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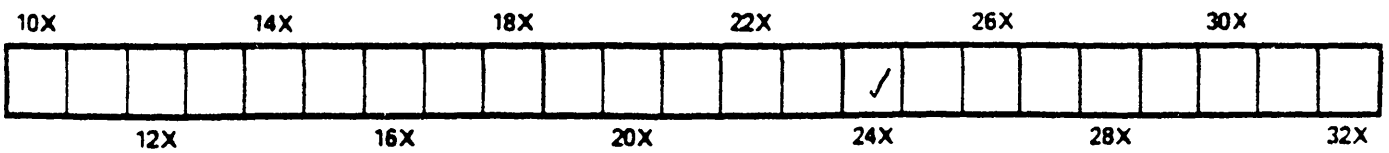

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Original Communications

DECROWNING TEETH AND IMMEDIATE EXTIRPATION OF PULP.

BY DR. R. E. SPARKS, KINGSTON, ONT.

I remember reading a few years ago an article upon crown and bridge-work in which the essayist, describing the preparation of abutments, said that some recommended the decrowning and immediate extirpation of the nerve by punching it out with a wooden plug. He, however, advised anyone attempting the operation to perform it upon a weak female, or to be sure he, the operator, was in a good physical condition. He evidently wished to convey the idea that the operation would be so excruciatingly painful that the victim of the outrage would be prepared for fight.

The writer had either never tried the operation or, having tried it, had had an unfavorable case, or for some reason had been unsuccessful.

As this is the operation generally practised for immediate pulp extirpation in case of decrowning, it may be as well to refer to it here; and let me say that while a description of the operation sounds barbarous it is comparatively painless. It is nothing to be compared to the pain of extirpating with a broach a pulp of which a little of the upper end is not fully devitalized. To make the operation successful a few precautions are to be observed. For the information of any who may never have practised the operation it may be well to briefly describe it.

With a disc in the engine cut a groove across the labial and palatal or lingual surfaces of the tooth to be decrowned, at the desired point.

Have prepared a few points of orange wood or hickory about two or three inches long. The ordinary wedgewood rods answer well. Make the points about the length, shape and size of the canal in the tooth to be operated upon.

Saturate them with some strong disinfectant. I have found pure carbolic acid very satisfactory. Have on hand a light mallet, also have the engine in position charged with a long pointed cone-shaped bur. Everything being ready, with a pair of excising forceps, one blade of which is placed in each groove previously made, the crown is removed. If the canal be found to have been exposed at or near its greatest diameter, one of the prepared points should be immediately inserted, and while held in position given a sharp, quick blow with the mallet. An additional light blow or two may be given to insure its advance to the apex of the canal.

If the plug be withdrawn, such of the pulp as may not have been forced out of the canal will be found adhering to the sides of the plug. The preparation of the canal for the post may be proceeded with at once. Indeed, some cut or twist off the plug and proceed to drill the post hole, leaving the plug as a filling for the apex. I have done this. An advantage of withdrawing the plug is, that if it has failed to reach the apex a broach or drill may be advanced.

It it be found when the crown is snapped off that the canal be not exposed at its greatest diameter it may be enlarged with the pointed engine bur and the extirpation proceeded with.

Whatever is to be done, however, must be done without delay. The shock to the nerve when the tooth is decrowned is so sudden, that the injury is not perceived at the seat of sensation. It frequently occurs in cases of accidents that severe injuries are sustained, as loss of fingers or toes, or wounds inflicted, without the victim being aware of the injury. Sensation soon returns, however, hence the necessity of haste in the removal of pulps in the case of immediate extirpation. This operation is only practicable in teeth having regularly shaped single root canals: as the six anterior superior teeth and second bicuspids and the ten anterior lower teeth.

I can conceive of cases even among the teeth named where this operation could not be successfully performed—for instance, in case of crooked and irregularly-shaped roots, or in very small flat-shaped lower incisors where the nerve canal may be very fine and ribbon shaped; or where a tooth may be largely decayed exposing the pulp above the point at which it is desired to decrown, or where the pulp had receded beyond the point at which it is decided to decrown.

In such cases the nerves would fail to receive the shock necessary to anesthetize them. In such cases the pulps may be anesthetized by cocain applied and its action hastened by means of compression, or by cataphoresis.

Indeed, many recommend drilling into the tooth to be decrowned, as far as feasible, and applying cocain as an anesthetic. But as the effect of cocain cannot be forced through dentine except by cataphoresis, and very few have cataphoretic batteries and appliances, and as it is seldom feasible to expose a pulp, in a healthy tooth sufficiently to anesthetize by cocain under pressure, we seem forced to resort to the first operation described. The *modus operandi* of anesthetizing a pulp by cataphoresis is no doubt familiar to many and may be better described by those who use this method of producing anesthesia.

The advantages of immediate root extirpation are various:

1. The saving of time. This is especially an object where a patient has come a distance and desires the work completed at the earliest possible moment.

2. The danger of toxic effects of arsenic are averted, and there is no danger.

3. The severe pain which sometimes follows the application of arsenious acid for devitalization of the pulp, is avoided.

4. The danger of subsequent periostitis is reduced to a minimum.

PYORRHEA ALVEOLARIS.

[The following part of the discussion on Dr. Curtis's paper did not reach us until the February issue was printed.—ED. D. D. J.]

Dr. DALY—Apologies seem to be in order—both the previous gentlemen having apologized, and I regret to be obliged to add mine. I listened with pleasure, and truly with pleasure, to the paper this evening. By some misdirection my paper failed to reach me until I was leaving to take a train, so that I could not make any special preparation for the discussion.

When we know that deposits, the majority of kinds, are of a nature to cause irritation and consequent trouble; when we know that more teeth are lost from deposits than from caries, then certainly we may say that it is an interesting topic. Then we may say, in an off-hand way, you must remove them. How easy it is to say that, but how difficult to accomplish! Now, the removal of deposits is not the work of the novice, but that of the particularly skilful and experienced practitioner. Dr. Stebbins, of Shelbourne Falls, who introduced nitrate of silver, said it was surprising to see

the deposits that we would find on teeth that we have extracted in our own practice, even when we have felt certain that they were thoroughly cleansed. Don't understand me that all forms of pyorrhea have deposits.

You urge in your paper a nearer contract, being more in touch, the physician to the dental treatment, and the dentist to the physician. There was a lecture delivered by one of our prominent surgeons before hospital nurses regarding the care of their teeth, touching on pyorrhea, and urging absolute cleanliness in regard to their mouths, recommending them to go to a skilful dentists and have all deposits removed, that they might not spread disease. This I consider an indication that physicians do realize the necessity of recommending to their patients and nurses the care of their teeth.

You know that it has been written concerning this disease in which it was treated under three heads, the gingival, the nodular, and the cachetic form. The cachetic is in common with the constitutional forms which you spoke of.

In my treatment of this disease, I have always been in the habit of using the acid treatment. After the most thorough removal of deposits that I am able to accomplish, I treat the pockets and diseased tissues with a fifty per cent., and even as high as seventy-five per cent. solution of sulphuric acid, taking every care not to come in contact with healthy tissue. With proper care, everything that will eschar can be avoided. I might mention, however, that the antidote to sulphuric acid is Phillips' milk of magnesia, if you ever found it necessary to use it. I then syringe out the pockets thoroughly by the aid of the water syringe.

Then follows stimulation with quinia.

Dr. Darby, of Philadelphia, in one of his treatises, recommends in the treatment of pyorrhea alveolaris the use of strong solutions of sulphuric acid, even as high as fifty to seventy per cent. When you know that the aromatic is twenty per cent., you will say that seventy-five per cent. is a pretty strong solution; nevertheless it does not burn deeper than the diseased tissue if proper care is taken.

There are writers to tell us that it is proper to cut the gums to enable us to remove the deposits. I would ask you to save them—never cut them. If you cut that constrictor muscle you have a soft, flabby tissue, which is incapable of giving the tooth any support. It is the constrictor muscle which hugs and gives the tooth its support, and a tooth supported from one-third will be a lasting tooth for years. I feel confident that I am right when I say that muscle should never be severed, although it is recommended in dental literature to do so.

You spoke in your paper of extraction. How often we see pyorrhea as the result of the extraction of the sixth year molar, allowing the twelfth year molar to tip over and debris to collect about that tooth. It might be said that this can be prevented if the teeth are thoroughly cleansed; but how many people do thoroughly cleanse the teeth? It is not the work of fifteen minutes, it is the work of an hour a day, to *thoroughly* clean the teeth, to remove with floss silk after each meal, the food which has collected between the teeth, to brush the teeth with a perfect tooth powder, and to use a perfect mouth wash; but I believe with Dr. L. D. Shepard, that give me a child at an early period, say two years old, and opportunities for treatment at regular and stated intervals, and I will promise faithfully they shall not have pyorrhea, because I will insist that whenever there is an ailment that the child will receive proper medical attention, that its health may be kept up to a normal standard, and then you haven't any culture ground for your pyorrhea to work on; and if you haven't any culture ground, then you wont get pyorrhea. I have had patients under my charge for twenty-five years, since they were children, and they never have it, except by some abuses on their part. I have others that have been under my charge who have had it, and will continue to have it, for the reason that after the relief comes, they neglect to follow my advice and pay no attention to their teeth until it gets to be unbearable and then they return for another treatment.

You spoke of ill-fitting plates as a cause of pyorrhea. All partial plates whether ill-fitting or otherwise will cause inflammation of the gums, and this in turn will often cause pyorrhea.

In summing up, I believe that we can cure this disease in a majority of instances by the skilful use of proper instruments, and those instruments always being delicate ones to enable us to find every deposit, and following that with local applications of sufficient strength to destroy diseased tissues, and then stimulating the tissues in which we have been operating to healthy granulation. I don't know but what I shall try the method described to us to-night by Dr. Curtis, and also Dr. Cravens, not mixing the two, but trying them in different cases and comparing them, and trusting at a future time to be able to give you the results of the comparative methods, by making notes and keeping them well tabulated.

Correspondence

TO THE DENTISTS OF ENGLAND AND THE DOMINION.

To the Editor of DOMINION DENTAL JOURNAL :

Just while New York had taken on larger proportions and become "greater," the United States seemed led to enter the arena in a contest with Spain, and she has emerged to take an exalted position among the nations of the world second to none other. England, always with an eye to greatness, now aspires to join hands with us, ready to stand in defiance against the remaining nations to defend the rights of any that may call for justice.

England and America occupy a proud position in the world's history. There is nothing like "plain English" for conveying definite thought. In the near future this alliance of the Anglo-Saxon race will make such declarations of security of rights, that it will be a foolhardy nation that will not hesitate before entering a contest against them.

So much for our introduction for a New York letter, that may be of interest to dentists of England and its territories. What is needed between the dentists of both countries is a better acquaintance, that our interests may be enhanced. We do not think there will be any difference of opinion in this respect. This is our aim, that we may excite a desire among a class of men uniform in interest, to become more mutually allied. Nothing so broadens a man as travel. Americans are known as travellers; they are not satisfied unless they see it all, and, as a rule, they do. Don't ever be fooled into the belief that you can keep a "Yankee" in the dark; he has a manner of looking that is not easily discovered, but *once* you are acquainted with a *real* one, the friendship is mutual and lasting. Without preliminary, we are disposed to introduce a specimen of a real "Down-Easter," from the State of Maine ("Remember the Maine"). Most of our marked men are what we term them,—"self-made men." They come from humble origin, and we are inclined to attribute to them, when they attain to distinction, that it is well earned. The proposition that we are pleased to place before the English dentists, we think will speak for itself. Professor Thomas Fillebrown, of the Dental Department of Harvard University, received his dental education and practised his profession for a number of years in the city of Portland, Maine. We think he was the successor of Dr. Bacon, with whom the late Dr. Coffin was a student. Dr. Coffin was well and favorably known to

all London dentists of repute. After the retirement of Professors Moffatt and Shepherd from the Dental Department of Harvard, Professor Fillebrown was called to fill the chair of Operative Dentistry, and has held it for some dozen years. While we have some twenty dental schools, not all of them are favored with men of marked ability as teachers. This state of things is more possible in a new and over energetic country than one that is founded in such depths of antiquity as old England. We hardly need to inform the dentists of England that more than ordinary prestige is given to one that is so fortunate as to secure a position under the patronage of Harvard. Americans *are* ambitious, and a quiet demeanor often overrides the avarice of the "boss politician,"—for we have them among dentists.

Professor Fillebrown has had a second honor conferred upon him of late, that he has creditably filled. We refer to the position of President of the new National Dental Association that convened at Omaha, Nebraska, for the first time during August last. This body has taken the place of the former American Dental Association, which was known to embrace most of our prominent practitioners of the older class, which are now fast becoming fewer each year. This new body, it is hoped and intended, will reach a larger area of our rapidly growing country, both on the Pacific coast and the extreme north-western portion, whose boundries lie contiguous to your British dominions. Doubtless another year will greet a delegation of dentists from all the former Spanish possessions that have so suddenly come into our possession. It would be a pleasant coincident that many of our English brethren might join with the session of 1899, which convenes at Niagara Falls, the marvel of the New World.

The story is told (we do not vouch for its truth) that an Englishman and a Yankee met at Mount Vesuvius, and the Englishman said to the Yankee, "Can you match that in America?" With an assurance that never leaves a Yankee of the manor born, "Why, we have a 'water privilege' that could squirt that thing out in five minutes!"

We have referred to the over energy of some of our calling in things that do not always commend a healthy ambition, but a large percentage are prone to pursue lines of healthy reaction, and our country is richly endowed with abundant outlets for all kinds of tastes. As wheeling is quite universal, we will pass to some of the most prominent fields that afford an abundant outlet. While cricket, tennis, and lastly, golf, are much indulged in, there are characteristics in the geography of our country that invite a larger diversity of out-of-door sport. This is found among the mountains and lakes and their various tributaries. To be sure much of the primitiveness of our country has been invaded by the

restless adventurer; yet we are far from any immediate danger of extinction from the height of enjoyment with the rod and gun. In this connection we are able to introduce by illustration a hint of what may be found in many parts of our country, and quite distant from the polite social functions, where one can adopt the garments and habits of extreme simplicity. This latter field for sport and recreation is heartily entered into both in the spring and autumn. It is without boasting, truly, that no country more abounds with the delights of the piscotutorist—by this we mean now in distinction from the vulgar "fish-worm" angler, with pole, etc., the more *polite* fly fisherman. Trout fishing has become almost an esthetic profession. We do not fish to kill and destroy in any sense as once, but only to enjoy the height of polite handling of the "speckled beauties" until we have the capture complete and then return our prey to his watery element, to be tempted indefinitely. This method is proving of great zest by giving an opportunity of observing the marvellous increase of weight that these favorite fish attain, surprising as it may seem, turning the scales at the extreme weight of eighteen pounds, and this a genuine "salmonidæ fontinalis"; so certified to by the late Professor Agassiz of Harvard University. These extreme sizes are found only in three quarters of our country, viz., "The Rangleys," Adirondacks and Lake Superior; and only in one place in Europe, and that is in Scotland. The Rangleys, in Maine excel all others; for lovers of the gun are amply provided for by a great supply of moose, deer, partridge, ducks, etc.

Regarding the information of our dental organizations, the journals are so prolific with information it would seem quite superfluous to add anything here. We are just now agitating the question of establishing an independent journal, or more strictly, a truly professional journal. We think in the near future it will be accomplished. So far as apartness from trade influence goes, the *International*, edited by Professor Truman, of Pennsylvania University, Philadelphia, is the best standard. Professor Truman is regarded as our ablest editor; but let it be remembered that the best must always give way to something better, if it can be produced.

To undertake to give anything like an adequate idea of customs among dentists in America would be a herculean undertaking, for every one is a law unto himself; while in your country it is almost a universally established custom, quite like the edict of the Medes and Persians—impossible to change. It might be inferred by a clip introduced into this letter that New York was behind in liberal fees. Some bilious practitioners are echoing that the day has gone by for the liberality of compensation for dental services that there has been in the past. The charlatan will always watch his chance for a liberal fee for (inferior) service; but

never was there a finer field of prospective liberality in our line than in our country, especially in New York. "Multi-millionaires are on the increase in all parts of this our country, and they gravitate to our great and luxurious city, where attractions are being multiplied in an almost unlimited degree; and our hotels, that are unsurpassed in all the world, are bringing together the rich and the richest. They want the best, if they are not misled. This they are after, for the spider and the fly are here in abundance also. But aside from all this, skill especially is sought, and it finds an equivalent among those that are not struck with the 'gilded age' fever.

No dentist has ever begun to give the impress for a skilful profession as did the late Dr. W. H. Atkinson. His whole purpose of life was sacrificed for a truly professional status, established by the stamp of special skill, and a "professional fee" required for "services rendered," and his thirty years in New York was an unflinching defence in this direction, and it is not strange that he did receive more generally the most liberal reward for his services; and while this was true he was the poorest paid practitioner—considering what he did for his patients—that ever stood by a dental chair. The profession of this country of ours owes eternal gratitude to his memory for the uplifting energy that he put under the low level upon which dentistry was grovelling before he came to the rescue. This will become more and more apparent in the coming years It is no unknown fact to many that simultaneously with Dr. Atkinson's coming to New York, in 1861, there commenced an upward tendency in dental fees, but with this also there was being created by the Doctor's example an ambition for better service. It was an uplift from the degrading trade and tinker view, encouraged partly by the dentist himself, and accelerated by the public. Dr. Atkinson sought to inspire a professional *esprit de corps*, and his labors have not altogether proved in vain. Dr. Kingsley, widely known in England for superior skill, paid Dr. Atkinson a very high compliment for his elevating views regarding professional fees, saying that he did more than any other to establish a respectable professional fee. No practitioner has followed this example more faithfully than Dr. Kingsley. It is the man that sends an itemized bill, like the grocer, that degrades the professional atmosphere. The commercial spirit always dominates in such practice. Our methods are quite unlike those of the prevailing custom in Europe. While they are much varied there is an increasing growth in the method of presenting bills for "professional services" only, and then keeping a record separately for reference if desired. The "time" basis is considerably in vogue; but the more truly professional idea is to give the patient the thought that they are expected to pay for "service rendered."

This includes all that has contributed to skillful results. This is but justice to both parties. Estimates can only be approximately given. Nothing can be more righteous than a remark often used by the late Dr. Atkinson, that "no one could estimate the value of services before they had been rendered." Not uncommonly it proves that it is not so much the amount of labor performed, but results secured. Here is a familiar illustration. A surgeon was complained of for charging $500 for lancing an abscess; but the patient was told it was not for the labor but for results. While there is a decidedly low standard in our country regarding the professional spirit, yet there is a progressive tendency aiming at greater ability. In our calling, like all others, it is the few that are to be saved from the "low aim, which is crime."

Dr. Geo. Weld's chemical method of filling pulpless teeth is attracting the largest attention in this country. His able paper, that has been called for a re-reading before several of our bodies, is found to meet the opposition of his ablest critics, he having the most skilful chemical experts to sustain his theory. Another indication of its value is the increasing sale in all countries. Dr. Weld ranks among our most intelligent practitioners. His "Syrup Chloride of Iron" has had a large sale, and afforded the Doctor a generous finance.

We are heartily glad when we know of the success of a skilful brother. This was markedly emphasized of late. We were cordially invited to visit our genial brother practitioner, Dr. Stockton, of Newark, N.J., and after taking a look at his side venture in business, viz., bicycle findings, employing some sixty or seventy operatives, together with his very luxuriously fitted office in which he attends to a large—doubtless the largest in his State—and lucrative practice, we then joined him at his beautiful country domain in East Orange, some seven miles distant from his office. We enjoyed an exhilarating ride in his *bona fide* New York turnout, literally "up to date," including livery. This ride was particularly pleasant, for we had never visited the Oranges—there being five of them. They are built up largely by men of liberal wealth, according to the most approved modern styles. The Doctor has two beautiful residences—one for his son, who is a physician; the other for himself and married daughter. None could help admiring the simple, but exquisite taste, displayed. After our very enjoyable ride we joined the daughter and son-in-law, at the Country Club of Hutting Park, and partook of the choice viands for which the Club is noted. The New Jersey dentists are titled by the synonym "Hornets," but we saw nothing of the "sting" in all our visit. No one among us is more noted for genial nature than our dear Dr. Stockton. "Long may he live and prosper."

Newark, N.J., U.S.A. G ALDEN MILLS, D.D.S.

Selections

ESSENTIAL OILS AND OTHER AGENTS.—THEIR ANTISEPTIC VALUE; ALSO THEIR IRRITATING OR NON-IRRITATING PROPERTIES.*

By A. H. Peck, M.D., D.D.S., Chicago, Ill.
Professor of Special Pathology, Materia Medica and Therapeutics in the Northwestern University Dental School.

Very soon after assuming the duties of the chair of materia medica and therapeutics in college work, I became convinced that in our literature there was much loose statement concerning the action of the drugs we employ in dentistry. Especially did this seem true in regard to the antiseptic powers of the various agents employed as antiseptics. Further, the therapeutic action of these agents has generally not been especially considered. It seems that iodoform is still used by many as an antiseptic, though it has long been known that it has not that power. It is also known that the presence of albumin renders the ordinary solution of bichlorid of mercury inert as to antiseptic power, and prevents the effectiveness of that agent in treating suppurative surfaces, yet it is persistently used for this purpose. The essential oils, some of which have previously been shown to possess antiseptic virtues, have seemed to be looked upon as a group of antiseptics, and, as it has seemed to me, are being used without reference to their relative merits as antiseptics, or to their therapeutic effects upon the tissues to which they are applied. For these reasons I have, in my teaching in the Northwestern University Dental School, made trial of these agents in the bacteriologic laboratory, concerning their effectiveness as antiseptics, and have also, in various ways, proved their effects upon the animal tissues in order that I might speak definitely of my own knowledge of these matters. In this paper I will give briefly my observations upon a number of these agents.

To determine the antiseptic value of these agents the following experiments were conducted: Test-tubes, each containing ten cubic centimeters of sterilized mutton bouillion (which amount will hereafter be referred to as the *unit of culture media*), were

* Presented to the Section on Stomatology at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Col., June 7-10, 1898.

used. The broth in these tubes was, for the most part, infected with saliva from various members of the class. In each set of plants made a control-tube was used, i.e., a tube in which the broth was infected with saliva, but into which no antiseptic agent was placed, simply to act as a control for the results of the remaining tubes into which antiseptic agents were placed. In each instance the control-tube presented a full development of bacteria, thus proving the accuracy of each set of plants. One drop of the essential oil was first used in the tubes, and when it prevented development of bacteria, the quantity was gradually decreased in other plants, until the least amount that would prevent development was ascertained. To divide the drop I placed ten drops of alcohol in a small vial, and into this placed one drop of the oil; the alcohol dissolves the oil immediately. I then used in the culture-tube such proportion of the drop of essential oil desired—one drop of the solution representing one-tenth drop of the oil. Those drugs that were found ineffective with one drop were increased in other plants until found effective, or were given up as unsuitable or worthless as antiseptics. The same dropper was used throughout. When using the same dropper it will be observed that a drop of alcohol is smaller in bulk than a drop of essential oil. Because of this difference in the size of the drops, ten drops of alcohol and one drop of an essential oil forms as nearly as can be figured a ten per cent. solution, and one drop of this solution represents one-tenth of a drop of the oil.

An antiseptic must be regarded as a poison to the vegetable cell, and many of them act also as poisons to the animal cell. I undertook this series of experiments for the determination of these differences of poisonous effects with the idea that in selecting antiseptics for use in practice we should have special regard to the effect of the agents upon the animal tissue to which they are applied. To determine the irritating or non-irritating proportion of these oils, an extensive course of experiments with them has been conducted during the winter months, in connection with sores artificially produced on guinea-pigs, and also on my own person. To determine the effect of these agents when applied directly to soft tissue, the applications were made, in each instance, to my own person. And pardon me for saying that I have come to positive conclusions regarding some of the agents along these lines.

Oil of Cassia.—We find that three-tenths of a drop is the smallest quantity that will prevent the development of bacteria in the *unit of culture media*, and there being sixty-seven drops of oil of cassia in one cubic centimeter, this agent is effective as an antiseptic in 1 to 2233 parts: that is to say, one whole drop of oil of cassia would prevent development of bacteria in 2233 drops of

infected broth. This explanation will hold good in connection with each agent we have used. Oil of cassia is undoubtedly the most potent of the essential oils as an antiseptic. I have analyzed a least a dozen samples of cassia, obtained from as many different sources, and have found them to be adulterated in each instance. One sample, especially, shipped direct from China to a dealer in Chicago, was found to contain fixed oils in considerable quantity. Others were found to contain alcohol, etc. This oil, as found in commerce, to-day, is not as potent an antiseptic by about one-half as was the cassia obtained ten years ago. A reference to the work done by Dr. G. V. Black about ten years ago, along this same line, serves to prove the correctness of this statement. The samples of cassia he used at that time were potent in 1 to 4000 parts. If I could have obtained a pure, unadulterated sample of cassia, it would have certainly outclassed oil of cinnamon as an antiseptic by a wide margin, but as it is, as to the division of a drop, they have proven exactly the same. However, you will notice when we consider that agent, that of the oil of cinnamon only sixty-three drops are required for one cubic centimeter, while of cassia sixty-seven drops are required. This simply means that one drop of the oil of cinnamon is just slightly larger in bulk than one drop of the oil of cassia, so that this discrimination in the number of drops to the centimeter, still places the oil of cassia ahead of the oil of cinnamon as an antiseptic, the potency of oil of cinnamon figuring out 1 to 2100 parts. While oil of cassia stands at the head of the essential oils as an antiseptic, it is also true that it is the most poisonous in its effects upon soft tissue. As a test of its irritating properties a pellet of cotton was saturated with it and placed in a small rubber cup, to prevent evaporation. This was applied to the surface of the skin and held there by means of a piece of court-plaster large enough to cover it and stick tightly to the surface of the skin about the edges. This was retained in place for twenty-four hours, during which time the irritation to the soft parts was by no means pleasant. At the end of this period a blister invariably formed ; the inflammation in the tissues at this time is not very great. The blister occupied an area from one-half to one-third greater than that to which the oil is directly applied, and filled and refilled with serum several times before any tendency to recovery was noticed. At the end of forty-eight hours the inflammation in the parts involved was intense, and occupied an area four or five times as great as that to which the oil was directly applied. Numerous small independent blisters almost invariably formed about the circumference of the inflamed area. This condition continued for several days, and while the inflammatory process was at its height the sore was one of the ugliest and most formidable in appearance it has ever been my privilege to look upon

These sores were also very slow in healing, for it was with seeming regret on their part that the inflammation was permitted to subside, and the parts to return to a normal condition. While these sores are in every way just as bad as has been described, they are, however, fraught with no serious consequences.

To further test the irritating properties of this oil, a sore, in connection with which there was considerable inflammation, was produced on a guinea-pig and treated for a number of days with the spray by means of an atomizer. So long as this treatment was continued the parts could not recover, the inflammation was greatly increased. Suppuration was then produced by infecting the sore with pus microbes. This in turn was treated with the spray, with the result that the germs were destroyed and the pus formation stopped, thus proving conclusively that this agent is an excellent germicide when applied to suppurating surfaces, as well as a most potent antiseptic.

To my mind, it is clearly proven that while the antiseptic and germicidal properties of this oil are of the highest order, it is one of the most irritating in its effects on soft tissue of all the agents with which we have anything to do. And because of these effects, as outlined above, I feel justified in making the statement that oil of cassia should never be used as a dressing in the root canals of teeth.

There is another reason above why it should not be used, and that is, its proneness to cause discoloration of the teeth. In almost every instance in which its use is continued for a time the teeth are more or less discolored, and in some cases very considerably. This is one of the most difficult forms of discoloration to correct that we are called upon to treat.

Is it not reasonable to suppose that when cassia is used in the treatment of pulpless teeth, the above disagreeable conditions may occur in the soft tissues occupying the apical space, and the peridental membrane become involved in the inflammatory process? Have you ever thought that the excessive flow of serum which so frequently occurs from the tissues of the apical space of teeth that are being treated with this oil is nothing more or less than the discharge of actual blister as in the cases above cited? If these are reasonable suppositions, and I believe they are, is it still a source of wonder to you that teeth, under these circumstances, so suddenly develop such extreme tenderness to pressure, as they so frequently do?

Oil of cassia, however, has a place in our practice as dentists. Cassia water, sometimes, in the treatment of fistulous abscesses, is very useful. It is so stimulating to the tissues that it excites a healthy action on the part of the latter when other agents fail. Oil of cassia in the treatment of severe cases of pyorrhea, so-called,

where the pockets about the teeth are deep, and considerable pus present, is exceedingly useful. In such cases it may be used in full strength by means of a drop syringe. The oil is not permitted to remain in contact with the soft tissues a sufficient length of time to cause trouble, it is so soon diluted by the fluids of the mouth.

Oil of cinnamon of Ceylon.—We find that three-tenths of a drop prevents development of bacteria in the *unit of culture media*, and that sixty-three drops constitute one cubic centimeter, thus showing this agent effective as an antiseptic in 1 to 2100 parts. Oil of cinnamon of Ceylon is very much the same nature as oil of cassia. However, in some respects there is a marked difference between them. It has been demonstrated that oil of cinnamon is not so irritating to soft tissue as oil of cassia. An application to soft tissue, in the same manner that cassia was applied and left for twenty-four hours, caused considerable irritation and formation of blister. At the end of forty-eight hours the inflammation was severe; however, not so intense as that caused by cassia, and the area of tissue involved in the inflammatory process was not so great. Also, the blister that developed by the application of cinnamon was by no means so large as that from cassia, occupying the centre of the inflamed area and spreading over tissue in extent equal only to that to which the agent was directly applied. The blister and inflammation were not so persistent as is the case with cassia, the former refilling with serum usually but two or three times, and the inflammation passing away quite readily.

A sore on a guinea-pig, attended with much inflammation, was treated with the spray of oil of cinnamon with the result that it was further constantly irritated and thus prevented from healing. Suppuration was then produced in the sore, and again treated with the spray of this oil, the germs being destroyed and the pus formation ceasing. The action of cinnamon was not so vigorous as that of cassia. To my mind, cinnamon is altogether too irritating for use in the treatment of pulpless teeth.

A synthetic oil of cinnamon.—A sample which I secured this spring from the first lot sent to this country (it being prepared in both France and Switzerland) proved to be as potent an antiseptic as the regular oil, three-tenths of a drop preventing development of bacteria in the *unit of culture media.* Sixty-four drops of this oil constitute a cubic centimeter, thus showing it effective as an antiseptic in 1 to 2133 parts. It is, however, in its first effects, more irritating to soft tissue than the oil of cassia. An application was made to soft tissue, and at the end of fifteen hours a fully developed blister, in extent larger than the area of tissue to which the oil was applied, resulted. There was very little inflammation or discoloration of the tissues. The first effect of this oil on the

soft tissue was so vigorous, very much tenderness and inflammation were confidently expected to follow. In this, however, I was disappointed. The blister continued to refill with serum several times, but no tenderness or inflammation worthy of mention developed in the surrounding parts. I cannot recommend it for use in the treatment of pulpless teeth.

Beech-wood creosote.—This is the next agent, from point of potency, as an antiseptic; five-tenths of a drop prevented development of bacteria in the *unit of culture media.* There are sixty-four drops in one cubic centimeter, thus showing creosote effective as an antiseptic in 1 to 1280 parts. This agent is non-irritating to soft tissue. An application remaining for a period of thirty-six hours produced no irritation. The surface of the skin was slightly discolored and also slightly burned or seared over, but not to an extent that caused the loss of any tissue. A sore on a guinea pig was treated with the spray with the result that the inflammation gradually subsided, and the sore healed rapidly.

Another sore in which suppuration was produced was treated in like manner, the germs being readily destroyed and the pus formation stopped. Continued treatment resulted in the gradual healing of the sore. Creosote has proven its right to stand among the first, from point of potency, as an antiseptic, and because it has been demonstrated that it is practically non-irritating to soft tissue, it is a safe agent, and in some cases a very desirable one for use in the treatment of pulpless teeth. In case of putrescent pulp, for instance, of long standing, one in which the lateral openings and also the dentinal tubuli are completely saturated with mephitic odors and gases, creosote, in my judgment, is the most effective and desirable of the available agents. It is very penetrating and one of the most persistent in its effects of all the agents at our command. I have used it to good advantage in severe cases of apical pericementitis. However, in some instances, where discoloration of the teeth has occurred, it has seemed that it was due to the action of the drug. Creosote being more or less of the nature of carbolic acid, possesses to a certain extent the properties of a local anesthetic, and because of this property it has a rather beneficial effect upon inflamed tissue.

Oil of cloves.—Six-tenths of a drop prevented growth in the *unit of culture media;* sixty-nine drops constitute one cubic centimeter, showing it effective as an antiseptic in 1 to 1150 parts. Oil of cloves is absolutely non-irritating to soft tissue. An application to the surface of the skin for thirty-six hours left no more evidence of having been confined there than so much sterilized water would have done; no irritation, no discoloration. Sores were produced on guinea-pigs and treated with the spray of oil of cloves. The inflammation subsided more rapidly than when

treated with any other agent, and the sores healed as rapidly as they could. A sore in which suppuration was produced by being infected with pus microbes was treated with the spray of this oil; the germs were destroyed, and the formation of pus was stopped, simply proving beyond any possibility of doubt that, while effectively destroying microbes, the only action of the oil in contact with irritated, inflamed soft tissue is that of a quieting, soothing agent, serving to reduce the irritation and inflammation, and returning the disturbed tissue to its normal condition.

A sore on my arm, produced by an application of cassia, became infected, and pus formed. This was washed thoroughly with a 1 to 1000 solution of bichlorid of mercury every night for several times, and dressed in turn with iodoform, nosophen and aristol, with no other result than an absolute failure to stop pus formation. One night, after having washed the sore thoroughly with the bichlorid solution, I poured oil of cloves in the raw tissue. There was only a very slight smarting for a few minutes, after which its action was that of a quieting, soothing agent. The application was held in position for twenty-four hours. It was then removed; no pus was present and the little granulations could be seen all over the surface of the sore. It was immediately dressed with aristol and let alone for forty-eight hours, at the end of which time it was perfectly healed.

Another sore on the lower part of my right leg, the result of an application of formalin, was causing a great deal of trouble. The inflammation was severe, the tissues very sore, the muscles felt bound up and were painful, it being exceedingly difficult to walk. Continued treatment with ordinary remedies resulted in no relief. One morning, after having thoroughly cleansed the sore, a liberal quantity of oil of cloves was placed on it and the bandage applied. Within four hours the very disagreeable, drawn condition of the muscle passed away, the pain ceased and the foot could be moved in all directions as freely and comfortably as could the other, and could be used just as well as ever.

Oil of cloves for general use in pulpless teeth, is certainly one of the best agents at our command. It possesses the property of destroying or rendering inert infectious material. In cases of apical pericementitis it is perhaps the best agent that can be used. It possesses local anesthetic properties to a marked degree, and like some of the other agents, because of this fact, serves to reduce the inflammation in the tissues in the apical space and causes them to return to a normal, healthy condition.

Oil of bay.—Seven-tenths of a drop prevented development in the *unit of culture media.* Seventy-two drops are necessary for one cubic centimeter, showing this agent effective as an antiseptic in 1 to 1028 parts. Oil of bay, to me, is a comparatively new

agent, and I believe I am warranted in making the statement that it is a new agent to a vast majority of the dental profession. A year ago last winter a gentleman spoke to me about oil of bay; said he had been using it for some time in the treatment of pulpless teeth, and that, so far as his clinical experience went, had found it to be an agreeable and efficient agent. He stated that he had not observed any bad effects along the line of producing irritation, or anything of that sort. He requested that I test it, which I did, with the result above stated, which places this oil in the foremost ranks of the list of antiseptics. I have used it more or less since, and in one case that I have in mind thought the irritation and tenderness which was induced was directly due to the action of the oil. But in subsequent use I have observed none of these bad effects. I came to the conclusion that I was wrong, that there must have been some foreign, irritating substance present which caused the trouble. I have made two applications of the oil to soft tissue, retaining each in contact for thirty-six hours, for the purpose of observing its effect, and no irritation resulted in either case.

A sore was produced on a guinea-pig with an irritant which caused intense inflammation. This was treated with the spray of bay for several days, and the closest observation did not reveal any additional irritation, but to the contrary, the inflammation gradually subsided. However, not so rapidly or willingly as when some other agents were used. A sore in which suppuration was produced, on being treated with the spray of bay yielded very nicely, the germs being destroyed and the pus formation stopped. I think we are safe in concluding that oil of bay is a valuable addition to our list of agents for the treatment of pulpless teeth.

Oil of sassafras.—Seven-tenths of a drop prevented development of bacteria in the *unit of culture media.* Seventy drops are required for one cubic centimeter, showing it effective as an antiseptic in 1 to 1000 parts. Oil of sassafras in contact with soft tissue for thirty-six hours produced no evidence of irritation. It has proven to be a very potent antiseptic. I have treated sores in which there was marked inflammation with the spray of sassafras, and the result was much the same as with the last previous agents; the inflammation subsiding, the irritation passing away and the sore healing. It has not exhibited the ability to destroy germs and prevent pus formation to nearly the extent that the stronger agents have. I have never used oil of sassafras in the treatment of pulpless teeth, but I certainly can see no reason why it should not be a potent and harmless agent in this connection.

Oil of peppermint.—Eight-tenths of a drop prevented development of bacteria in the *unit of culture media;* seventy-two drops are necessary for one cubic centimeter, showing this agent effective

as an antiseptic in 1 to 875 parts. An application of oil of peppermint to soft tissue continued for thirty-six hours produced no irritation, thus showing conclusively that this, also, is non-irritating to soft tissue. A sore in which considerable inflammation was present was treated with the spray of this oil, with the result that the germs were destroyed and the pus formation stopped, which proves that this agent is not only an antiseptic, but also destroys the germs and thus prevents pus formation. This is an agent which I have rarely ever used in practice. Three years ago I used it a little in treatment cases, but discarded it simply because of its persistent, penetrating odor. Other than that, I can see no objection to its use in pulpless teeth.

Dr. Black's "1-2-3."—This is the next agent in point of potency. One and four-tenths drops prevented development in the *unit of culture media;* sixty-five drops are necessary for one cubic centimeter, showing this agent effective in 1 to 454 parts. "1-2-3," as you know, is a preparation given to the profession a number of years ago by Dr. G. V. Black, consisting—the mild solution, so-called, and this is the one used in these tests—of one part oil of cassia, two parts carbolic acid crystals and three parts gaultheria. It has always proven itself a most efficient agent in the treatment of pulpless teeth, and has been used by very many practitioners for the last ten or twelve years, possibly more than any other agent. I have used it continuously since I have been in practice, and have never observed any bad effects from its use, no irritation of the soft parts, no tenderness of the tooth to pressure, no inflammation resulting. Possibly some of you will wonder why "1-2-3" is such an efficient and desirable agent, consisting, as it does, of cassia, carbolic acid and gaultheria; carbolic acid being not a positive, persistent antiseptic, but one whose restraining effects upon the development of bacteria are only transient; oil of gaultheria being absolutely worthless as an antiseptic, and the use of cassia being so thoroughly condemned because of its extremely irritating properties. This agent depends upon the cassia for its antiseptic properties. The gaultheria is used as dilutent to the cassia. The carbolic acid was used more especially because of its anesthetic properties on soft tissue. When these three agents are properly mixed to form "1-2-3," it is the opinion of Dr. Black that there is more or less of a chemic union between them, so that the individuality of each seems to be lost, and the result is the formation of a new agent, or one with different characteristics from those possessed by the three individual agents. At any rate, it is non-irritating to soft tissue. An application left on for thirty-six hours produced no irritation whatever. There was only a slight searing and discoloration of the surface of the skin. Sores with much inflammation present were treated

with the spray, which did not produce further irritation. Its action was more like that of a neutral agent (so to speak) not irritating the sore; nor, on the other hand, imparting to any appreciable extent, a soothing, quieting influence, the inflammation subsisting just about as it would if left to itself with all irritating influences removed. A sore, in which suppuration was produced, was treated with the spray of this agent. It demonstrated its right to be classed as a very potent germicide. The germs were destroyed and the pus formation ceased.

As formed with the present cassia of commerce, "1-2-3" is not so potent an antiseptic as that formed with cassia obtainable several years ago. This must be due to the fact above stated, that cassia is so adulterated at the present time. In fact, "1-2-3" is lessened in potency in almost direct proportion to the extent of the adulteration of the cassia. Seven-tenths of a drop was effective in ten cubic centimeters of broth, as shown by experiments conducted by Dr. Black several years ago. As shown by these experiments, "1-2-3" is abundantly effective, but if cassia is continued to be adulterated, the time may come when it will not be. For general use, in the treatment of pulpless teeth, "1-2-3" is certainly an effective and excellent agent.

Carbolic acid, 95 per cent.—One and eight-tenths drops prevented development in the *unit of culture media;* sixty-one drops are required for one cubic centimeter, showing this agent effective in 1 to 338 parts. Carbolic acid is not a permanent, positive antiseptic. Its restraining power on the development of bacteria in the majority of plants one makes, is only transient. One and eight-tenths drops prevented development for three days, after which the bacteria developed in almost every instance. The restraining effect upon the development of bacteria seems to be almost in direct proportion to the quantity of the agent used in the culture-tube. The use of this agent in dentistry is so familiar I need not dwell on that point.

Oil of myrtol.—One and nine-tenths drops were necessary to prevent development of bacteria in the *unit of culture media;* sixty-eight drops constitute one cubic centimeter, showing myrtol effective as an antiseptic in 1 to 357 parts. Oil of myrtol is an agent which I have used but little in practice. In the majority of cases in which I have used it, there has been more or less tenderness of the tooth developing, so that it impressed me as being somewhat of an undesirable agent for this purpose. An application of myrtol to soft tissue for thirty-six hours produced decided irritation, and there was a strong tendency to the formation of blister. The surface of the skin was destroyed. The irritation and inflammation present continued for two or three days, gradually abating. A sore on a guinea-pig treated with the spray

showed evidence of further irritation. So long as the treatment was continued the inflammation refused to subside. A suppurating sore being treated in the same way, was certainly benefited by a consequent destruction of the germs and cessation of pus formation. There is no doubt that this agent is quite irritating, and one that should not be generally used in the treatment of pulpless teeth. There are cases where I use strong myrtol water, seemingly to good advantage, and these are in connection with abscesses with fistulous openings, especially those of long standing, in which there is more or less irritation of the soft parts throughout the tract of the fistula and that uneasy, disagreeable feeling often experienced by the patient in connection with these cases.

Oil of cajuput.—Six drops are necessary to prevent development in the *unit of culture media;* seventy-two drops are necessary for one cubic centimeter, showing this agent effective in 1 to 120 parts. Cajuput is non-irritating to soft tissue. Applications of this oil to soft tissue, retained for thirty-six hours, produced no evidence of irritation; in fact, the discoloration of the skin was very slight and remained but a short time. A sore on a guinea-pig in which there was considerable inflammation, was treated with the spray of this oil and no increase of the irritation was produced. Another sore in which suppuration was produced was treated in the same way, with the result that the germs were gradually destroyed, its action, however, not being positive, for if the treatment was discontinued for a day or two the pus formation continued as before.

At first I used oil of cajuput more or less in the treatment of pulpless teeth, but latterly I have not used it in this connection; in fact, the only use I make of it is occasionally to moisten the inner walls of the root canals previous to filling with gutta percha. For this purpose its non-irritating nature recommends it, and especially the fact that it is a solvent of gutta percha and causes the latter to adhere to the walls of the canals.

Eucalyptol (Merck's).—Six drops each of this preparation are necessary to prevent development in the *unit of culture media;* seventy drops are necessary for one cubic centimeter, showing each preparation effective as an antiseptic in 1 to 116 parts. Eucalyptol in contact with the skin for thirty-six hours produced no evidence of irritation, inflammation, discoloration, thus proving that the agent is non-irritating and harmless in contact with soft tissue. A sore in which considerable inflammation was present was treated with the spray of this agent, with the result that the inflammation readily yielded, the irritation subsided and the sore healed, thus further proving that it is non-irritating even to injured, inflamed soft tissue. A sore in which suppuration was produced was treated in the same way, with virtually the same results as with cajuput;

it exhibited a restraining influence upon the development of bacteria and pus formation, but the treatment being discontinued for a while, pus formation went on as before. As an agent to place in the root canals of teeth after the removal of a pulp, following devitalization, in order to keep the parts healthy for a few days previous to root-canal filling, it is perhaps the agent that I use more than any other. It is certainly harmless, never exciting irritation. For the purpose of slightly moistening the inner walls of the root canals previous to filling, eucalyptol is the agent I nearly always use.

The oil of eucalyptus, as found in the market, only produced a restraining effect upon the development of bacteria when a saturated solution was formed with the bouillon.

Oil of gaultheria was carried in my experiments as high as eight drops, this quantity forming a saturated solution in the *unit of culture media;* that is to say, the broth had taken up or dissolved all of the oil that it could possibly retain, there being also a large number of free globules floating about in the broth, and still development of bacteria took place quite abundantly, showing that this agent is useless in restraining the development of bacteria.

Eugenol.—This agent resulted in the same way as gaultheria. Eight drops were used in the *unit of culture media*, which amount formed a saturated solution, with numbers of globules of the free oil floating about, and still the bacteria developed, thus proving that eugenol, also, is useless as an antiseptic.

Formalin.—Of late the dental profession has taken up this agent for the treatment of pulpless teeth and abscesses, for devitalizing pulps, etc., and many are reporting wonderful results from its use. Not long since I read an article in one of our journals in which the writer paid a glowing tribute to this agent as a most efficient and desirable one for the treatment of almost all conditions of pulpless teeth. Having had some experience with it myself, and because of many negative results experienced, being suspicious whether it was a proper agent to be used about the mouth, I decided to investigate it as thoroughly as possibly. First I tested it as to its antiseptic properties, and found it to be very powerful. Of the formalin preparation, which is a saturated solution of the gas formaldehyd in water (the latter taking up about 40 per cent. of the former), four-tenths of a drop prevents development of bacteria in the *unit of culture media;* fifty-six drops are necessary for one cubic centimeter. This shows formalin potent as an antiseptic in 1 to 1400 parts. Somebody has been so enthusiastic over this agent as to make the statement that it is fully as potent an antiseptic as bichlorid of mercury. This is certainly a mistake. I prepared a 1 to 1000 solution of bichlorid

of mercury and found that it required nine drops of this solution to prevent development of bacteria in the *unit of culture media*. I prepared a 1 to 1000 solution of pure formaldehyd, which we now have in a solid state—the gas being reduced to such by chemic processes—and of this solution found that it required forty drops to prevent development of bacteria in the *unit of culture media*, thus proving that formaldehyd is not so potent an antiseptic as bichlorid of mercury by at least one-fourth. I next resolved to determine its ability to irritate soft tissue, the same as I did with the other agents. I took a small pellet of cotton, saturated it with formalin, placed it in a small rubber cup to prevent evaporation, placed it on the surface of the skin on the lower part of my right leg and covered it over with a large piece of court-plaster stuck tightly about the edges. This was placed there March 14, 1898, at 12.30 a.m. I went to bed and went to sleep. Between 4 and 5 in the morning I was awakened by pain, and could get no rest after that. The pain was intense and of a very peculiar character. It seemed as if something were inside my leg gripping it with a vise. Then it would take a turn and twist about, as if tearing the inside out. It would stop for an instant, and then the performance would be repeated with renewed vigor. The pain continued more or less severe all day. I wished to keep the application in place for twenty-four hours, the time adopted for the other agents; but at the end of twenty hours, the pain had been so constant and the tissues began to look so ugly, that I concluded to remove it. The tissue to which it was applied and for about two inches in all directions was turned as white as pure snow, as if all the blood were driven from the parts. The pain was lessened very considerably in a short time after the application was removed. The tissue to which it was applied was perfectly anesthetized to a considerable depth. Just at the circumference of the application there was considerable tenderness. There was much swelling, which seemed to be more like that of edema than of true inflammation. In two or three days some color began to return to the parts, except those to which the agent was directly applied, which never regained normal color. In two days more a line, purple in color, began forming at the circumference of the point of application—a line of demarcation—and it became apparent that there was to be a break in the tissues. This break occurred and sloughing took place; considerable tissue was lost all over the surface of the inflamed area. The tissue in the centre raised about the edges, but was very obstinate about coming away. From the time the agent was thoroughly absorbed in the tissues, physically I was not up to the standard; my appetite was more or less impaired, the digestive and eliminative organs were somewhat interfered with. These conditions continued to grow worse until the

climax came in a bad case of systemic poisoning, the poisonous matter being thrown off through the medium of quite a severe diarrhea, and also much vomiting—the former continuing for a period of three days, the latter for one, following which time my physical condition rapidly improved.

Having seen a number of cases which have been treated by physicians with various percentage solutions of formalin in which more or less sloughing of the parts has resulted—one which I saw not long since in which as low as a 2 per cent. solution was used, in connection with which considerable sloughing resulted—and also because of the very vivid recollections of my own experience with it, I have come to the conclusion that we should get along without it in the treatment of diseased conditions about the mouth.

As I have devoted a paper to this agent before another society I will not give my observations of it in more detail here. My paper is now too long for me to consider the subject of the selection of antiseptics with a view to utilizing their therapeutic effects in individual cases in connection with their antiseptic powers, but this can be fairly made out from the observations related.—*Journal of the American Medical Association.*

TEMPORO-MAXILLARY ARTICULATION.—REMARKS REGARDING VARIOUS AFFECTIONS THEREOF.*

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In considering the occasional remote and disastrous results of acute, sub-acute and chronic diseases of the temporo-maxillary joint, it may be well to refer briefly to the anatomy of this articulation, so as to bring plainly before us its somewhat complicated construction. The temporo-maxillary is a double arthrodial articulation, being possessed of two separate synovial membranes that normally, in very rare instances, communicate with one another through an orifice in the inter-articular cartilage. Owing to this construction of the joint the movements that take place in its inferior and superior compartments are of two kinds. In its upper compartment the fibrocartilage glides forward and backward in the glenoid cavity; in the lower, the condyle rotates on a transverse axis against the fibrocartilage. When the mouth is widely opened these two movements are combined; the jaw and the fibrocartilage together move forward and rest upon the articular

* Presented to the Section on Stomatology, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Col., June 7-10, 1898.

eminence, while at the same time the condyle revolves on the fibrocartilage. When the lower incisors are protruded beyond those of the upper jaw the movement is confined chiefly to the upper articulation; whereas the lateral or grinding movement is accomplished more largely by the lower articulation. Owing to the anatomic arrangement of this joint, we occasionally see as the result of disease in this articulation instances in which partial impairment of its movements has occurred, and in which this restricted mobility is more marked in the one than in the other of its compartments. Cases of that more distressing affection, viz., complete ankylosis of this joint, are of course much more frequently encountered by us in our practice than are those referred to above; and these would be still more frequent were it not for the anatomic construction of this joint which, by virtue of its two compartments, offers a partial barrier against its easy invasion by disease.

Any cause that may produce disease or injury in the other articulations will act with equal force upon this joint. From its more exposed position and from its occasional involvement from external ear diseases and dental inflammations, it is more liable to be affected than are the better protected articulations. Trauma, unless it be of a slight degree, is more apt to result in complete than in partial ankylosis. Scarlet fever, diphtheria, measles, smallpox, typhoid and typhus fever, and tuberculosis are among those affections which have contributed to swell the list of cases of partial and complete ankylosis of the temporo-maxillary articulation. Rheumatic and gouty affections are much more likely to produce pain, stiffening and impairment of movement by working organic changes in one or more of the structures of the joint than to lead to complete ankylosis. Rheumatism more frequently attacks the cartilaginous and bony structures of the joint, destroying, in many instances, the fibrocartilage and frequently causing atrophy or complete absorption of the condyle and portions of the glenoid cavity. Cruveilier, who first described an example of rheumatoid arthritis of the temporo-maxillary articulation, says: "I have never seen the disease I call wearing away of the articular cartilage better marked than it was in this case. The condyle of the lower jaw did not exist. It might be supposed to have been sawn off horizontally at the line of junction of the head with the neck, and that which remained of the neck had been flattened. The articular part of the glenoid cavity was represented by a plain surface; no trace of inter-articular or cartilage of incrustation existed. Both surfaces of the altered articulation were remarkably red" (*Anatom. Pathologique*, liv. 9).

The opposite condition of hypertrophy as the result of rheumatism of this joint has been recorded. This hypertrophy of the condyle and neck may occur in otherwise healthy individuals and

may produce sufficient displacement of the teeth so as to disarrange the normal bite. Heath, in his work on the diseases of the jaw (3rd Ed., p. 420), gives an account, with illustrations, of an extreme case of this kind in which the patient had a queer, lopsided appearance of the face.

The milder result of this disease, as affecting the temporo-maxillary joint, is to produce that condition to which attention was first directed by Sir Astley Cooper, and described by him as "sub-luxation." He held the opinion that this condition depended upon relaxation of the ligaments of the joint. Heath, however, believes it is more frequently due to rheumatic changes in the articulation, and says: "The fact that these patients suffer more in damp weather and when the general health is feeble, shows that it depends upon an arthritic diathesis, and the relief that is obtained by counter-irritation and the administration of anti-rheumatic remedies proves that the complaint cannot be due to purely mechanic causes."

Gouty affections cause more acute pain and more or less acute swelling of the joint, accompained or preceded by gastric disturbance. Repeated attacks of this disease are apt to result in permanent impairment of this joint, by occasioning calcareous deposits among its structures, and this result is especially likely to occur in unrecognized or neglected cases of this nature.

Necrosis of the lower jaw, originating from whatever cause (with the exception of exanthematous necrosis, which is nearly always symmetric and limited to the alveolar processes), may extend from any part of the bone to the articulation and seriously interfere with its mobility or result in complete ankylosis. Other affections originating in the neighboring soft parts, as scrofulous inflammation of the face (John Howship), abscesses opening into the joint and the prolonged pressure of tumors, may each lead to partial or complete disorganization of this joint. As a case illustrating the extension of a suppurative disease of the alveolar process to the temporo-maxillary joint, I refer to the following:

On August 9, 1897, I was asked by Dr. W. H. Creighton, of Cincinnati, to see a patient of his, Mr. B. aged 65 years, who had suffered for five months past with an affection of the left side of the lower jaw. The disease had orginated in the aveolus of the first molar on the affected side, giving rise to a necrosis of this process, which had gradually extended until the entire left arch of the bone had been invaded by the disease. On several occasions during the past few months Dr. Creighton had removed a number of fragments of necrosed bone, varying in sizes. At the time I saw the patient there was considerable tumefaction of the left side of the face, which extended from the lower border of the jaw as far upward as the zygoma. The soft tissue of the neck, reaching

from the mastoid downward along the anterior border of the sternomastoid muscle, was tense from inflammatory effusion. The parts involved were exceedingly sensitive to touch. An examination of the mouth brought into view a puffy, unhealthy line of gum tissue which extended from the incisor to the post-molar region, from which pus was seen to exude from several points. A flexible silver probe was without much difficulty, passed into one of these pus openings, upward and outward, under the masseter muscle, until it reached the condyle. At various points along this sinuous course the grating sensation of disintegrating bone was plainly felt. No operation, except one to enlarge the explored sinus was recommended at this time. In addition to this, a lotion containing aconite, opium and stramonium was directed to be kept applied to the swollen cheek and neck, and the following prescription ordered:

℞ Tr. aconiti rad ..... ℥ ss.
Potass. acetatis ..... ℥ ii.
Tr. hyoscyami .. .. ℥ i.
Syrupi capsici ..... ℥ iii.
Aqua q. s. ad ..... ℨ iii.

Misce ft. misturæ—Sig.: Teaspoonful to be taken every two hours.

By this course of treatment the local swelling and pain of the parts was considerably relieved and a threatening abscess under the chin was averted. In the course of a few days the diffused swelling, as at first seen, had become localized to the immediate neighborhood of the temporo-maxillary joint, where some fluctuation could now be detected. This was relieved by the use of the hypodermic syringe, and a considerable amount of pus was removed from the joint by the aid of this instrument. The fear now was that the case would terminate in ankylosis, and the apprehension as to such an unfortunate result was enhanced when, a few days after the operation, a piece of cartilage the size of a small finger-nail was discharged from the sinus opening into the mouth. A careful examination of this specimen confirmed the belief that it was a fragment that had been cast off from the inter-articular cartilage. From this time on the case progressed uneventfully and at the present writing, May 10th, 1898, an unexpectedly good result has been attained. The movements of the joint are but slightly impaired. The mouth can be opened nearly to its full extent, but in doing this the jaw is pulled slightly to the affected side. The lateral or grinding movement is, however, more noticeably limited. The conclusion arrived at in this case is that the fragment of cartilage discharged came from the lower compartment of the joint.

The treatment of this case, in addition to that given above, consisted in maintaining a free draining into the mouth and upon the surface. A wash for the mouth, containing permanganate of potash, was directed to be used frequently, and the sinuses were kept as far as possible in an aseptic condition by occasional injections of weak antiseptic solutions. His general condition was improved by the internal administration of small doses of tartrate of iron and potash, and Fowler's solution of arsenic given in alternate doses. Both of these remedies are known to have a constructive power in many vitiated conditions of the blood. The former acts by entering into the composition of some of the proximate principles of the blood. The latter remedy probably acts by modifying the vital conditions of its organized constituents. We know from clinical experience that these two remedies are of signal service in hastening, in many cases, the formation of healthy granulations around necrotic bones, reducing in this way to a minimum time the separation of the sequestrum, and aiding to bring many cases to a comparatively rapid cure. Owing to the somewhat unusual history and present termination of this case, it has been described in detail. The result so far appears to be an excellent illustration of a disease being limited to one compartment of the temporo-maxillary articulation, and although it is rather early to prognose as to the final outcome of the case, the conditions now are certainly favorable for a permanently good result.

The unhappy termination of comparatively slight injuries to the temporo-maxillary articulation in children can best be appreciated by bearing in mind the difference in the conditions of this joint in children and adults. Perhaps no writer has written more clearly and tersely upon this subject than has John Hilton, in his work on "Rest and Pain" (2nd ed., p. 301), in which he says: "In adults the individual structures of a joint may be diseased and each may present its own local indications of special local symptoms. Thus we may meet with isolated inflammations of the synovial membrane and ligaments, or a disease of the articular ends of bones in the adult. Now, although these structures are at all periods of life necessarily continuous with each other and closely allied in function, yet it is at the adult period, after the completion of their development, that each separate structure seems to have acquired, and thenceforward to manifest, both in health and disease, a structural independence which gives a character of individuality and isolation to the diseases of the different structures of the joint. In children all the structures of the joint must be formed, built up and nourished in concert and in due relation to each other. On this intimate sympathy existing between the different parts of a joint during childhood or during

the period of growth, depends the tendency to diffuse disease contemporaneously in all the articular structures. Hence we see in our practice the quick propagation of inflammation from one articulation to another, and a rapidity of implication of the various structures of the joint which we do not observe at a later period of life."

This tendency to a rapid and complete involvement of an injured joint in children should be constantly borne in mind by the surgeon when treating any articular disease in the young. Especially should it be remembered that the discharge of pus from the ear in children is not unfrequently due to disease originating in the temporo-maxillary joint, and which is unfortunately, at times, not recognized until too late to prevent the disorganization of the articulation.

Affections of this articulation may occur at a very early period of life. Holt, in his work on "Infancy and Childhood," mentions a case of suppuration occurring in the temporo-maxillary joint at the early age of two weeks.

Acute arthritis in children is not a rare disease, and is a suppurating one from the outset. As late results there may be pathologic dislocation or a flat joint; occasionally ankylosis. An early evacuation of pus in these cases may aid them to terminate favorably, but in neglected cases complete destruction of the joint often occurs. If more attention were given to early manifestations of pain occurring in the temporo-maxillary articulation of infants and children, we would not be so frequently confronted by distressing cases of ankylosis of this joint.

Treatment.—The treatment of acute affections of the temporo-maxillary articulation should engage the early and watchful attention of the surgeon. All remedial means, local and constitutional, should be applied at once and persevered with until an obvious result has been obtained. Nor should his efforts be relaxed, neither should he become discouraged, even in those unpromising cases that apparently resist remedial measures, for by exercising patience he may bring to a successful termination a case that otherwise might result in complete ankylosis. There can be no doubt that the local abstraction of blood in acute inflammatory diseases of joints, especially when this condition is due to trauma, is one of our most potent means of preventing secondary changes in the structure of the articulations. This local depletion can be best accomplished by the liberal use of the leech. Six, twelve, twenty of these can be applied, according to the size of the affected joint and the amount of acute swelling present. For the temporo-maxillary articulation not more than four to eight are required. After their use, bleeding should be encouraged by the use of hot fomentations. If leeches cannot be secured,

recourse can be had to the artificial leech or to the lancet. Internally, arterial sedatives should be administered. The tartrate of potash and antimony, the mercurial compounds and aconite are remedies of recognized value in these cases. The successful surgeon will apply the general principles of treatment to each case committed to his charge; recognizing and meeting in each instance any special condition of his patient that may, in any way, modify the local affection, whether this condition be of a temporary character or one of a constitutional nature, as a rheumatic, tubercular, malarial or a specific taint of the system. I cannot refrain from again urging the decided benefits to be obtained in the cases under consideration by the local abstraction of blood in the early stages of these affections. I am confident that many joints have been preserved by this treatment that would otherwise have become useless; and I desire to enter a protest against the growing neglect of local blood-letting in acute synovitis and in other acute inflammatory affections of the articulations. In the subacute and in those cases of a more chronic nature in which complete ankylosis has not taken place, we can hope to obtain good results in most instances by the prolonged use of counter-irritants, absorbents and mechanic devices. Iodin applied externally exerts a mild counter-irritant effect and also favors absorption of fibrinous exudate. Repeated blistering is of much service in many instances.

The actual cautery, applied not directly over the joint, but in its near neighborhood, is an effective mode of treatment. Mercurial unguentums exercise a curative effect; and although they have been extensively used in chronic joint affections, they have been made of more value by the preparation of oleates of this metal, first introduced to the profession by John Marshall, surgeon of University College Hospital, London, who speaks highly of their utility in chronic inflammations, when the seat of the disease is in or sufficiently near the skin. He says: "I may first mention that not only in persistent articular inflammations, but also in simple synovitis, these remedies rapidly relieve the tenderness and pain and promote the absorption of the fluid diffused into the joint. They are also of decided benefit in the rheumatic, the arthritic and the mixed forms of joint disease, but in these they do not supersede the necessity for general treatment."

He further states, that "these oleates of mercury should not be rubbed in like ordinary liniments or embrocations, but should be merely applied with a brush or be spread lightly over the part with one finger, otherwise they may cause cutaneous irritation or even produce a few pustules on the skin, especially in some persons." After long use of these preparations I have become more and more convinced of their great usefulness in chronic inflammations of joints.

Among the mechanic means to be employed to prevent or overcome a gradual tendency to the closure of the jaws, due to disease of the temporo-maxillary joint, are the various forms of shields, wedges and gags that have been from time to time devised by dental surgeons, some of which have proved of service. Among these may be specially mentioned the device of Dr. Goodwillie, of New York (*Archives of Medicine*, N.Y., June, 1881), who, writing of chronic cases of inflammation of the temporo-maxillary joint, says: "The method that I employ is as follows: In this case the patient is under the anesthetic effect of morphin and nitrous oxid. If there is any rigidity of the muscles, cautiously force open the mouth and take an impression of either the upper or lower teeth, and a rubber splint is made from the cast to cover all the teeth in one jaw. Upon the posterior part of this splint is made a prominence or fulcrum, so that when the mouth is closed the most posterior teeth close upon it while the anterior teeth are left free. The next step is to take a plaster-of-Paris impression of the chin and from this to make a splint. On each side of this splint is made a place for fastening elastic strips that pass up on each side of the head to a close-fitting skull cap. When this appliance is in place and the elastic straps tightened so as to lift the chin, then pressure is brought to bear on the fulcrum at the posterior molar tooth; and so by these means extension is made at the joint and the inflamed surfaces within the joint are relieved from pressure; then immediate relief is experienced."

This method is an admirable one and is based upon sound surgical principles, for it secures to an inflamed part rest, which is a condition so essential to be obtained during the process of repair.

In cases which have terminated in complete ankylosis, operative treatment is the only way to insure relief. In some few cases of fibrinous ankylosis, if a diagnosis can be made, it is practical to attempt the division of the fibrinous bands, and after this to make use of mechanic appliances in the effort to restore the mobility of the joint.

Mr. Spauton, of Harley (London *Lancet*, April 16, 1881), publishes two cases of fibrinous ankylosis of the temporo-maxillary articulation, in both of which he proved the correctness of his diagnosis by dividing the fibrous bands with a tenotome passed into the articulation. The patients were girls aged 9 and 10 respectively, and in both cases the disease of the temporo-maxillary joint had followed scarlet fever. Other surgeons have also reported instances of the same character.

It is difficult to make a diagnosis of fibrinous from bony ankylosis, but in a doubtful case the surgeon, before attempting a more serious operation, would be justified in using the tenotome to sever the fibrinous bands, and if successful in this to forcibly open

the mouth and effect a cure by these methods. In all cases, however, of bony ankylosis the only relief to be obtained is by an operation upon the bone itself, either by resection of the condyle or by Esmarch's operation. The first operation for the removal of the condyle was by Professor Humphrey, of Cambridge (*Association Medical Journal*, London, 1856), and was undertaken for chronic rheumatic arthritis. Since that time resection of the condyle has been performed by many surgeons and the operation has been generally adopted. This operation usually affords relief, providing the entering condyle be removed. A mere section of the neck or a partial removal of the condyle has proved to be inadequate. The operation is usually unattended with danger to life, but occasionally fatal results ensue, as in the following case: Miss M., at the age of 4 years, fell from a porch, striking upon her chin. Pain and some swelling of both temporo-maxillary joints occurred shortly after the accident, followed by gradual, persistent and increasing stiffness in these joints until finally, some nine months after the receipt of the injury, complete ankylosis of the jaw became established. At the age of 19 years she was brought to me by Dr. C. A. Schuchardt, of Cincinnati, as a patient for the Ohio College of Dental Surgery. Her appearance at this time was the usual one presented by the unfortunate subject of early and complete ankylosis of the temporo-maxillary joints. The marked dwarfishness of the chin, owing to arrested development, was as marked as in any case under my observation, but she had experienced much less pain and there was less irregularity and mal-position of the teeth than is usual in these cases. Her desire for an operation was mainly due to the fact that I had relieved a friend of hers who had been similarly afflicted from infancy and to whom I had given relief by performing a double Esmarch operation.

After an examination of the patient it was decided to resect the condyle, and she was placed in the Good Samaritan Hospital of this city, and the left condyle, being the more enlarged, was selected for the first operation. This condyle, which appeared to have become a part of the glenoid cavity, so firmly was it blended with the temporal bone, was removed in pieces. Three days after the operation the patient was in good condition and hopeful spirits. She said: "I felt my jaw move on the other side." On the fourth day, however, a secondary hemorrhage occurred. This was controlled by a gauze compress. Unfortunately, however, septic infection of a virulent form invaded the wound and shortly occasioned an arteritis that extended rapidly along the external carotid artery, which probably had been injured during the operation. A malignant cellulitis of the adjoining parts occurred and death resulted on the twelfth day after the operation.—*Journal of the American Medical Association.*

Dominion Dental Journal

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DR. C. N. JOHNSON ON FILLING TEETH.

There are so many good things from time to time in many of our contemporaries, that every month we regret that the limitations of our space prevent us giving them to our readers in Canada. Notably we refer to the series of articles running in the *Cosmos*, by Dr. C. N. Johnson, entitled, "A few Considerations in Filling Teeth," and which we trust the publishers of the *Cosmos* will reproduce in permanent book form. As a teacher in operative dentistry, Dr. Johnson has won a distinguished position, and he is one of those who has proved the fallacy of the old supposition that a teacher could not attain equal merit as an operator. The series to which we refer cover the ground so far that it would be unfair to the author to publish one without the other. We feel we are giving good advice to students and practitioners in urging them to get the *Cosmos*, and diligently study the articles in question. Of course every dentist in Canada knows that Dr. Johnson is a old Toronto boy, and a L.D.S. of the "Royal College of Surgeons of Ontario," and, though permanently settled in Chicago, has always a warm corner in his heart for the Dominion.

A HINT TO SECRETARIES.

The JOURNAL has lost some good papers owing to the neglect of the secretaries of societies. It ought to be a standing rule to ask essayists to hand their papers to the Secretary after being read, and if the association desires to have a complete report there should be some arrangement made by which the papers and proceedings should be sent to the editor by one mail, instead of being sent by instalments.

EDITORIAL NOTES.

ONE of the comical characteristics of many members of our profession is the unthinking haste with which they will sign petitions. A year or two ago a large number of licentiates in Quebec put their names to a petition, asking the local Legislature to legalize the public employment of unindentured assistants, in such a way as opened the door to all sorts of breaches of the dental law. The excuse made by the signers was, that they "did not think, or did not see at the time the evil consequences." Somebody then got up another petition against the petition, and with one or two exceptions, the petitioners of the first part signed the petition against their own petition! But it was not only too late, but so incongruous that the second petition gave a good deal of amusement to the Parliamentary Committee.

Another petition was recently sent forth for presentation to the Legislature, very generally signed, asking that a law be passed to compel dentists to confine their advertising to the usual card! One of the funny things about this document is, that some of the signers have been open offenders. Weak souls! they beg the Legislature to compel them by law to be moral. The morality that has to be created by Act of Parliament, is like the honesty which is made by the presence of the police. If some of the parties who signed the petition had begun with themselves the reformation desired, there would be less cause to suspect their hypocrisy. We may frankly say that we seriously doubt the sincerity of some of the signers of the petition. Most of them are, we are perfectly sure, honestly indignant and consistent, but there are others who remind us of the saying, that as there are no roads so rough as those that have just been mended, so there are no sinners so intolerant as those who have just turned saints. This journal has for years endeavored to lead the way to reform in this matter. It has tried to enlist the respectable members in educational methods which would expose the lying advertiser. All the time those who were not passively

indifferent, or who were willing to have others pull the chestnuts out of the fire, were in a variety of ways committing breaches against the code of ethics, while busy at the motes in the eyes of their neighbors.

ONE of our leading dentists from over the border, after spending a holiday for his health through Ontario, Quebec and the Maritime Provinces wrote us a letter, which we are sorry he will not permit us to publish in full, but he has kindly allowed us to use the following extracts: "I was greatly surprised at the average *personnel* of the dentists in Ontario. I was not quite prepared to meet so many whose general education is far above the average; men not only skilled in their art and keeping well up with the times, but men of refinement and gentlemanly bearing, neat and tidy in their office environment. In Toronto I found just what one might expect to find in a large and prosperous city side by side with a very superior class of practitioners, the 'real painless,' and the really painfully poor wretches—but a very few—who make a precarious living and who try to build up their business by living in the gutters of practice, where they want to pull everybody else. . . . In Quebec Province, I found to my satisfaction the same class of ethical and skilful men, and alas! the same ignominous few, one or two of whom prove by their advertisements that if they are third-class dentists, they are first-class rogues and that they perfectly revel in their shame. Montreal can beat Chicago all hollow for ingenious dental liars. I wonder they do not seek a wider sphere for their imposture. They are quite sure to get played out there, while Chicago would be a more congenial field for their fraud and duplicity. . . . The ever charming Maritime Provinces of the Dominion seem pretty free from the advertising quackery which disgraces Toronto and Montreal. I was pleased to meet some of the pioneers of the profession who, they told me, had been warmly supported by the younger generation. One of the marked features of Canadian dentistry seems to me to be the large number of brainy men well up in years who have what the younger generation cannot have—*experience*. It is the same in my own country. The seniors, as a rule, are the thinkers as well as the workers, and experience adds to their skill."

IN a largely populated and free country many abuses necessarily arise which could not exist in a smaller country. The diploma mill business is again in full force in the United States, and honorary degrees for $35, C.O.D., are being offered by the Kansas City College of Dental Surgery. Dr. J. D. Patterson, editor of the *Western Dental Journal*, exposes the fact that the Kansas City Dental College—a member of the National Faculties—is about to be confounded with the disreputable attempt of the Kansas City

College of Dental Surgery to deceive the profession by using a name so much like the Kansas City Dental College. We manage these things better in the British Empire. All degrees are given through some recognized and established university, and it is impossible for a few or many scallywag dentists and physicians to get a charter and legislative power to grant degrees irregularly.

THE typical Canadian tooth is a bluish-white or a green-gray. It is neither a pearly white nor a tobacco yellow. But it is commonly remarked that the general run of artificial teeth inserted in the Dominion, more especially in the Province of Quebec, tends to the very whitest and smallest, independent of the complexion, features, size, etc., of the patients. Most of the "parlor" people in practice, confine their selection to a very few number to save time. Like one of their contemporaries who said he could not afford to wash his hands after every patient, they cannot get paid for the time necessary to choose the most suitable teeth.

IT is more difficult to write a good short article than a good long one. There are writers in our journals who have a fashion of beginning every article as far back as they possibly can to the time of the flood. They rope into their paragraphs, historical, scriptural and other subjects of no more point or application than the Greek ellipses. It is fortunate for dental literature that Moses got the Ten Commandments so clear that they cannot be quoted in discussing the etiology of Caries.

HE is a shrewd man who has the tact to hold his tongue when he has nothing to say; but he who withholds knowledge is unjust to himself and his contemporaries. Many a man gets a reputation far beyond his merits, just because he keeps his mouth shut. It is only those of us, who by pen and tongue have to do and say, who expose ourselves to the sneers of the fools. The dumb enjoy one privilege—they cannot be caught in a *lapsus linguæ*.

IF the fact could be fixed in the mind of the profession that the real governing body is that of the licentiates, and that only can grievances be remedied by the mass of the members dictating their wishes, the annual meetings would be largely increased.

OUR own and only private and confidential "printer's devil" does not know how to spell Gehenna. Perhaps he thought it ought to be spelled Gay-henna.

MANY of our best Canadian dentists have a great talent for silence. The light they hide under bushels, if concentrated, would eclipse that of the sun.