddle to the anterior anchorage, it is very likely to give way. I do not believe in saddles.

After the teeth were treated the roots were cut off and the anchorages made like this (illustrates) with pins going up into the cuspid teeth. They were well made, and the only weak point and the cause of destruction of the piece at the end of three years—I wonder it did not give out sooner—was that he made the caps flat.

I think it very important the root should be hollowed out and the cap burnished down in after having been soldered on to the band. Hollowed in that way gives additional strength or hold to the pin. Filling this up with solder makes the cap stronger for anchorage.

In backing up a porcelain shell, especially in bridging over the anterior spaces, making dummies, or supplying the lines of centrals or laterals in bridge work, it is quite important that the edges of the porcelain should be well protected with gold. In reducing the length of porcelain I hold the tooth after it has been backed up—this representing the backing—I hold it to the corundum wheel, bevelling the gold with the tooth, and then wax on a piece of hard

metal (gold and platinum), just about in this shape (illustrating), letting it extend below the cutting edge of the porcelain, and then fill in here with solder. I should recommend the piece to be about twenty-three or twenty-four gauge, and when a tooth is invested let the investment come over the edge to hold it firmly and then fill in here with solder. You can do that after it is waxed on to the cap.

You can take twenty carat gold with three or six per cent. platinum. The metal ordinarily used for clasps will do very well, producing hardness of the gold by admixture of a small percentage of platinum, and then by filing and grinding this away, leaving it extending a little below, you will have a hard cutting edge to save the porcelain from fracture. I think that is quite important in bridge work, and in fact wherever the occlusion comes very greatly upon the front tooth.

There is another point I may state here. Where centrals and laterals are to be supplied and the back teeth are lacking to any great extent, destruction will come to such a piece of bridge work, unless the teeth are shouldered at this point. By filling in with solder here and building out a shoulder, the lower teeth will catch here on this shoulder, so in biting it will have a tendency to throw the teeth in, instead of striking on a bevel and throwing the teeth out.

Of course the incisors, in cutting, strike the cutting edge; but as they come up they strike this shoulder and that overcomes the resistance. You have really converted the anterior teeth supplied into bicuspid. That is quite important. There are very many pieces of bridge work made to supply the lines of the anterior teeth between the bicuspid. These pieces answer, as a rule, for a time very nicely; but unless the posterior occluding teeth are in good condition, these pieces are very quickly destroyed by the undue force put upon them.

Q.—Any piece of metal put in front, would not that have a tendency to crack the facing?

A.—No, I don't find that. Porcelains crack by undue use of borax. I have every piece of gold I use smeared with borax. I paint it on with a camel's hair brush where I want to have the solder flow, for I don't sprinkle it on, because borax unites with the body of the tooth and the enamel and will weaken the tooth. The breaking of porcelains comes, I think, more from not properly heating pieces before submitting to the melting flame. A piece should be heated until it is brown and then quickly transferred to the pad and under a blow-pipe, the heat applied at that part farthest from the porcelain first, gradually working up to the point where the porcelains are lying under gold. With proper investments covering porcelains, and proper heating and proper cooling, you should

have no broken teeth. If every time you solder you could heat up a little sand and put your case in it, covering over with hot sand and letting it cool down slowly, it would be a great deal better than to put the piece on the bench and let air come to it quickly, as some allow. In making porcelain teeth it is necessary to raise the heat gradually, and very necessary to allow the heat to come down slowly before removing from the muffle, and of course the rule applies to continuous gum work. If we were always as careful in manipulating heat as manufacturers are in making continuous gum work, or making teeth, I think we would have less trouble with broken porcelains. One great cause is that in locating the teeth we allow the edges to come together. In old plate work it was thought a good plan to put a thin piece of isinglass or paper between the teeth, so that when the paper burns out the teeth are left slightly apart, so that the force of contraction of the metal would not be exerted to the breaking of the teeth.

(To be continued.)

NOVA SCOTIA DENTAL SOCIETY.

Officers elected: President, Dr. Frank Woodbury, Halifax; 1st Vice-President, Dr. M. K. Langille, Truro; 2nd Vice-President, Dr. L. St. C. Saunders, Kentville; Secretary, Dr. F. W. Ryan, Windsor; Treasurer, Dr. H. H. Bigelow, Halifax. Auditors: Drs. A. W. Cogswell and G. H. Fluch. Executive Committee, Drs. C. O. H. Webster, L. St. C. Saunders, J. A. Johnson, with President and Secretary.

Next annual meeting to be held in Halifax, N.S.

Dental Board officers: President, Dr. A. C. Cogswell, Halifax; Secretary-Register, Dr. Geo. K. Thomson; Treasurer, Dr. H. H. Bigelow.

NEW BRUNSWICK DENTAL SOCIETY.

Officers of New Brunswick Dental Society: President, J. W. Moore, D.D.S., St. Stephen, N.B.; Vice-President, Dr. J. W. Sangster, Sackville, N.B.; Secretary-Treasurer, C. F. Godham, D.D.S., St. John, N.B.; President of Council, L. Somers, D.D.S., Moncton, N.B.; Secretary and Registrar, F. A. Godsoe, D.D.S., St. John, N.B.; Examiners, H. C. Wetmore, D.D.S., St. John, N.B., C. A. Murray, D.D.S., Moncton, N.B., and E. Manning, A.M., St. John N.B.

NOTES ON THE UNION MEETING.

To Dr. Geo. K. Thomson, of Halifax, is due the largest share of credit for providing material for so successful a meeting, though no small share is due those who prepared and presented papers.

Dr. Cogswell's paper, though delivered once before, was well worthy of representation, and must have entailed a large amount of labor and care.

Dr. Woodbury's paper certainly touched a vital spot in the development and progress of our profession, for without a comprehensive educational foundation, we cannot expect the coming generation of dental practitioners to place our profession in the position it should occupy, namely, on an equal footing with the medical, or in fact any profession.

Dr. Wetmore submitted a paper well thought out and well delivered. It suggested a train of thought which must in the near future bring forth good fruit.

Dr. Murray's paper being more practical than theoretical, was the more acceptable to the ordinary everyday practitioner on that account.

Dr. Bagnall's paper was highly appreciated. So little has been written and said about the deciduous teeth, and so little care and attention given them by the parents of their possessors, that it will require some time to thoroughly digest the subject matter contained in it.

Time did not permit more than a hasty consideration of Dr. Beers' paper, it having just arrived by mail at the closing of the session, but he who carefully reads it will find that he is a step nearer a solution of pyorrhoea alveolaris.

Dr. Melotte, besides his clinical talk the first day, gave a bench clinic the morning of the second. He exhibited his ingenious triple attachment bench device, comprising anvil, vice, and rubber block, against the latter of which one may hold a piece of dental work for filing or trimming more firmly than against wood, and with no danger of breaking or bending or marring the surface. He also demonstrated melting gold and explained its further treatment in successive stages to the completion of an artificial tooth crown. At the close of the clinic he congratulated the audience on the interest manifested, and close attention given him. When not feeling well, as was the case the first day, he actually dreaded coming forward, but instead of being depressed he really felt as though he had received a tonic. The operative clinics we watched with a great deal of interest, and the desire for knowledge evidenced by the many questions asked.

Dr. Sawyer inserted a beautiful gold filling in a left upper central incisor (distal surface involving the cutting edge) using Packs gold cylinders. He also, in the same mouth, removed a cuspid pulp using cocaine injected directly into the pulp simultaneously with the thrust of the hypodermic needle. The result was perfect anæsthesia, and the root was filled immediately.

Dr. Magee's clinic was a contour amalgam filling in an upper bicuspid (the best available case), illustrating the use of Perry two-bar separators, and steel matrix cut fitted for the particular case. It may be interesting to note that Dr. Sawyer and Dr. Magee were classmates at college, yet neither one knew the other was to clinic at the meeting until the programme appeared. The exhibits were a feature of the convention; in fact no meeting could be complete without them.

The S. S. White Dental Manufacturing Company's goods under the agency of Brown & Webb, of Halifax, sustained their well-known reputation, the tireless F. S. Horton and the genial hypnotist W. H. Town, coming from Boston to give Mr. King a helping hand.

The Boston Dental laboratory exhibited some beautiful specimens of work for artificial substitutes of lost dental organs.

The Dominion Dental Manufacturing Company, under the charge of its superior officer, Dr. George W. Lovejoy, had an extensive and comprehensive display.

The consolidated Dental Manufacturing Company's goods from the depot of C. R. McDowell, of Montreal, were effectively displayed by the courteous and obliging Mr. Pattison.

Mr. McDonald, of the Boston Dental Manufacturing Company, though coming late, displayed a choice lot of goods.

Paterson & Foster's display was in charge of the junior member of the firm, and it need scarcely be added that their well-earned reputation was completely sustained.

S. B. Chandler's agent, Mr. McKenna, though rather later on the ground than any of the others, lost no time in getting his extensive assortment of goods ready.

Taken together, the meeting and exhibition of goods will long be remembered by those present, and their only regret seemed to be the falling through of the excursion to Annapolis. This came through the refusal of the Government authorities to allow the small steamer to take the party. The weather was charming throughout, and everyone turned his face homeward feeling that he had gleaned a great harvest.

Reviews.

A Dictionary of Dental Science, and such words and phrases of the collateral sciences as pertain to the art and practice of dentistry. By CHAPIN A. HARRIS, M.D., D.D.S. Sixth edition. Carefully revised and enlarged by FERDINAND I. S. GORGAS, M.D., D.D.S. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street, 1898. May be ordered from any dental depot advertising in the DOMINION DENTAL JOURNAL. Price, cloth, \$5.00; leather, \$6.00. 662 pages.

This greatly improved work has the unique relation to our literature of never having had anything whatever in the shape of a rival. It never can be in better hands than that of Professor Gorgas, whose editorship of Harris' two works has been conscientiously and ably performed. Every dental student ought to own the dictionary. It is an absolute necessity to one who wants clear interpretation of the phrases of dental science. It does for dentistry precisely what an English dictionary does for our language. The present edition has been weeded of obsolete words, and has had many important additions made relating to the micro-organisms of the mouth, electricity, etc.

Information for Patients and Dentists. A Magazine for the Reception Room Table. \$1.00 a year. Published monthly by Dr. L. P. Bethel, Kent, Ohio.

A sixteen-page paper, with original and selected tit-bits and articles, intended to make patients think about their teeth and the importance of their care. A first-rate reference for dentists who ought to talk to their patients about their teeth. And Dr. W. C. Barrett's facile pen contributes an interesting article, "Do Candies and other Saccharin Substances Injuriously Affect the Teeth;" while Dr. C. N. Johnson writes a charming short story which will make all men feel like forgiving each other their trespasses.

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DEMI-MONDE DENTISTRY.

Dr. Norman W. Kingsley, of New York, has recently added his anathema, to the unsightly barbarian splendor "of large conspicuous gold fillings, and gold crowns, showing the degeneracy of refinement and good taste in the dentists who practice these vulgarisms, as well as in the patients who demand them." "It is bad enough," he says "when gold becomes a necessity for the preservation of the teeth from further decay, but when it is used for purposes of display and to attract attention, it is an offence against all refinement and culture. I once saw a passenger on board an Atlantic steamer, dressed like a lady, whose upper front teeth were nearly all gold. It was subsequently learned that she was of the demi-monde and used this means to attract attention. While small pieces of gold in teeth exposed to observation are unsightly enough, the introduction of entire gold crowns is an offence that only a savage would take pride in."

There is a very curious difference in public taste in this matter between our friends in the United States and the people of England and Canada. As a rule, the most eminent in our profession dissuade their patients from adopting these vulgar displays, and when they are done, they are done under protest, similar to that which an artist might offer were he forced to in painting a portrait, to give black hair to one whose head is whitened by age, or make eyes that squint, eloquently large and loving. The height of art is to conceal art. But the entire object of some in our ranks is to make their patients public advertisements, and, in doing so, they publicly announce their own lack of esthetic taste.

THE QUESTION OF PORTRAITS.

We have a measure of sympathy for the dislike some entertain about the publication of their portraits. The thing is so much overdone by self-admiring people, who want pictorial notoriety, and who go so far, some of them, as to expose their most indelicate diseases, to get their pictures in the papers. Vulgar vanity has, however, no entrance to respectable journalism, and there is no journalism more singularly cautious in this respect than medical and dental.

It is perfectly natural that we should like to look upon the courtesies of those whom we respect. It is not unnatural that we should wish to have some idea, even through the imperfect idea of a portrait, of men who talk to us with tongue or pen through our journals. The object is not to "advertise" the portrayed, but to introduce to the profession, not the public, the author, or essayist, or official. We like to meet each other face to face in conventions. It is unfair to infer that there is any self-advertising in the portraits we have published from time to time. No one has ever solicited the insertion of his portrait.

"THE PRACTITIONER AND ADVERTISER."

We have not yet recovered from the shock of losing the *Odontographic Journal*, and the personality of Dr. J. Ed. Line. Our readers will share our regret in the announcement of the Buffalo Dental Manufacturing Company, that the *Dental Practitioner and Advertiser*, after an existence of twenty-nine years, has been discontinued for purely business considerations. The chief regret will be that the profession will lose the able and racy pen as editor, of Dr. W. C. Barrett, to whom our journalism and professional literature in general owe so much.