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CONTENTS FOR NOVEMBER 1870.

ORIGINAL COMMUNICATIONS.	PAGE.
Practical Hints on Mechanical Dentistry. By R. G. Snow, D.D.S.	65
Borax. By W. E. Hughes, L.D.S.	69
Oxy-Chloride of Zinc. By X. Y. Z.	69
Quick Method of making Dies. By J. A. Troutman	70
The "Pyroxyline" Base for Artificial Dentures.	70
PROCEEDINGS OF DENTAL SOCIETIES.	
7th and 8th Districts Society of State of New York. Reported by C. S. Chittenden, L.D.S.	73
EPITOME OF THE PROCEEDINGS OF FOREIGN SOCIETIES.	78
SELECTED ARTICLES.	
On Nitrous Oxide.	83
Inserting Rubber Dam.	87
Heavy and Light Folds.	87
Light vs. Heavy Gold Foil and Crystal Gold.	90
BIBLIOGRAPHICAL NOTICES.	92
EDITORIAL.	
A Dominion Fee Bill	93
Make a Beginning.	94
Another Reminder.	95
"The Expositor of the abuses of Dentistry".	96
Dr. W. B. Patton.	96
MISCELLANEOUS.	96

INDEX TO ADVERTISEMENTS.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Gullion's Cement, &c. 2. New Amalgams. 3. Johnson's Gold Foil, &c. 4. Johnson's Gold Foil. 5. S. S. White's Depot. 6. Lawrence's Amalgam. 7. Smith's Oxy-Chloride of Zinc. 8. Hubbard's Depot. 9. Chandler's Depot. 10. Kelsey's New Vulcanizing Apparatus. 11. Eureka Gold Filling. Doherty's Rubber Dentist's Microscopes. 12. J. R. Tatum & Co's. Excelsior Porcelain Teeth. | <ol style="list-style-type: none"> 13. Dental Instruments. Barnum's Rubber Dam. 14. Pure Gold Foil. Thomas on Nitrous Oxide. 15. Lyon's Forth Tablets. 16. Johnson and Lund's Teeth, &c. 17. Weston's Dental Metal. 18. Canada Medical Journal. 19. Corfield's Teeth, &c. 20. Rubencame and Barker's Depot. 21. Green's Pneumatic Burr, &c., Automatic Mallet. |
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W. GEO. BEERS, L.D.S.,
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Vol. III.] January, 1871. [No. 3.

ORIGINAL COMMUNICATIONS.

PRACTICAL HINTS ON MECHANICAL DENTISTRY.

BY R. G. SNOW, D.D.S., BUFFALO.

Read before the 7th and 8th Districts Society of the State of New York.

MR. PRESIDENT AND GENTLEMEN.—The subject you have assigned me for a few practical hints, is so old, and has been so thoroughly discussed, and your various methods of manipulation are so well established that it hardly seems possible to advance anything new, or that will in any way change or improve your practice. The substitution of artificial teeth, however, when the natural organs are lost, and, to do this in such a manner as to preserve the natural expression of the face, and afford the greatest usefulness and comfort to the wearer, is second in importance only to the preservation of the natural organs.

It will therefore bear a good deal of talking about and discussing:—

And, first, let me say, as I have said before, there is far too much mechanical dentistry done; we are too ready and willing to extract teeth. Indeed, there are many who claim to be in the profession who do little else than extract teeth and insert artificial ones.

The true surgeon always uses every possible means of saving a limb before resorting to amputation. The oculist exhausts his skill in trying to save and make useful the natural organ before resorting to an artificial one; and does not the same rule hold good in our profession? Is not he the true dentist who endeavours, by every possible means, to save the natural organs before resorting to extraction?

At the meeting of the American Dental Association, held in Nashville in August last, Dr. Walker said, during their discussion on mechanical dentistry, that he thought “the time would come when extracting teeth would be a crime.” I leave it to you, gentlemen, to say whether that time

has not already arrived, whether it is not criminal to extract teeth in the wholesale way that many do.

People ought to know better than to submit to such treatment, but they get their ideas of dentistry from the dentist whom they employ, and many are taught to believe, and do believe, that the great desideratum is to get rid of their natural teeth and have them replaced by artificial ones, and that then their troubles are at an end, that a well made whole set will last them their life time. Now people ought to know better; and dentists who have the good of their patients at heart, ought to teach them on every occasion, the value of their natural teeth, and the necessity of preserving them. And here certainly is a chance for missionary work, and, if some means could be adopted to instruct people on this point, great good would result from it.

Nothing is permanent or stationary in this world. If we take a physiological view of this subject we shall see that every organized living being is always and at all times undergoing certain changes, and those changes in early life all tend to growth, development and perfection, and when full development is attained the tendency is to decay, destruction and death. The form and general contour of the face, as is apparent to you all; is greatly changed from infancy to adult age; and the change is equally apparent from middle life to extreme old age.

Now what are these changes? I shall mention a few of them only. The maxillary bones undergo manifest changes in their form from infancy to old age, and it is a curious fact that the form of these bones in old age, is, in many respects, similar to what they were in infancy. And first I will mention the alveolar processes. In the fœtal state, instead of a process or projection, you find a groove inclosing the germs of the teeth, and the processes are developed as the teeth are developed. When the deciduous teeth have protruded through the gums, they seem to occupy the whole of the alveoli; but about the sixth year the jaw has grown, and the process is sufficiently developed to admit the first, or six years molar, and at the twelfth or thirteenth to admit the second molars, and at the twentieth or twenty-first, to admit the third molars, or dens sapientiæ, when the maxillary bones and the alveolar processes may be said to be fully developed.

The alveolar process would thus seem to be formed to sustain and support the teeth, and it is evident enough that they are so, for the moment the teeth are lost, either by disease or by dentist, nature sets the absorbents to work to carry it away and reduce the jaw to the same form it had in infancy; and, I presume, many of you have seen cases in extreme old age when there was not only no alveolar ridge, but a depression, a groove similar to what there was in the fœtal state; and this particularly if the

patient had worn a bad fitting plate for fifty or sixty years more or less. And right here let me offer you a "hint." A plate, and particularly a bad fitting plate, by its pressure greatly hurries this absorption. Now let me ask you if it is not your duty to impress it upon your patients, that they must not wear a plate any longer than it continues to fit well. They may heed your advice or they may not; at any rate do your duty and let them do what they will and take the consequences. But, by no means ever say to a patient that a well fitted set of teeth will last them their life time. I aver that any dentist who advances that idea to his patients is lacking either in honesty or a proper knowledge of the principles of his profession.

Again, in the infantile state the angle of the lower jaw is very obtuse; in the fœtus it is nearly straight, but as age advances it becomes less and less obtuse, and at mature age it has contracted nearly, and some authors say quite, to a right angle. The condyloid and coronoid processes in consequence of the obtuse angle of the jaw in childhood, look obliquely backward and upward, the coronoid process being considerably the highest when the jaw is placed in a horizontal position; but, at mature age, by the gradual lessening of the angle of the jaw, they are brought to be nearly on the same level. In old age, however, the angle of the jaw has again become obtuse, and the condyloid and coronoid processes have assumed their original infantile state.

Once more:—The pterygoid process of the sphenoid bone are also affected, and undergoes changes during the development of the teeth. These processes give origin to the pterygoid muscles which are inserted into the lower jaw and assist in mastication. They, the processes, are, says Blaudin, to the superior dental arch, what the posterior border and angle are to the inferior. Both are alike points of support to the alveolar arches, and both undergo similar changes during the development of the teeth. At birth they look very obliquely forward and downwards. In adult age they have taken the vertical position, and in old age they have again returned to their primitive oblique position.

Now it must be admitted that these, and other changes of like character which might be mentioned, exert a great and controlling influence on the configuration and expression of the face. It would seem that, at each period of life, the face has its appropriate form and expression, and I submit it to you, gentlemen, whether the early extraction of the teeth does not tend to hasten these changes, and bring on prematurely the expression of old age? I know very well that you propose to restore the natural expression by means of an artificial set of teeth; but this is by no means always done. I think I am safe in saying that it is very seldom done; mere mechanical skill can never do it. The skill of the artist

only can accomplish it; and how many of those who are engaged in mechanical dentistry possess the requisite artistic skill to restore and preserve the natural expression I leave you to decide. I fear there are many whose thoughts penetrate no deeper into the subject than to the dollars and cents.

Much was said, also, at the last meeting of the American Dental Association, in regard to the effect of dental plates on the soft parts of the mouth. Many attribute the soft spongy state of the gums which we sometimes see to the effect of rubber, or rather the mercury in the rubber. Others had seen spongy gums apparently produced by wearing gold plates. Each had his opinion at the commencement of the discussion, and each had also at the conclusion. Now I apprehend that there are two causes, neither of which were alluded to in the discussion at Nashville, which tends to produce a spongy, diseased state of the gums in the mouths of those who wear dental plates, and neither of them having any reference to the material of which the plate is made.

First: The continual wearing of the plates, night and day. Now it must be apparent, on physiological principles, that this constant pressure of the plate prevents the normal circulation of the blood in the parts pressed upon, thus tending to produce this red, inflamed, spongy state of the gums.

Second: The wearing of badly fitting plates. Some of the worst cases I have ever seen were produced, so far as I could judge, by perseverance in wearing badly fitting plates. They, of course, keep up a constant irritation, and tend to inflammation and a spongy state of the parts.

This leads me to say once more that patients ought never to be allowed to wear a plate after the parts have changed by absorption so as to destroy its accurate fit; no plate ought to be worn unless the fit is good.

Patients ought also to be instructed to leave their plates out when they retire for the night, and allow the gums to recuperate and as far as possible establish a healthy circulation.

I might mention a third cause, and that is a constitutional predisposition from a syphilitic taint, or some other similar cause. This of course would require constitutional treatment, and is not in my province at present.

Now, gentlemen, in view of what has been said, is it not apparent that our profession is tending too much to mechanical dentistry? Is it not our duty to use greater efforts, and exercise greater skill in saving the natural teeth, rather than to fall back at once upon artificial ones? The introduction of rubber as a base for dental plates has certainly worked a great revolution in mechanical dentistry, and by its cheapness has placed artificial teeth within the reach of every body. I think its worst effect

is, that it has led people to undervalue their natural teeth. Do you ask me what remedy I would propose? I answer, I'll preach to my patients, and I hope you will to yours, and, in course of time, the little leaven may leaven the whole lump.

BORAX.

BY W. E. HUGHES, L.D.S., AYLMER.

Thinking that the experiment I have made with this substance may be of use to the profession in general, I proceed to give the following new use to which it may be put, and, I think, with advantage. It is well worth a trial, and will not cost much to try, and the way I accidentally stumbled on it was this. I had read that borax applied to plaster made it very hard, and one day I was using a boiling hot solution, about half an ounce to a pint of water, when I immersed the model therein and immediately withdrew, and proceeded as usual to put on the teeth. After vulcanizing the plate in the usual manner, and when the flask was cold, I pried it apart and was agreeably surprised at the result. Scarcely a particle of the plaster adhered to the plate; that is, on the upper surface. I therefore have arrived at the conclusion that this simple process will answer instead of liquid silic, collodion, tin foil, or any of the ætherel solutions sold for the purpose of covering the model. The solution should be used boiling hot, allowing the model to remain in only two or three seconds. The same solution may be used a number of times. It is well worth a trial, and, if found as useful as my experiments have proved it to my satisfaction, I shall feel glad in knowing that some good may arise from the accidentally finding out this simple process. Whether or not any particular chemical action takes place I am not prepared to say, or even to give any reason why, for the above cause. I leave this to any person to study out who wishes. I merely give the facts of the case as I find it.

OXY-CHLORIDE OF ZINC.

BY X. Y. Z.

I think a great deal of oxy-chloride of zinc for capping exposed pulps, because I have proved to my own satisfaction that I can save hundreds which ten years ago I would have destroyed. That I consider to be a desideratum, and if I do find my hopes sometimes blighted by death and failure, the fact that we can save a bare pulp with certainty in many cases is a fact of great value to our profession. Many failures result, no doubt, from ignorance, haste to finish, and improper application. It is so with everything we possess for the preservation of the teeth.

One little point in using oxy-chloride of zinc I have found of great use. I find that any painful effect of the acid is lessened by heating it a little on a slide of glass just before mixing the paste. The pulp bears it with more impunity by reducing it to its temperature. The same may be said with amalgams; I warm the first pieces. However, care must be taken not to over-heat the oxy-chloride of zinc, as that will make it crumble like chalk. I have a microscopic slide warming on the tray of my annealing lamp; I drop sufficient of the fluid on this, and, having the cavity of the tooth ready dried, I mix the paste and instantly insert it, drawing a dry napkin across its face, and putting a drop of collodion on its surface to protect it from the saliva until hardened. With intelligent care I think oxy-chloride of zinc may be found to be a more effective and perhaps permanent filling, than we believe.

QUICK METHOD OF MAKING DIES.

BY J. A. TROUTMAN, TORONTO.

I first take an impression of the mouth and make a model the same as for vulcanite, then take a flask (the same as is used for vulcanite) and drill three or four holes through the bottom; fill the lower part of the flask partially with sand, a little damp; put some sand on the inside of the model, and press or drive the model firmly into the flask, then press the sand around the outside of the model, not allowing it to come up any further than the impression did; brush around the model, and then insert a sharp instrument through the holes in the bottom of the flask to allow the steam to pass out, then lift out the model and replace any sand that might be removed by the drawing of the model, then set the upper part or ring of the model firmly to its place and pour in the metal and allow it to cool. Then remove the ring, take out the model, attend to any defects that may arise from pouring the metal, set the cast on a bench, model upward, pin a slip of thick brown paper around the cast, pour the lead inside of the paper (the paper is strong enough to hold the lead without the support of sand) remove the paper and the cast and die are complete.

By this method the most difficult casts can be made with the use of about a handful of sand, and with much less labor than by the ordinary method.

THE "PYROXYLINE" BASE FOR ARTIFICIAL DENTURES

The material is cotton fibre, decomposed with ether. It is not explosive, but combustible at about three hundred degrees Fahrenheit. Hence its name, Pyroxyline. It has the strength, texture, and appearance of

translucent horn ; but is more compressible. It is not at all affected by the secretions of the mouth. Raised or pressed between dies at a sissing heat, under a severe pressure, it readily takes and retains the form of the dies. Parts or pieces are readily united by applying to surfaces in contact, ether of the proper strength. If the ether be pure (as is Squibs'), one-third alcohol must be used. All other is uncertain, and is to be tested before trusted. To unite the teeth, filings from the plate, or other like material, are used as a solder ; and in all cases the eye must witness an actual solution ; the grains or filings must be lost, and a homogeneous lustrous appearance taken on.

But this material, being wholly or partially dissolved, shrinks more than an hundred per cent. in drying. Hence its manipulation throughout, must be treated with reference to this fact. Properly manipulated, its shrinkage is made useful instead of hurtful. The plate never tarnishes, nor will the filings, if the following rules be well observed :

First. The filings must be clean, fine, and free from all admixture, except a very little vermilion.

Second. They must be thoroughly dissolved, so as to assume a clear, translucent and waxy appearance.

Third. They must be very thoroughly packed or pressed together, while setting or hardening, to prevent porosity.

Fourth. The piece must never be put in the mouth, or in water, until the ether is entirely dried out, by a heat equal to boiling water, continued for at least half an hour, after the case is otherwise ready for the mouth. With these precautions, the secretions of the mouth produce no change, except a very slight but agreeable change in the color, leaving a beautiful golden hue, and a clear and high polish. The Pyroxyline acquires additional solidity and strength for six months.

The plates being supplied, well seasoned, they have only to be raised with dies, as are metallic plates, but always with a screw power, never by blows. The male die should be zinc, its counterpart lead.

The impression being taken and the teeth selected, the first thing is to back them up, by putting a quantity of filings on and about the pins ; then dissolve them thoroughly with ether ; let them dry for a half hour or more ; see that the heads of the pins are uncovered, that the material may shrink around the necks of the pins. Use only teeth with good necks and heads.

Second. The teeth being thus backed up, may be ground and articulated. When articulated and set to wax, as upon metallic plates, then remove all wax from the outside, wash the plate with alcohol ; scratch serrate, or furrow the surface wherever the filings are to attach. Then put a thin coat of filings *outside* the teeth ; dissolve them well with ether

After a few minutes add more filings, and dissolve them. After filling up to your satisfaction upon the outside of the teeth, put up the case in plaster just as for soldering, only be more careful to carry the plaster over the cutting surfaces of the teeth, to hold them very fast in all directions; and let the plaster cover the inside of the plate quite up to where your filings are to cover it, to prevent the springing of the plate. Always put up your teeth on a true cast of the mouth, and keep them cramped or well fastened to it till the case is put in the mouth.

Third. You will now remove the wax, clean and serrate, or furrow the plate; then put a thin coat of filings under the teeth and over the plate as far as you wish them to extend when finished. Wet plentifully and constantly with ether until they are thoroughly dissolved and well united to the plate. Be careful in putting on the first filings, to press them before wetting, and also after partially drying, very thoroughly down to and under the blocks or teeth, and in each succeeding application. repeat with force this pressure. Be sure to make all solid under and around the teeth. The first coat being dry, add another, and yet another, until you have filled up to your pleasure, allowing each coat to dry by itself, and subjecting each to hard pressure. Be careful to keep a space between the plate and teeth open until the finishing coat, and also, do not unite the blocks or teeth, till the finishing coat is put on; so that the material may shrink toward the centre and around the pins of each block, and also shrink to the plate without drawing in the teeth. Continue hard pressure as long as you can produce any effect; be sure and make all solid.

All done as above, remove the plaster. This may be done by cutting down to the teeth in the centre of the arch. Each side will thus pry off, leaving the teeth on the original cast. Now fill up the outside, and add another coat of clean, fine, properly colored filings; attend to all imperfections; burnish with a heavy hand all the filings; brush and finish up with the pumice and whitening. Then clamp or screw your case fast to the original cast, to remain until called for. The plate can be fitted to the mouth with pliers just as a metallic plate. It will be seen that in every step of the process of manipulations, reference is had to the shrinking tendencies of the material:

First. Hence, the plates are got up and submitted to a ten tons pressure, and left to season for weeks before they are put into the market.

Second. When raised or put up by the Dentist, they should be pressed, and for a time remain under the pressure of heated dies.

Third. When finished and ready for the mouth, they should be submitted to a heat, equal to boiling water, for at least a half hour, to dissipate all remains of ether and shrinkage.

Fourth. The filings are first put upon the teeth and pins, in order to dry and shrink to the pins and not from them.

Fifth. The filings we first put upon the *outside*, that they may shrink up to and around the teeth, and that the inside may reach to and shrink together.

Sixth. The filings are to be hard pushed and parted inside, so as to unite them with the outside, and make all solid.

Seventh. The filings are to be kept cut off from the base inside, and also the blocks kept separate, until well dried, so as to prevent drawing the teeth out of place.

Eighth. A piece should never be put in the mouth, until after being thoroughly dried and free of all taste and smell of ether. Thus there will be no change in the mouth.

For under sets, it is necessary to have the plate in a large sheet, to be cut to the case. And to prevent the danger of springing or drawing together, a very narrow plate of silver should be raised and put over the Pyroxyline plate, under the teeth, not so wide but the filings will entirely cover it and hold it fast. This gives the most perfect under set ever made, all our previous views of weight notwithstanding.

A strict adherence to the above instructions, will prevent all difficulties of manipulation.

PROCEEDINGS OF DENTAL SOCIETIES.

ANNUAL MEETING OF THE 7TH AND 8TH DISTRICTS SOCIETY OF THE STATE OF NEW YORK.

REPORTED BY C. S. CHITTENDEN, L.D.S.

The Second Annual Meeting of these combined Societies was convened in the Council Chamber of the City of Rochester, on Tuesday, the 25th of October; the President, Dr. L. D. Walter, in the chair.

The first of the special topics for discussion was then taken up, viz:—
“Secondary Syphilis and its effect upon the osseous system.” Dr. J. F. Harvey, essayist. In his absence, his essay was read by the Secretary.

Dr. Bennett said that the form of syphilis which was of most importance to be understood by the dentist, was the tertiary, which attacks the osseous system. Primary syphilis is chancre, secondary syphilis is the ulceration, and tertiary syphilis is the destructive stage of the disease.

He had seen a skull affected by the tertiary form of this disease which was like a honey comb. As dentists, we are not called on to cure this disease, but to repair and sustain those parts which have been destroyed

by it. Dr. Whitney said that the subject is of more importance to the dentist than Dr. Bennett would have us believe. He thought it was the duty of every dentist to be prepared to treat the disease when he meets it and thus prevent the necessity for the replacement of lost parts.

The hour for adjourning having arrived, the discussion was closed.

Afternoon. Dr. French's essay on the "Filling of Fangs; and Alveolar Abscess," being the next subject on the programme, it was called up, when he read a very interesting paper on the subject.

Dr. Bennett, omitting the first part of the subject, said as follows, viz: In order to the proper understanding of the mode of treatment of this disease we must first know what it is. Alveolar abscess is inflammation which has passed the adhesive stage. It is a breaking down, a disintegration of tissue. Plasma is thrown out, but from a low diathesis, or a lack of vitality, or a continued irritating cause, the tissue cells are not vivified. It commonly differs from ulcerous abscesses in that the disintegration does not spread to a discharging healthy tissue. If it reaches the gangrenous stage it is commonly called by a different name. It is by means of inflammation that nature carries on the reparative process, but it must not pass beyond the adhesive stage. Then plasma is deposited, and, if the circumstances be favourable, it is built up into tissue cells. What we wish to do in alveolar abscess is to establish a clear line of demarcation between healthy and unhealthy tissue.

To destroy and obliterate the half broken down cells, and leave a healthy surface to work upon. First, then, cleanse completely from pus, that you may get at the diseased surface. This may be done by thoroughly syringing with tepid water. Next cauterise every part of the diseased spot. This may be done with any escharotic. If the abscess points through the gums I commonly use pure creosote, forcing it through the tooth and out through the fistulous opening; sometimes I use a solution of nitrate of silver. When there is no fistulous opening, the final cure may demand more time.

Force the cauterant as far up as possible, and leave a loose pledget of cotton in the tooth cavity to retain it, depending upon absorption and capillary attraction to carry the remedy where it is needed. When the surface is thoroughly cauterised, little more will, in ordinary cases, be needed. Inflammation will again commence the reparative process. If the irritating cause be removed it will not probably again pass the adhesive stage, and a cure will quickly be effected. Some demulcent preparation may be needed, and the quicker the root of the tooth is filled the better; but foreign substances do not intrude to excite new complications. When the practitioner once thoroughly understands inflammation, the treatment of what is called alveolar abscess is a very simple

matter, unless it be in some exceptional cases of impaired vitality. But if nature has not sufficient force at hand to build up waste places she must be reinforced by constitutional treatment. Sometimes the foramen of the tooth will be found to be sealed up, when prompt measures must be taken to open it that the seat of disease may be reached.

Alveolar abscess presupposes the death of the pulp and nerve. Such a violent inflammation of the investing membrane as precedes this disease, it seems to me, would be amply sufficient to produce the death of the pulp, if it be not already lifeless. But its, at least, most common cause is the irritation of what becomes a foreign substance, namely, a dead pulp.

If a sliver be thrust into living muscular tissue, mother nature commences the process of its removal by causing violent inflammation, which rapidly reaches the suppurative stage. The tissue cells immediately contiguous to the foreign substance are broken down and changed into pus, and with this sloughing off the sliver is removed. Completely analogous to this is alveolar abscess.

Sloughing commences, that with the dead tissue thrown off the irritating substance may be eliminated. The dead pulp and nerve in the one case answers to the sliver in the other. In both is the treatment the same, only that it is complicated in the one case by the confined position of the irritant. Remove the irritating cause, and in each nature will commonly effect its own cure.

Dr. Gifford said, Dr. French has told us that we never find an abscess on a tooth unless the nerve is dead, but he had met more than one case of abscess over teeth in which he had found the nerve alive, the teeth being quite sor. to the touch, and considerably elongated.

In reply to a question he said he had not been able to find any connection between these living nerves and the fistulous openings.

Dr. Southwith gave a very interesting description of his method of treating abscess and filling roots, by means of diagrams on the black board.

Dr. Daboll spoke of a tooth over which an abscess had formed, after it had been filled for years. As the tooth had become painful he removed the filling and proceeded to treat it in the usual way, but found that after each dressing more violent pain ensued, and he only succeeded after drilling through the root and enlarging the foramen. He did not think there are many cases of abscess which cannot be cured if they can be got at.

Dr. Holmes had seen many instances of necrosis of the ends of the roots, or of the alveolus at that point. He treats ordinary abscess as has been described by others. In filling roots he dips a piece of gold into osteo plastic before inserting it; thinks the oxy-chlo. assists the gold in closing the foramen; has never been successful with gold alone. He prepares the gold in the same manner as if it were to be used alone, then

mixes the oxy-chlor. quite soft, and dips each piece of gold into it before insertion.

The next subject was "The treatment and filling of the deciduous teeth and the first permanent molars."—Dr. Southwick, the essayist, said he was not prepared with an essay, but would be happy to offer a few remarks on the subject. In the first place, then, he would never extract these teeth unless there was danger of necrosis. They were placed in the jaws of children for a purpose, and he was unwilling to remove them until they had performed the duty for which they were intended. He had recently seen a child whose cuspids had been removed at an early age, and when the bicuspid came in they stood next to the lateral incisors, leaving no room at all for the cuspids.

Dr. Daboll thought the maintaining of the deciduous teeth in the jaw until the permanent ones were ready to take their places, was of the greatest importance. If removed sooner the jaw would contract so much that there would not be room enough for the permanent set.

He tells parents that they should nurse aching teeth carefully instead of having them extracted. Always fills them if possible and uses for this purpose gutta percha, and seldom has any trouble.

Dr. Barrett said there were no two opinions in regard to the necessity and desirability of preserving the deciduous teeth, but some children have such excitable, nervous temperaments that they cannot bear the pain of tooth ache, and when he meets with such cases he extracts. Again, he has met children with the deciduous teeth, and the gums about them, so much diseased that there was danger of mischief being done to the permanent organs: in such cases he would extract.

Dr. McCall fills the deciduous teeth with some plastic filling, and saves them till the new ones come.

Dr. Southwick treats them by any ordinary means to allay the pain of aching teeth, but always leaves the tooth substance in the jaw. He would, in some cases, fill the sixth year molars, but often extracts them, but not till the child is past its tenth year, and not before the second molar is emptied. But few mouths are large enough to contain the three molars, and so he would prefer to sacrifice the first, and thus leave room for the wisdom tooth, which, in most cases would be as useful as any other.

Dr. McCall said we were not careful enough about teaching parents in regard to these sixth year molars. If we were we should save children from a vast amount of suffering.

Dr. Southwick had endeavoured to do his duty in this matter, but so far he found that parents had entirely disregarded his teaching, and he was getting tired of wasting his breath.

Dr. Whitney has always been in the habit of saving the deciduous teeth as long as possible. When children are brought with a throbbing pain of the nerve, he punctures it and lets out a drop of blood and then treats as in ordinary cases.

The next subject, "The Gums, their Diseases and Treatment," was passed over as the essayist, Dr. Fowler, was not prepared to read one.

SECOND DAY.

Clinics were held by Dr. Walter and M. E. Smith, from 8 to 11 A. M. Dr. Walter described his method of filling with cylinders. At 12 the meeting was called to order to listen to an essay on "Practical Hints on Mechanical Dentistry," by Dr. R. G. Snow.

Dr. Whitney advocated the putting in of pivot teeth and preserving the natural roots as long as possible. He thought that the face rarely retained its natural expression after the extraction of the roots.

Dr. Walter objected to the leaving of the roots in the mouth, as it is so very difficult to make artificial teeth over them, that will answer a good purpose. Adjourned.

2 P. M. Dr. Miller read a valuable paper on "Miscellaneous subjects," which was well received, after which several members of the society spoke of the use of mercurius vivus in incipient periostitis, occupying the time till 4 o'clock, the hour fixed for adjourning. During the meeting opportunities were given to quite a number of gentlemen to exhibit new inventions and appliances connected with dentistry. This was a pleasing and profitable feature of the proceedings.

An hour was given to Dr. Brockway of Albany to explain his method of inserting teeth on the Pyroxline base. He stated that he had obtained a patent for it, both in the States and Canada, and that he was then ready to dispose of office rights to use the material at \$10, the same as he had done to others. He also stated that he had made very great improvements, both in the material and manner of working it. Dr. Bristol asked whether those who had already paid the \$10 would be allowed to use the improvements without paying anything more, and whether each Licentiate would not be liable, under some peculiar circumstances of the Patent Laws, to have his books overhauled from time to time to see how many sets of teeth he had made, in order to compel each to pay a Royalty. Dr. Bristol stated further that he was one of the first to take hold of rubber and introduce it, and had been put to a great deal of trouble, annoyance and expense by those holding the different rubber patents, and he was unwilling to assist in introducing a new *patent* material unless some positive guarantee could be given that the Pyroxylene Co. would not serve their Licentiates as shabbily as the Rubber Co. had done. Dr.

Brockway would not say anything positive in the matter. [It is greatly to be hoped that we, in Canada, are not to be put to such exceedingly great annoyance in the use of that base as our brethren in the States have been in using rubber.]

Dr. Moffatt, of Harrisburgh, exhibited his adamantine base ; Dr. Kelsey his new vulcanizer, (*see advertisement*) ; Dr. Brown, of Buffalo, a porcelaine lined retort for making nitrous oxide gas ; Dr. Carpenter exhibited and explained Greens Pneumatic Burring Engine and Automatic Plugger ; and Dr. Hopkins a Gas Regulator, by which an even temperature can be maintained for hours without any attention. Dr. Loomis sent some account of his manner of casting aluminous plates, which was read by the Secretary. Altogether, it was one of the best if not *the* best meeting of the profession ever held in that section of the country.

EPITOME OF THE PROCEEDINGS OF FOREIGN SOCIETIES.

ODONTOGRAPHIC SOCIETY OF PENNSYLVANIA.—SEP. 8TH. DR. TRUMAN.—We have all noticed the liability of approximal surfaces to decay, especially of the bicuspids, and generally agree that this is due to their peculiar shape,—the crowns being so much larger than the necks, leaving a triangular space or pocket between them, in which the food lodges, and decomposing generates destructive agents. Prof. Arthur proposes to remedy this by changing the natural (as usual) shape of the teeth, removing the overhanging portion of the crown,—leaving a slight and, easily cleaned space between them ; and is so confident of success as to recommend this operation in teeth unaffected by caries, if the condition of the other teeth leads us to fear any special liability to trouble at this point.

On the other hand, Dr. Perry contends that we should endeavor to *maintain* the natural shape of the tooth, and restore with contour fillings any portion lost by decay,—even *exaggerating* their peculiar shape by building out the crowns so that they may touch at one point, and thus keep them separate at the necks ; and make this pocket as large as possible, trusting to the filling extending below the point of danger,—replacing the easily-injured tooth by a more resistant material. I cannot but think, while the idea may be plausible in theory ; that it will not prove reliable in practice ; yet it is well worthy of consideration. We are commanded to prove all things. In matters of this kind we must be guided by our own experience,—we do not all work or see alike, nor is it to be expected beings so entirely different, so richly endowed with reasoning powers, should do so. We aim to preserve the teeth, and make them, as useful and *beautiful* as possible, and it is our duty to make use of those

means which *we*, individually, in the exercise of our own judgments think best.

From experience, I have been led to regard contour fillings as weak and unreliable. That it is possible to make the gold solid enough to hold its own there is no doubt; but exposed as they are, presenting more or less leverage to the force used in mastication, it is extremely difficult to anchor them with sufficient firmness to effectually and completely resist it. They are very often found, even after a short time, slightly dislodged, with a little space between the tooth and the filling, and may remain so a long time: their condition not being suspected until decay has made extensive progress; or, especially in bicuspid, where the filling extended to the gum, decay will set in below it, the overhanging portion concealing it until irreparable injury has been done.

When decay has set in, caused by the difficulty of keeping the teeth clean and free from accumulations of food, owing to the peculiar shape, it seems much more reasonable to remove, as far as possible, the first cause of the mischief while repairing the injury.

The food, packing between the teeth thus separated, is very often an annoyance, but if it leads the patient to appreciate a well-used toothpick, the good will certainly overbalance the evil.

In several cases either the food or the toothpick had caused considerable periosteal inflammation; the trouble was relieved by making the V-shaped space more obtuse.

We speak of self-cleansing surfaces, but must remember that teeth will not clean themselves. We may assist, but cannot, by the exercise of any art, expect to relieve our patients of their part of the work. The constant and faithful use of toothpick and brush, the exercise of care and attention is the price of sound teeth. They may deceive the poor dentist, but Madame Nature never fails to visit with promised and deserved punishment any infraction of her commands. A good honest toothache is very often an excellent "*educator*."

D. A. Eisenbrey recalls the case of three sisters, whose teeth made a fine display of such fillings, performed by the same operator, and who, unfortunately for them and the operator, had to replace them every year for three years, notwithstanding the superiority of such a system.

He (Dr. E.) replaced them one year ago, but not in the same manner as heretofore. He made free separations up to the necks of the teeth, but not through to the gums, and in such a manner that after the teeth were filled, it would protect the filling, and not the filling the tooth. In the former case the tooth will be preserved by the filling; while in the latter the filling will be the means of fracturing and breaking the tooth, but not preserving it as was intended.

The majority of teeth are in a sound and healthy condition, but, owing to the close and crowded position in the mouth, and the impossibility at most of keeping them clean, their substance soon breaks down, from the presence of decomposed food and the constant abration occasioned by mastication.

When we find out the cause of a disease in any portion of our body, we remove it, and then the organ will regain its normal condition, if the destruction is not too great. Who, in the name of reason, when having broken-down teeth under his care, and knowing the cause of such a state, will put them in the same condition as before to preserve them? The cases that will admit of contour fillings and do well are very few.

As a rule, he prefers to have the teeth touch each other at a point near the gums, making the separation straight through from the labial and buccal to the palatine or lingual surfaces, rather than to separate entirely from the palatine, and let the whole buccal surfaces touch, making a double V-shaped face. He thought that when teeth were so treated and filled they would be preserved for years.

Prof. Stellwagen has not changed his opinion of the practice of removing superficial caries. Daily the conviction as to its efficacy was confirmed, and yet he could not lay down rules which should govern all cases. He regretted to see the disposition in his profession to treat men as if they were mere machines, without the power of judging for themselves.

The difference of our patients necessitates the most careful choice of means for cure; and while in some cases the denudation of the dentine by filing would be malpractice, in others it is the best treatment at present known.

Dr. Gilmour had had occasion to obtund sensitiveness in dentine as the result of very moderate separation, which in other teeth would have given no inconvenience, and would even admit of a freer use of the chisel without discomfort to the patient either during or after the separation; would follow no system of separating merely as mechanical effort, but deviated whenever judgment would suggest a change.

He expressed himself as a firm believer in the separating of the oral teeth by chiseling the palatine faces—preserving, however, all the labo-approximal contour of the teeth.

Dr. Neall read a paper on "Alkalies and Alkaline Saliva."

Prof. Stellwagen occasionally met with cases where the dentine, after exposure to Alkaline saliva, appeared to have lost its organized materials, and a white, friable or chalk-like residue remained. He did not think the enamel appreciably affected by such alkalies as are found in the mouth,—no doubt due to the heavy percentage (95 to 99) of inorganic matter in it. The layer of dentine, with its ramifications of tubuli, and

the membrane immediately under the enamel, are largely made up from the organic kingdom; and there is but little doubt that strong alkalies, admitted to this through fissures or openings in the latter covering, would unite with and wash out much of the animal matter. In such cases the enamel, losing its natural support, would be readily broken down by mechanical action.

When the saliva is found to be readily drawn out in ropes or strings, offensive in odor and alkaline in reaction, with the gums tumid and flabby, he had prescribed an acid mouth-wash recommended by Prof. Garretson; its use gave happy results, without any sign of injury. Subsequent trials of the same stimulants, without the aromatic sulphuric acid, he thought equally satisfactory, and he now rarely made use of it.

It is asserted by some authorities that the vegetable acids produce an alkaline constitutional effect, and pure lemon juice is a well-known remedy for rheumatism, which disease the antacids will relieve. If this be true, it is probable that the mineral acids will operate best to change the oral secretions.

Dr. Bonwill. The use of the galvanic battery in sensitive dentine has been absorbing some of my time since March. I have made use of it in about forty cases, and, with the exception of a few children, I have had most gratifying results. These cases were intelligent patients; and after trying the current from first one pole, then the other, and in various ways endeavoring to cheat them,—one by detaching so that no current could pass,—I found that, whether anæsthesia was produced or not, one thing was certain,—the patient would not allow the excavation to be continued without the direct application. I noticed that after the current had been passing for a few minutes through the excavator, and then breaking the circuit, the dentine was the same as when the current was passing, but remained so only a few moments, returning to more than its former sensitiveness. As soon as the circuit was completed, after holding the excavator for a few minutes to the tooth, the anæsthesia was again complete. This would seem to prove that electricity is a temporary local anæsthetic, or why should the obtunding still remain after breaking the currents?

No subsequent ill effects have been noticed. Until I have made further research, I prefer to say no more as to its application, as it is one of those subtle agents that cannot be handled by the majority of practitioners without explicit rules. The general condemnation of its use in extracting suggests that I be prudent in what I may say at this time. So soon as other cases may be experimented upon, proving its further practical results, I shall make it known to the dental world.

Prof. Stollwagen. If an automatic mallet can be made that will prevent the supposed necessity of exposing the infirmities of patients to

third parties, and at the same time relieve the weak or sickly operator from the expenditure of force in filling, it would be well.

Patients are no less entitled to privacy during dental than medical treatment. It is often necessary for the practitioner to hold strictly to the Hippocratic oath, in order to gain that thorough knowledge of the general health of the patient, which is essential for the cure and prevention of disease.

Prof. Stellwagen had used the galvanic current upon teeth, and found that it caused uneasy or painful sensations, but he expressed a determination to try it again.*

Seriously, he thought the success attending the use of galvanism for sensitive dentine was owing to the courage instilled by the mystery, and the light, quick cuts with sharp instruments, together with the general tenderness of the operator.

Dr. Gilmour spoke of the relative liability of teeth to discolor from given causes. 1st. Superior centrals from blows. 2nd. Superior laterals from infiltrated putrescence as the result of pulps dying from thermal changes. 3d. Bicuspid, same cause as laterals, with the addition of local stains from amalgam fillings;—laterals, however, being the most frequent of all. He also mentioned the air-drying method as practiced by Dr. Flagg and himself in ordinary daily operations. He thought the term *bleaching* rather obsolete, as the use of medical agents was displaced by the air-drying process under the rubber dam, which proved very satisfactory after two years' testing.—*Cosmos*.

* He states that he has since tested with both poles and different degrees of strength, during the removal of sensitive dentine from the teeth of patients. Three (physicians of experience and skill) pronounced it to be a decided addition of pain or discomfort to that of cutting; one patient rather favored it, as he had a "great respect for electricity;" and the fifth, a hysterical young lady, seemed much pleased with the noise of the machine, which diverted her attention from the operation, leaving her unconscious of the pain. There was no difference of expression when the instrument was attached to or disconnected from the battery, so long as she was allowed to hold the handle and listen to the buzzing. Two others liked it; and one (a nervous lady) thought it possibly relieved the pain, but was soon tired of holding the handle.

There did not seem to be any advantage gained by connecting the instrument with the battery, as the application of the current to the cheek or hands was quite as effective.

SELECTED ARTICLES.

ON NITROUS OXIDE.

We publish the following letter, which is a type of many which have been received the past few years :

TO THE EDITOR OF THE DENTAL TIMES :

DEAR SIR :—I have recently determined to administer nitrous oxide, and have procured a large gasometer, capable of holding 40 gallons of gas over a corresponding quantity of water. I have given the gas several times, but am not quite satisfied with the results. I have administered the gas from a seven-gallon rubber bag with a plain mouthpiece—the patient breathing from and into the bag. I have in many cases had the following symptoms: blueness of the lips, lividity of the countenance, muscular twitching, irregular respiration, and an appearance as if the patient was about to have a convulsion. This condition has in all cases^s come on suddenly, and, upon removal of the bag, the person has quickly recovered consciousness, and has appeared to suffer no bad after-effects—except that in a few cases there has been a desire on the part of the patient to take every few moments a long breath, as if the lungs were not able to take, in natural respirations, the requisite quantity of atmospheric air. This has, however, passed off in an hour or so after the administration of the gas. In one case the patient, a strong healthy woman of 28 years of age, went from my office well, or, at least, apparently so, but was taken the same night with congestion of the brain—so pronounced by her physician—and continued very ill for some weeks; recovered eventually, but still suffers with “low spirits and headache:” lays her sickness and unpleasant feelings “to the gas.” I would remark that the gas used, in all cases was *fresh*, and washed according to your advice in your work* and your oral teachings. My object in addressing you is, to ask you if you had met with such an experience. 1st. So far as symptoms detailed during time of administration. 2d. Have you noticed any unpleasant results immediately after its exhibition? 3d. Have you met with, or have you heard of any bad results following the administration of gas, say several hours or even days after, that might be reasonably traced to the ill-effects of nitrous oxide? 5th. How long will gas keep useful over water? By answering these questions you will confer a favor, for which I shall tender you my warmest thanks.

Respectfully yours,

We take pleasure in answering the above communication, for it enables us to point out to *many* the reckless manner in which gas is administered—the popular idea being, both by dentists and physicians, that gas is perfectly harmless for any and everybody—one operator alone stating that in “four years,” he had operated on 15,800 patients, which, allowing the average to be four teeth from each individual, would make a sacrifice of 63,200 teeth or roots. But it is not of this wholesale extraction to which we shall now refer, but shall remark, that the selection of cases for the administration of nitrous oxide calls for just as much discrimination as is required for the administration of sulphuric ether. And the only advantage which nitrous oxide possesses over ether is, that an anæsthetic condition can be more quickly produced by the first named, and that, when properly exhibited, nitrous oxide is more rapidly eliminated, and hence is well adapted for minor surgical operations. In reply to our correspondent's first query we would state, that we have repeatedly seen the symptoms so accurately described by him as occurring to his patients at time of administration, and though not willing to acknowledge to a constitutional timidity, yet can truly say, that we have never witnessed them without alarm; for such symptoms are sure indications of a carbonized condition of the blood, an unfavorable influence on the medulla oblongata and nerves controlling respiration, and a like “reflex” influence on the cerebro spinal nerves and nerves of the great sympathetic system. Such involuntary movements, happily described by our correspondent “as an appearance as if the patient was going to have a convulsion,” are the efforts made by nature to arrest, modify, or give evidence of the presence of some poison or noxious agent that, if not quickly removed, will overthrow vital force. Fortunately, the alarming symptoms are so marked that the operator quickly removes the bag, and while it may be said the patient is on the brink of the grave the teeth are extracted. This assertion may to some seem extravagant, but we do not doubt that *two minutes* of continued administration of the gas, to a person exhibiting such appearances, would induce a fatal termination. Precisely the same results are induced upon the inferior animals, and if continued beyond this point death ensues. But let us see what is the cause of these untoward symptoms. Nitrous oxide, unadulterated with air, a powerful supporter of combustion, is rapidly inhaled into the pulmonary air cells, through which absorption takes place into the blood with great facility. This blood, surcharged with this great combustible agent, is carried over the system, and, as a consequence, combustion occurs between the remote tissues and nitrous oxide conveyed to the immediate neighborhood by the blood, carbonic acid gas being the result, which is taken up and returned to the lungs, where, if no *valved mouthpiece* is used, it is carried by the exhalation.

tions back into the bag to vitiate its contents, and cause the pulmonary air cells to contain, in the course of a few inspirations, a poison gas, a mixture of nitrous oxide and carbonic acid gases, the blood at each inspiration becoming more and more carbonized. While, then, these symptoms may result, even when gas is properly administered from a valved inhaler, allowing none of the respiratory product to enter the receptacle from which gas is inhaled, we have yet, in an extended experience, to meet with such symptoms, and believe *that they are mainly the result of breathing back and forth into small rubber bags*—carbonization of the blood occurring from interference with the endosmotic process in the lungs.

The most bigoted man on the subject of nitrous oxide with whom we ever conversed was an eminent physician of New Jersey, who saw a patient (his wife) take gas at one of the dental slaughter-houses which flourish—to our shame be it said—in all the cities and large towns from one end of the land to the other. This gentleman remarked, that he had never seen one apparently so near death and yet recover. The same lady, on another occasion, took gas from a large gasometer, breathing easily through a tube and valved inhaler, no unpleasant symptoms being present—the countenance, color of lips, expression of eye and hue of skin, respiration and circulation being continuously normal.

We answer question number two by stating, that the involuntary long breaths every few moments were only nature's efforts to overcome excessive waste of parts engaged in respiratory movements, and to supply proper "residuary" air to the pulmonary air cells; or it might be due to the continued presence of an irritant acting by reflex nervous action upon the respiratory nerves. This condition was mainly due to *improper* administration of gas—the person breathing their own exhalations instead of pure nitrous oxide. But there is one objection made by some to the use of the valved inhaler, which we consider should have no weight when safety, comfort and cleanliness call for such a method of exhibition; it is that "patients breathe more gas," and "do not stay so long in a state of narcotism, hence have to administer gas over and over," which is true; but if safety is not to be considered carbonic acid gas might be used, as it is just as rapid in producing narcotism, and the effects would be continued longer than when diluted with nitrous oxide.

In reply to question No. 3 we would state, that we have heard of many cases of sickness following the administration of nitrous oxide. Several such cases have been published. We quote one.

"*Coma, from Nitrous Oxide.*—BY PROF. THOMAS, Bellevue Hospital, Dec. 11th, 1869.—E. McLester, 19, domestic, Ireland, admitted to Hospital 10th December. She was in perfect health up to Tuesday, 7th

December, when she took nitrous oxide, from the hands of a dentist, previous to having a tooth pulled. She has been comatose ever since, says there is nothing the matter, but has a distinct remembrance that she had or was about to have a tooth removed, and, from repeated exclamations of "my tooth," seems yet to suffer from it. In answer to questions as to where she is, she replies "at my mother's." She presents a robust appearance, remains quiet, with a constant tendency to lapse into unconsciousness; from which a considerable amount of shaking is necessary to arouse her. Questions have to be repeated, and elicit imperfect and unsatisfactory answers. The pulse is perfectly natural. She had double strabismus, which has now disappeared. The face gave the impression of being flushed; but she seemed naturally florid. *Treatment*.—Let her alone until she recovers. I have known a case in which the coma lasted four days. This patient went out perfectly well a few days afterwards."—*Medical Gazette*.

[Such cases do not always come out of it when left alone. Miss D. Smith informs me that a lady, at Belvidere, took gas a few months ago, who was affected in a similar manner, but died on the 3d or 4th day. The dentist who administered it took up his bed and walked, and has not been heard from since. The dental and medical journals relate numerous similar cases. In view of these facts we cannot credit the sweeping statements of Dr. Colton, that his association has administered it in 75,000 cases without accident.]—*The Dental and Medical Journal*.

We would further remark, that we are keeping a record of cases, well authenticated and markedly significant, of bad results from administration of nitrous oxide, and will thank our friends in different sections of the country to forward such cases to our address, that they may (without giving publicity to names of patient or operator) be published to warn the dental public against the great error that nitrous oxide can be given to any and everybody. And doubtless many would be surprised at what evidence has already been accumulated.

To question No. 5 we would reply, that we have repeatedly given gas six weeks old; and on this day, September 25th, have given gas twice from a gasometer filled August 5th—narcotism being in both cases readily and satisfactorily induced in less than two minutes. But gas will not keep this long unless the gasometer is perfectly air-tight, and the water should not be removed from the gasometer, unless gas is made very frequently, oftener than once in one or two months. We have answered our correspondent at length, though we have not touched upon points which we consider of vital importance. From an extended acquaintance and correspondence with dentists, we believe the rule is to use the rubber-bag and old-fashioned mouthpiece, and that valved inhalers are the exception.

INSERTING RUBBER DAM.

That it is the rule to give gas to everybody, young or old, sick or well ; but we would urge the most careful discrimination in all cases, rejecting those where doubt exists or where other anæsthetics would be contra-indicated, adopting the remark which has been made of mercury—" That it is a two-edged sword, capable of doing a great deal of good or a great deal of harm."—*Dental Times*.

G. T. B.

INSERTING RUBBER DAM.

BY EDWARD J. KING, DECATUR, MICH.

Having traced several cases of absorption of the alveolus to injury done the dental and alveolo-dental periosteum by heroic wedging and ligatures in the application of rubber dam, I was induced to seek for some less difficult and severe method. About a year since, the plan I am about to describe suggested itself to my mind, and I have used it up to this time with increasing satisfaction to myself and patients. I can place it *in situ* in from one to three minutes, without the aid of an assistant. Make two perforations in the rubber about the usual size and distance apart, if the cavity to be filled is an approximal one; if on the crown, one only is needed. Prepare two soft silver or hickory pins (I prefer silver wire, flattened to the required thickness), of sufficient length to pass between the teeth and project three-sixteenths of an inch on each side. If the cavity is on the grinding surface, the pins are passed through the interstices, close to the gum of the tooth to be filled. The rubber is then drawn on to, say, the lingual point of one of the pins. Next draw it *over* the interstice and insert the labial point; treat the second pin in the same way, both pins and the tooth now being inclosed in the same perforation.

When the cavity is on the approximal surface, it is necessary to include two teeth, with two perforations, and a *wedge* placed below the cavity. The ends of the pins should be nicely rounded to prevent their cutting the rubber.—*Cosmos*.

The following extracts from valuable papers by two eminent Dentists, one of Chicago, the other of New York, will be interesting. We leave our readers to form their own conclusions.

HEAVY AND LIGHT FOILS.

By G. H. Cushing, D.D.S., Chicago.

To reconcile the claims of this great revolution in practice with the principles of philosophy will be to make clear to our minds the proposition that foil of the thickness of No. 60 is better than No. 2 for the purpose

of filling teeth, that it is equally manageable, is applicable in all cases where No. 2 was formerly considered to be almost the only thing that could be used, that it is more adhesive, welding more perfectly, with less force, and making a more solid filling. I think this can be established. In order to do this, we must go back to the examination of how No. 2, or other low numbers of foil are manipulated, and in doing this, I think we can easily explain away a fallacy which has prevailed regarding the use of low numbers of foil generally.

The low numbers of adhesive foil are used by either rolling it into pellets of various sizes, into ribbons and ropes of varying diameters and lengths, or folded upon itself with more or less irregularity, into strips and blocks. I think it may be safely stated that the foil, as it is generally prepared for use, presents a mass folded upon itself more or less irregularly, varying from ten to twenty thicknesses of the original foil, according to the sized pellet, strip or block. Now, when we use this are we not practically using Nos- 20, 40 or 60? In fact, we are using a heavier foil than the number of folds represents, for it is so folded upon itself in such irregular shape that presents an endless succession of surfaces and angles, braced in every conceivable direction, one against the other, rendering the mass more resisting than a solid sheet would be, which represented the number of folds we have in our pellet.

Herein, I think, lies the fallacy which has prevented many from seeing anything reasonable in the claims made for the heavy foils, viz: in ignoring the fact that we have practically been using heavy foils, though composed of a succession of layers of lighter numbers; and I think it must be readily seen that if we can pack twenty layers of No. 2 or 3 satisfactorily, we can equally well pack a single layer of No. 40 or 60 in the same place, and it certainly is sound philosophy to say that it can be packed more easily and perfectly, for the reasons mentioned before, viz: that in folding the lighter numbers upon themselves, no matter how regularly, we have a largely increased resistance to overcome, and largely multiplied surfaces to weld together.

Now, as it is well known that the less gold is hammered or beaten, the more it retains of the properties of adhesiveness, softness, tenacity and pliancy, I claim that philosophy clearly establishes that the thicker the gold (within certain limits) which can be used, the more perfect will be the welding, and the more solid will be the filling. Thus much for the philosophy sustaining these claims.

Now, to consider briefly what experience teaches concerning the use of heavy foils:

1st. That as high as No. 60, they are applicable in all classes of cases where the mallet can be used, even in the most frail teeth, where the inexperienced in the use of these foils would think they surely could not be used; but experience seems to prove that they are peculiarly adapted for use against frail walls, accommodating themselves to their irregularities with great facility, and requiring but slight force to place them properly, and in fact giving immediate support to the frailest walls, and thereby rendering the operation less difficult and less dangerous.

2d. No. 60 fills retaining points better than any other number, making more certain and solid anchorages than the lighter foils.

3d. They are much more adhesive, and when properly packed must make a stronger as well as a more solid filling, while owing to the peculiar softness, as well as a great adhesiveness of the numbers as high as 60 an upwards, they require really less force to condense them thoroughly, than the numbers from two to ten.

4th. In binding they are invaluable: that is, where the cavity is approximal and the crown compounded, and the approximal portion can be but poorly anchored, as is sometimes necessarily the case, while a good anchorage can be secured in the crown—in such a case, by securing a strip of No. 60 or 120, in the crown, and carrying it over to the approximal portion, the filling can certainly be made more perfectly secure than with light foils.

5th. In building out and restoring the contour, they make vastly stronger operations than anything of the kind done with the lower numbers could possibly make.

6th. They spread laterally, in condensing, to a much greater degree than the light foils; and, finally to sum up in a word their merits, they produce, when properly packed, the most perfect operations which have yet been attained.

With reference to the method of manipulation, it is difficult to write satisfactorily; one observation of an operation would teach more than twenty pages of written instructions, and I will only briefly state some of what I consider the chief points to be closely observed. The foil should not be handled with uncovered fingers; it may be cut into pieces varying from one-fourth to three-fourths of an inch square, or into strips of proper width and length to suit the case. Where easy access is to be had to the cavity, the strips may be used to excellent advantage, condensing each layer across the whole surface, and folding the strip upon itself, thus saving time. The retaining points should be carefully filled, and the foil packed carefully from one retaining point to the other, securing and preserving as nearly uniform and plane a surface as possible, and the foil should be carefully condensed at and over the margins of the cavity, layer

by layer. Care should be observed not to allow the foil to become very much crumpled or folded very irregularly upon itself. Rather small points should be used in packing it, as with them less force of malleting is required than with the larger points, while in finishing the operation of packing, great care should be observed to condense the entire surface thoroughly.

It must not be supposed that operations are greatly facilitated by using the heavy foils. My own experience thus far is, that it requires longer to perform thorough operations with the heavy than with the light foils; but that should not weigh against them when the greater superiority of the operation is considered.

I have thus far spoken chiefly with reference to No. 60 and higher, which I consider as most desirable in a majority of cases, though Nos. 20 and 30 may be used to advantage in large fillings, for the principal part of the operation, as those numbers, when the cavity is favorable, can be packed more rapidly than the higher, while the heavier numbers should be used for the margin and finishing. I would also recommend these numbers to beginners for their experiments, from which they will soon feel their way to the higher grades.

Before concluding what I have to say upon the subject of heavy foils I would remark that since writing this paper I have been using foil of Nos. 30, 60, 120 and 240, which were not hammered at all, but produced by rolling, and they are certainly softer and more manageable than any I have used made by the ordinary practice of beating, and I think more adhesive. They seem to me forcibly to corroborate the statement made in the first part of this paper, that "perfectly pure gold, properly treated and made thin by rolling, possesses the essential properties of an adhesive foil in the highest degree." This foil also possesses the advantage of presenting a dull surface, an advantage which those who have used the heavier bright foils will not fail to appreciate.

In conclusion, I would earnestly commend the heavy foils to all who desire to secure the highest results, feeling confident that if these foils are fairly and properly tried, they will commend themselves far beyond anything that I could say in their favor.

LIGHT vs. HEAVY GOLD FOIL AND CRYSTAL GOLD.

By Frank Albott, D.D.S., New York

I have carefully conducted a series of experiments in the following manner and with the following results: I first had several cavities prepared in steel of precisely the same size, to resemble as nearly as possible cavities in teeth. In order to accomplish this more perfectly, several fine

cuts were made in each with a graver, to represent the cuts of excavators; at the same time they were so arranged that the entire mass of each plug could be removed without marking its surface. This done, gold of the following numbers was then prepared (taking care that the pieces should all be as nearly the same weight as possible), viz: Nos. 2, 3, 4, 5, 6, 10, 20, 30, 40, 60, 120, 240, adhesive foil, and Nos. 3, 4, 5 and 6, soft foil and Watts' crystal gold, No. 1.

An automatic mallet, with the same weight of stroke, and the same point, was used for each operation. The time occupied in condensing each was as follows:

No. 2, adhesive.....	14 minutes.	No. 40, adhesive.....	28 minutes.
" 3, "	14 "	" 60, "	31 "
" 4, "	14 "	" 120, "	35 "
" 5, "	16 "	" 240, "	36 "
" 6, "	17 "	" 3, soft or non-adh....	11½ "
" 10, "	18 "	" 4, "	12 "
" 20, "	21 "	" 5, "	14 "
" 30, "	24 "	" 6, "	16½ "
" 1, Watt's crystal gold.	14 "		

On removing the plugs, after their surfaces were finished, I found that Nos. 3, 4, 5 and 6, non-adhesive foil and the crystal gold plugs all presented the appearance of having been perfectly adapted to the cavities in every particular, while all the other cavities were more or less imperfect, even the very light Nos. 2, 3 and 4 presented innumerable minute openings into the body of the plug, and the fine cuts made by the graver were not perfectly filled, and as the gold increased in thickness, the imperfections increased correspondingly, so that from No. 10 to 240 there was hardly an approximation to adaptability. The cuts of the graver were not filled; every point where the gold was folded in the least an open space was left; in short, they presented an appearance which might very appropriately be called the height of *imperfections*.

The weight of each plug was as follows:

No. 2, adhesive.....	15½ grains.	No. 60, adhesive	13½ grains.
" 3, "	16 "	" 120, "	15 "
" 4, "	15½ "	" 240, "	15 "
" 5, "	16 "	" 3, non-adhesive.....	17 "
" 6, "	16 "	" 4, "	17 "
" 10, "	14½ "	" 5, "	17½ "
" 20, "	14 "	" 6, "	17 "
" 30, "	15 "	" 1, crystal gold.....	14½ "
" 40, "	15 "		

With the above facts before us what becomes of the assertion that with heavy gold "time is saved;" "that more perfect operations are made,"

and "that more in weight can be packed into a cavity than can be of soft or non-adhesive gold of light Nos.?" These questions I leave for the advocates of heavy and crystal gold to answer. In summing up this matter it seems unnecessary to add that the light Nos. of soft foil present decided advantages over any other material experimented with.

1st. It requires about one-third the time under the same circumstances to manipulate them.

2d. Cavities are apparently perfectly sealed with them, while all the others, except crystal gold, present more or less imperfections; and

3d. From fifteen to eighteen per cent more gold in weight is, with the same pressure, packed into a cavity.—*Register*.

BIBLIOGRAPHICAL NOTICES.

TRANSACTIONS OF THE SIXTH ANNUAL SESSION OF THE ILLINOIS STATE DENTAL SOCIETY, MAY 10, 1870.

Through the attention of the indefatigable Secretary, Dr. C. Stoddart Smith, of Springfield, we have received a copy of the above, forming a volume of 112 pages. The several essays and the discussions thereon, bear testimony to the great interest taken in the objects of the society by its members. It is worthy of note by our Canadian societies, and ought to stimulate them to increased action, that this society consists of a few members, and at the session in May had only twelve present; yet those twelve, by each assuming a share, have done great credit to their society and themselves by their associated results.

DICKINSONS DENTAL PLATE REGISTRAR. (*See Advertisement.*)
In the August number of this Journal, (vol. 1) we gave a form of a Laboratory Record, which we found very convenient, but the above is so great an improvement that we would never think of using the home manufactured registrar again. It is an unfortunate fact that the dentist is subject to many petty annoyances and disputes, arising from short memories, both on the part of dentist and patient; and the intervals elapsing between the extraction of teeth, insertion of temporary, then of permanent sets, naturally confuse the memory, and a record such as the above is essential. It is very neatly arranged, giving separate columns for name, date, number of teeth extracted and number to be made, amount

paid, base and price of temporary, time temporary set was made, base, and price of permanent, &c., &c.

It will be interesting as a record of the proceeds of the mechanical as distinct from the operative branch.

EDITORIAL.

A DOMINION FEE BILL.

Several subscribers having requested us to publish a Fee bill adapted to the Dominion, we venture to draw up the accompanying tariff, approximated as near as possible to the fees received by respectable dentists in Hamilton, Toronto, Ottawa, Montreal, Quebec, and Halifax.

We think the profession in Canada generally, should take a decided stand at once, and demand fair remuneration for their services; for there is no question but, that while for some few operations, we are adequately paid, we are very badly paid for the largest portion of our work, and *not paid at all* for services occupying time, which neither physicians nor advocates would render *gratis*. There is no use mincing this matter of fees, and pretending we do not feel the degrading tendency of "cheap dentistry," accompanied, as it invariably is, by inferior work, and discredit upon the craft. Unless the cheap dentists assume to be a new race of philanthropists, we cannot disguise the fact from ourselves that they border upon empiricism; and, from our knowledge of human nature, and personal acquaintance with many of these men and the work they impose upon the public, we do not believe that they try to work honestly, or that they are so obtuse as to be ignorant of their imposition.

Some operators can demand more for their services than others, because of the infinite superiority of their work, but on an average they demand more than two dollars for small gold fillings, and will not make single vulcanite sets less than forty dollars. But an ordinary good dentist anywhere in Canada, does himself an injustice by charging only one dollar for the former, and twenty for the latter. This question might be discussed *ad infinitum*.

We would suggest preliminary associated efforts in every city, town, and village in the Dominion where two or more dentists reside, so that, instead of *confrères* "cutting each others throats," as it has been called, some uniformity may be attained, and the degrading effects of the present system of fees removed. It would tend to improve the class of work made, and what is done would be better done when a dentist is paid ac-

ording to the value of the work, rather than the cost of material,—in fact paid as a *professional* man instead of a tradesman.

This tariff is suggested as the leading prices; and it is further suggested that country practitioners might accept it as it stands with an understood discount of fifty per cent. The cost of living, office-expenses, &c., is about fifty per cent more in the cities and towns than in the country.

B.

Gold Fillings (small).....	\$ 2.00
do do large	2.50 to 10.00
Compound do do or Pulp Cavity and Crown...	5.00 to 25.00
Temporary and other fillings.....	1.00 to 2.00
Reducing sensitiveness previous to filling.....	0.50 to 1.00
Separating teeth previous to filling.....	0.50 to 1.00
Removing Superficial Decay and Polishing... ..	0.50 to 3.00
Treating Exposed Pulp and Filling Temporarily.	1.00 to 3.00
Destroying and Removing Pulp.....	0.50 to 2.00
Scaling and Polishing Teeth.....	1.50 to 4.00
Treating Abscesses and Diseases of Gums	1.50 to 10.00
Extracting each Tooth.....	0.50
Extracting each Tooth at night or by the use of Anæsthetics	1.00 to 1.50
Each Additional Tooth	1.00
Professional Visit at Residence (extra).....	1.50 to 4.00
Pivot Teeth	4.00 to 10.00
Upper or Lower Set, on Gold.....	60.00 to 80.00
Upper or Lower Set, on Vulcanite, Gum Block Teeth	30.00 to 50.00
Upper or Lower Set, on Vulcanite, Plain Teeth, Permanent	25.00 to 30.00
Temporary Sets, on Vulcanite.....	20.00
Partial Sets, on Gold, per Set.....	5.00 to 8.00
Single Tooth, on Gold.....	10.00 to 15.00
Partial Sets, on Vulcanite, per Tooth.....	3.00 to 8.00
Single Tooth, on Vulcanite.....	4.00 to 8.00
Regulating Teeth	10.00 to 100.00
Consultations, according to time occupied.	

MAKE A BEGINNING.

An "itch for writing," is an abhorrent nuisance, when a writer has really nothing to say, and is determined to say it. But dentistry is so eminently practical, and there is such difference in the ways of working, that hardly any two dentists can talk together for five minutes, and not fail to learn something worth knowing from each other. Now if this is

so, how is it that this Journal is not "deluged" with practical contributions from all parts of the Dominion? We can only attribute this reticence to the fact, that many men can say in conversation what they think they cannot put on paper, especially if for publication, and to the other fact that many who have never yet contributed their practical knowledge to a Dental Journal dread to begin.

Now, we are quite sure, that nearly every dentist in Canada has some practical ideas and methods of working of his own, which are well worth publishing, and we ask one and all to make a beginning, and do the best they can: many can write well who are not aware they can, because they have never tried. Those who write, however poorly, and who have anything worth saying to say, will receive any assistance from us, in the way of revision, they may request.

B.

ANOTHER REMINDER.

We sent the greater part of volume one to every dentist in the Dominion, whether paying subscribers or not, so that many received it for nothing when the subscription was a dollar higher than now. We do not desire or expect to make money out of the JOURNAL;—indeed we lose considerably by not attending more to our legitimate business: but we do desire and aim to make the only dental periodical in Canada creditable to the Canadian profession. Every Canadian dentist should support this undertaking, and remit his subscription promptly. Our best supporters are really those who are the best pay. The base matter of "dollars and cents" is a necessity of existence.

Every other dental journal enforces the cash in advance system. We commend the following extract from the last *Cosmos* to the attention of our subscribers, and we take it for granted that all who did not return No. 1 are legitimate subscribers:—

"We shall, as hitherto, adhere to the system of cash payments in advance, experience having shown that *in no other way can heavy loss to the publisher be avoided*; and moreover, it is appreciated and prized most, when promptly paid for."

"THE EXPOSITOR OF THE ABUSES OF DENTISTRY."

"H. M. Bowker, Esquire," as he signed himself in his first abusive article in the "Canada Medical Journal," has again dipped his pen in sunbeams. The distortion of other writers and the twisted quotations again prove that Mr. Bowker's object is not so much to develop the truth as to damage the professional character of his *confrères* and curry favor or himself with the medical profession.

We will shortly publish some correspondence and details of interest to the dental and medical profession, and especially to "H. M. Bowker, Esquire."

DR. W. R. PATTON.

The profession in Quebec province will be sorry to learn that they have lost one of their most promising members, in the person of Dr. W. R. Patton, of Quebec city, who has been induced by very flattering offers to settle in Cologne, Germany. His friends will, however, join with us in congratulating him on this marked appreciation of his abilities as an operator, and in wishing for him a safe arrival and a successful career.

Dr. Patton adds one more to the list of *Canadian* dentists who have decided to carve out a reputation for themselves in Europe. We trust he may be as successful as his predecessors; and do credit, as undoubtedly he will, to the good old city of Quebec, and the dental profession of Canada.

He has kindly consented to correspond for the Journal, and we will anxiously look forward for "letters from our German correspondent."

B.

MISCELLANEOUS.

He who fails to try is sure to fail.

Polish depressions in rubber plates with felt cones. They are admirable.

Several cases are reported where artificial sets adapted to one mouth, have been found to fit other mouths.

"*Eurydamus*, a wrestler of Cyrene, in a combat, had his teeth dashed to pieces, which he swallowed without showing any signs of pain, or discontinuing the fight."—*Ælian V. II. 10c. 19.*

"CHEAP DENTISTRY is like dollar stores and gift enterprises, you may possibly get the value of your money, you most probably will not. Now and then a dollar may buy ten dollars worth, but in the long run, the inevitable laws of barter will prevail, and the dollar will only buy the dollar's worth.

A dentist who is mean enough to get work by underbidding, will be dishonest enough to make it correspond to the price."—*Dental Times.*

NEW AMALGAM.

A beautiful and excellent preparation for filling teeth. For this new combination of metals (chemically pure) for dental purposes, great superiority is claimed over ordinary Amalgams. It will remain bright for years, and, *when used according to directions*, will preserve teeth more perfectly than any article in use, except gold; and under many circumstances can be successfully used for the permanent preservation of teeth when gold would prove a failure in the hands of a large majority of operators.



The process of combining and purifying the metals is such as to guarantee comparative freedom from the tarnish of fillings, or discoloration of teeth, so often observed from the use of ordinary Amalgam. Ten years' experience with it in the hands of some of the most skillful members of the profession has proved its excellence. The increasing demand for a reliable Amalgam has prompted the introduction of this article, with the confidence that it will give entire satisfaction to those who use it rightly.

To manufacture a superior Amalgam, always uniform in quality and texture, at a moderate cost, it is necessary to make it in large lots, and by the aid of machinery. It is also necessary that each lot be thoroughly tested by a competent Dentist before offering it for sale. The inventor has made such arrangements for its manufacture as to enable him to guarantee the reliability of every package.

To meet the wants of different operators, two grades of the New Amalgam were manufactured (fine and medium coarse).

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In response to frequent inquiries, we are now prepared to furnish this Cement.

There are four shades, Nos. 1, 2, 3, and 4, indicated by a sample attached to each package. No. 1, bluish; No. 3, bluer; No. 2, yellowish; No. 4, yellower.

From a communication to the *British Journal of Dental Science*, by Charles James Fox, M.R.C.S., L.D.S., we give the following extract:

"I have been for some time expecting to see some communication respecting this cement, recently introduced, as every one who tries it expresses privately extreme satisfaction with it. When this is the case, I think it is only fair to say so publicly. It is of the same nature as that commonly called osteoplastic, but it differs from it in this particular, that it can be mixed to a consistence much resembling putty, and in that state can be manipulated for some minutes without setting irretrievably. If you mix the other osteoplastics as thick as this, they set rapidly or crumble; if you use them in a thinner condition, they run about on the gums and teeth. When once set it is so hard, if it has been properly manipulated, as to turn the edge of the instrument, should it be deemed requisite to remove it. As to its durability, it is of course impossible to say much, seeing that it has only been introduced into England for a few months; but this much may be said, that, taking four months' experience with other cements, and four months' with this, I have found it so superior that I have entirely discarded all other osteoplastics, amalgams, etc. In small cavities in the incisors, or in shallow cavities where osteoplastics would wash out in a short time and dissolve away, Guillois' Cement remains at the end of four months as good as when it was put in. I cannot tell what further experience may prove, but so far—and only for four months' experience do I speak—I have not had one failure, which is more than I can say of any other."

Put up in one-ounce glass-stoppered bottles—the liquid in a drop-bottle—directions accompanying. Postage free.

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(THE CELEBRATED GERMAN CEMENT FILLING.)

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We make Nos. 3, 4, 5, 6, 10, 20, 30, 60, 120, SOFT and ADHESIVE FOIL at FIVE DOLLARS PER BOOK, Thirty-Eight Dollars per Ounce. Also No. 2 ADHESIVE at TWENTY-FIVE CENTS per Book Extra

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UNITED STATES ASSAY OFFICE, NEW YORK, MAY 8, 1869.

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JOHN TORREY, U. S. Assayer.



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Its reputation is already established; a result of its working qualities, apparent in the fact that it makes a very uniform paste,—so tenacious that it can be readily adapted to the most difficult or irregular cavities—that from its great density it is not permeable to the fluids of the mouth, and will neither crumble nor wear away in mastication.

If used according to directions in cavities *properly prepared*, it will tarnish very little, if any.

N. B.—Dealers, as well as Dentists, should bear in mind that our Amalgam is never sold in bulk, nor in any other than our LITHOGRAPHED ENVELOPES, with our MONOGRAM TRADE MARK, on the lap.

This caution becomes necessary in consequence of some unprincipled parties offering worthless amalgams, of their own make, using our name to insure a sale. No one has our recipe nor the right to use our name in the manufacture of amalgams. "A word to the wise is sufficient."

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OXYCHLORIDE OF ZINC.

This article has been in use for the last eight years; the call for the same increasing as its availability as a Medico-Mechanic agent has become known.

Similar articles have been brought to the notice of the profession under the names of Os-Artificiel, Osteoplastic, Bone Filling, &c.

We quote from the *Materia Medica* compiled by James W. White, and published by Samuel S. White, of Philadelphia :

"This preparation has been extensively tested as a capping or temporary filling over freshly exposed pulps, and with results which are represented as highly gratifying. For this purpose the solution should be diluted with water so as to be only just strong enough to cause the mixture to set. On its removal, months after, the subjacent-pulp has been found healthy, and even protected by a deposit of secondary dentine. The success which has attended its use gives hope of relief from the necessity of extirpating exposed pulps, when they have not taken on a highly inflamed condition. The cavity having been cleaned, creosote should be applied to the exposed pulp, and the oxychloride introduced in a semi-fluid state. The pain experienced varies in intensity. It is generally of short duration, but may in exceptional cases continue for an hour or even longer. The permanence of this material greatly depends on its being perfectly protected from the fluids of the mouth till it becomes quite hard (requiring about half an hour), which may be assured by any of the methods deemed most advantageous for preventing the ingress of saliva; the rubber-dam, in this connection, as in the insertion of gold, proving a most valuable appliance. It is best to introduce a surplus of material, to admit of trimming to proper shape, which may be done at once, although it is advisable to cover it with a layer of gutta-percha in chloroform, and allow several days to intervene, for the more thorough solidification of the cap prior to the removal of the excess of material and final insertion of the metal stopping.

"There is another direction in which oxychloride of zinc proves a most valuable adjunct in efforts for the preservation of teeth, viz., in filling the bulk of cavities in treated teeth. By this method many advantages accrue, among which may be mentioned the saving of time and expense, with an equally durable result; the diminution of the risk of periodontitis, so liable to supervene upon prolonged violence; the avoidance of risk of fracture in frail teeth, and the equal support insured; the obliteration of the yellow color when the enamel is thin; and, in the event of subsequent trouble, the comparative ease with which its removal may be effected. The gold must of course leave no portion of the oxychloride exposed.

"This material is likewise employed for securing the effects of chloride of zinc in the hypersensitiveness of dentine,—used as a temporary filling, and allowed to remain until, in the judgment of the operator, its effects are induced. Should tenderness recur in excavating, a second and even a third application may be found advantageous."

It has the entire confidence of many of the best men in the profession as a thoroughly reliable article. It is manufactured with great care and with uniformity, and is believed to be the best preparation of its kind in the market.

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AND IN PARTICULAR TO MY

DOUBLY REFINED ADHESIVE GOLD FOIL,

To which I would respectfully invite comparison with the
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Also, other makers' Foil at their prices.

Agent for Canada Journal of Dental Science, also, Agent for S. S. White's Dental Cosmos. Gasometers, and other Nitrous Oxide Apparatus, and Nitrate of Ammonia.

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I AVAIL myself of the opportunity afforded by the *Canada Dental Journal* to express my thanks for the liberal patronage I have heretofore enjoyed from the Dental Profession, and trust by promptness and attention on my part to merit increased favor in future.

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The Catalogue of any Manufacturer or Dealer in Dental Goods may be used in ordering from me, and all goods will be sold as low as can be obtained elsewhere.

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Constantly on hand a good Stock of all the most popular makers,

GOLD FOILS,

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Gold Preparations for filling, and at Manufacturer's prices.

I wish the Profession to distinctly understand that I intend always to be up to the times, in all the new inventions and improvements in all things pertaining to Dentistry.

Every article sold by me is warranted as represented, and in all cases, if not in accordance with the order, will be exchanged or the money refunded.

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DENTAL PLATES

AND FOR OTHER PURPOSES.

PATENTED AUGUST 10TH, 1869.



A SAFE, SIMPLE AND CHEAP PROCESS OF VULCANIZING RUBBER, ESPECIALLY FOR DENTAL PURPOSES.

The following are some of the advantages claimed by the Inventor.

It vulcanizes any number of pieces at once, owing to size of apparatus. The air is excluded from the flask while vulcanizing, the gum being thus prevented from becoming brittle, and will shave like horn.—There is no iron rust. The flask is always perfectly clean. There are no screws, bolts or wrenches. No danger of over-heating. *No possibility of explosions.* No danger of breaking teeth, as it heats and cools gradually, and is always uniform.

Useful for casting plate. Heating up casts, and packing rubber, all done by this instrument.

The apparatus is so constructed as to make any size required. By this process, better work can be done. The rubber vulcanized is tougher, of finer texture, and can be made of ANY DEGREE OF FLEXIBILITY, ELASTICITY OR HARDNESS DESIRED. All kinds of rubber gum can be vulcanized by this method; by means of which Plates are made of better color, tougher and more durable, and made to fit better than is possible by the old mode.

It was invented by a practical Dentist of over twenty-five years experience; and has been by him tested in every possible way, and in all cases with the most satisfactory results. The patentee once experienced an explosion of a steam vulcanizer, which prompted him to invent a process by which such results could be avoided, and has succeeded.

Full directions sent with each machine. Apply to

C. M. KELSEY, Mt. Vernon, Knox Co., O.

Prices	{	No. 1.	\$15.00.	} Either for Gas, Kerosene or Alcohol.
		No. 2.	20.00.	
		No. 3.	25.00.	

(Patented May, 1870.)

TRY THE
EUREKA GOLD FILLING.

SOFT, TOUGH AND ADHESIVE.

The superiority of this form of gold for filling is universally endorsed by the Profession as a better article than foil, it being tougher, softer, and at the same time adhesive. It is softer than the softest foil, and its adhesive qualities are perfect. The gold is chemically pure, and these essential qualities are produced solely by my principle of manufacture, whereby I preserve its crystalline structure unbroken and uniform. By its homogeneous condition I can guarantee its being uniform for

THE QUALITY CANNOT VARY.

It is sold in a very convenient form for manipulation, and each box contains a description of the gold and how to use it. For sale at all the Dental Depots.

PRICE, \$5 PER 1-8 OZ., \$38 PER OZ.

Agents and travellers will receive a liberal discount.

IT CANNOT BE MADE HARSH BY ANNEALING.

GEORGE J. PACK & CO.,*Manufacturers,*

506 Broome Street, New York.

N. B.—Also manufacturers of adhesive and non-adhesive gold foils.

EUGENE DOHERTY,

PROPRIETOR OF

WILLIAMSBURG INDIA RUBBER WORKS,

364 FIRST STREET, BROOKLYN, E. D.

MANUFACTURER OF

DENTAL RUBBER, GUTTA PERCHA, STEAMPACKING, BELTING, &c.

The superiority of Doherty's Rubber is so well known that commendation is unnecessary. To be had in all the Dental Depots throughout the States.

RETAIL PRICES.

Dental Rubber, No. 1.	\$2 50 per pound.	Flexible Rubber.....	\$2 75 per. pound.
" " No. 2....	2 50 " "	Gutta Percha,.....	2 00 " "
Black Rubber,.....	2 50 " "		

DENTISTS MICROSCOPES.**A RARE CHANCE.**

With a view to encourage Microscopical studies among Dentists in Canada, the undersigned has made arrangements for direct importation from England, of superior microscopes, which he will supply the Canadian profession at *wholesale prices*.

No. 1. a very fine lust—\$40 Retail price \$60 and \$65.
No. 2. " 35 " "
No. 3. " 20 " "

W. GEO. BEERS.

TO THE MEMBERS OF THE DENTAL PROFESSION !

BEAUTIFUL COMBINATION

OF

Elegance, Strength, Naturalness, and Adaptation.

Dr. J. R. TANTUM & Co.,

MANUFACTURERS OF

EXCELSIOR

PORCELAIN TEETH,

Address, 909 Market Street,

WILMINGTON, DELAWARE.

We are now manufacturing teeth EQUAL TO THE BEST OF WHITE'S OR JUSTI'S. We SINCERELY BELIEVE THEM more beautiful than the FORMER AND STRONGER THAN THE LATTER. THEY ARE FAR SUPERIOR TO ANY EVER SOLD AT THE SAME RATES, IN THIS OR ANY COUNTRY.

As an inducement to Dentists to try our teeth, we will sell them at the following EXTRAORDINARY LOW PRICES, FOR FIRST CLASS TEETH.

GUM TEETH.

1 to	20 sets,	\$1 96 per set,	or 14 cts. per tooth.
20 to	50 sets,	\$1 68 per set,	or 12 cts. per tooth.
50 to	100 sets,	\$1 40 per set,	or 10 cts. per tooth.
100 to	500 sets,	\$1 12 per set,	or 8 cts. per tooth.
500 to	10,000 sets,	\$0 98 per set,	or 7 cts. per tooth.

PLAIN TEETH.

1 to	100 sets,	\$1 25 per set,	or 9 cts. per tooth.
100 to	5,000 sets,	\$0 84 per set,	or 6 cts. per tooth.

Gum Plain Teeth and Plain Plate Teeth at the same rates as Gum and Plain Teeth above.

REASONS FOR THE ABOVE STATEMENT.

During the last year we have spent large sums of money in experiments, and in the study of chemical affinities, until the eye and tests demonstrate our teeth to be beautiful and strong as any now manufactured.

PINS.—Our pins enter the teeth well, having a good head inside. They are longer than those used by most manufacturers. The first complaint is yet to be made of their pulling out of the teeth. The heads of the pins outside of the teeth are put on by a revolving stamp, an invention of our own, which spreads the head actually in every direction from the centre.

EQUIMOLDS.—We have constantly employed a mould cutter, who ranks only second in the country in his line, who cuts the finest moulds from patterns as well as originates new designs.

BURNING.—Our burner has had an experience of sixteen years, and is unsurpassed in his department.

For these reasons, as well as many others we could give, we are well satisfied that our teeth are equal in mould, style, finish, adaptation, &c., &c., to any made by the leading establishments in America or elsewhere. We speak unto wise men in their profession, judge ye what we say, by using the teeth.

Dentists will see by ordinary large quantities at one time the teeth are much lower in price. Sent by express B. C. D. to any address.

J. R. TANTUM,
B. F. WOOLSTON.

J. R. TANTUM & Co.

JOHN BIDDLE,
 MANUFACTURER OF
DENTAL INSTRUMENTS
 OF EVERY DESCRIPTION,
WHOLESALE AND RETAIL,
 207 CENTRE STREET,

Between Howard and Grand,

NEW YORK.

✉ Orders filled for all kinds of Dental Goods.

✉ Instruments repaired in the best manner and at the shortest notice.

A BOOK EVERY DENTIST NEEDS!

DICKINSON'S DENTAL PLATE REGISTER AND LEDGER

Dr. J. G. Ambler, President of the American Dental Convention, says:

"I consider it a very valuable addition to the Mechanical Department of our profession, and, I trust, will be appreciated and adopted by all Manufacturers of Artificial Dentures."

Printed on extra heavy paper. Bound in a superior manner in half roan, cloth sides, and calculated for Six Hundred and Fifty Cases.

PRICE: \$3.75.—U. S. Postage paid.

✉ Send for Circular and Sample Shees.

W. P. DICKINSON,
 DUBUQUE, IOWA.

BARNUM'S RUBBER DAM.

As much difficulty has been experienced by the profession in obtaining an excellent quality of RUBBER DAM, and having been applied to often for such as I am using in my own practice, and also that I might be able to supply the demand, I have had it manufactured in sufficient quantity of three grades of thickness, and will send it by Express C. O. D. to all ordering direct from me, at \$4 per yard.

I can recommend it as being very elastic and tough, and will not deteriorate with time.

N. B.—If preferred to send money by mail *do not fail to register the letter.*

S. C. BARNUM, D. D. S.

597, Fifth Avenue, New York.

THE GOLD FOL,

MANUFACTURED BY

J. M. NEY & CO.,

HARTFORD, CONN.

SOFT, TOUGH AND MALLEABLE,

Can be made as ADHESIVE as desired by re-annealing. Receives our personal attention in refining.

For Sale at Dental Depots Generally.

THOMAS ON NITROUS OXIDE.

JUST ISSUED,

A TREATISE UPON NITROUS OXIDE GAS :

ITS MANUFACTURE, ADMINISTRATION, AND EFFECTS,

WITH

EXPLICIT DIRECTIONS FOR THE MANAGEMENT OF PAIN AND
EXTRACTION OF TEETH UNDER ITS INFLUENCE.

BY F. R. THOMAS, D.D.S.

A 12mo Volume of 122 Pages.

Price..... \$1.25.

PUBLISHED BY SAMUEL S. WHITE.

And for Sale at his Dental Depots.

DR. I. W. LYON'S

TOOTH TABLETS.

An Improved form of Tooth-Powder.

Unlike the Tooth-Powders commonly in use, this article is made into neat, portable cakes, divided into little tablets each of the right size for use, not liable to scatter or be wasted, and therefore very convenient, especially for Travelers. There is no occasion for dipping the brush into the box, thereby soiling what is not used, but a single tablet, enough for one brushing, may be broken off and put into the mouth; thus, several persons can use from the same box with perfect neatness and propriety.

It is made of the materials that were most approved of in the discussions of the American Dental Association at their Annual Convention, and is believed to be the best preparation yet produced for the teeth and gums. It has received the hearty approval of many leading dentists, to whom the formula has been submitted. The following certificates are submitted to those of the profession who have not had an opportunity of testing it.

CERTIFICATE OF THE DENTISTS.

This is to certify, that, being personally acquainted with I. W. Lyon, D.D.S., of New York City, and having been informed by him of the precise ingredients composing the Dentifrice known as "DR. I. W. LYON'S TOOTH TABLETS," and having ourselves used the same, we do unhesitatingly commend it to the public as the *best and most convenient Dentifrice now extant* :

W. H. Atkinson.....	New York City.	Chauncey P. Fitch..	New York City.
John Allen.....	" "	Wm. H. Allen.....	" "
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Ball & Fitch.....	" "	J. Ward Ellis.....	" "
I. A. Salmon.....	" "	A. Lawrence.....	Lowell.

Price, per dozen boxes..... \$3.50

A larger discount by the Gross. A liberal discount to the trade.

Each box contains 120 Tablets. Retail at 50 cents per box.

Or sent by mail for 65 cents.

Sold at all the Dental Depots, and by the Proprietor,

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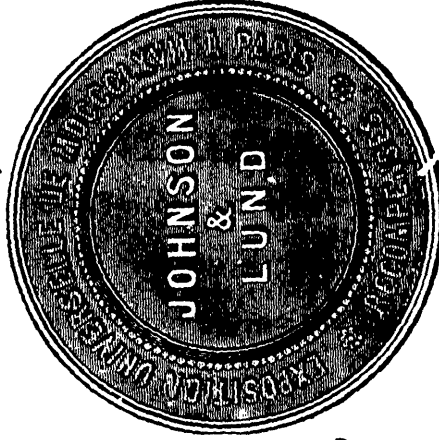
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P R I Z Z I M E D I A L S .

WORLD'S FAIR,
PRUSSIA, 1865.



AMERICAN INSTITUTE,
NEW YORK, 1867.



WORLD'S FAIR,
PARIS, 1867.

AWARDED

FOR

ARTIFICIAL TEETH,

TO

JOHNSON & LUND,

MANUFACTURERS AND IMPORTERS OF

DENTISTS' MATERIALS.

DEPOTS, 27 North, 7th Street Philadelphia.
74 and 76 Madison Street, Chicago.

Weston's Metal for Dental Purposes.

THOROUGHLY TESTED FOR THREE YEARS.

Warranted superior to anything of the kind ever offered to the profession. Produces as sharp and perfect casting as any copying or type metal known. With care and experience plates may be cast so light and smooth as entirely to dispense with the use of burs and scrapers. For accuracy of adaptation, it is equal if not superior to any material in use.

It is tasteless and cleanly, and will positively keep its color in the mouth equal to the finest Gold or Platinum.

It is particularly adapted for full lower plates. For upper and lower parts of sets it has many decided advantages over the different cheap materials so much in use. In contact with aluminium there is no perceptible galvanic action or change of color. It receives a brilliant polish with very little labor.

Parties using this metal are not required to purchase a license. No additional apparatus required.

In 1 lb. packages..... \$6.00

In $\frac{1}{2}$ lb. packages..... 3.00

In $\frac{1}{4}$ lb. packages..... 2.00

Each package accompanied with full instructions. Manufactured and sold by

H. WESTON, Dentist,

Towanda, Pa.,

AND AT ALL THE PRINCIPAL DEPOTS.

Opinions of the Profession.

The following resolution was unanimously adopted at a regular meeting of the Bradford and Susquehanna Dental Association :

"That the members of this Society express themselves as more than pleased with the use of 'Weston's Metal,' in place of rubber, and feel themselves under lasting obligation to Dr. WESTON for enabling them to throw off the oppressive yoke of the Rubber Company."

216 North Sixth Street, St. Louis.

Dr. Weston :—Your metal is used and recommended by the Missouri Dental College to its students.

Respectfully yours,

HENRY S. CHASE,

Professor Operative and Surgical Dentistry.

OFFICE OF PERRINE & FRANKLIN, No. 115 W. 31st St.,

New York, March 1st, 1870.

Dr. H. Weston :

DEAR SIR :—We have given your metal a trial, and are pleased with it and the results. We believe for partial under cases it is superior to any other substance known to the profession. We can get a more perfect adaptation with it than with rubber, and all delicate points acting as supports, are stronger and more reliable than rubber. We have seen cases that have been in daily use since September last (now seven months ago), that show no evidences of oxidation—an important quality, and one that at first we had fears your metal did not possess.

The great facility with which your metal is manipulated into plates renders it an important adjunct to our list of materials out of which to construct dental plates, and other dental apparatus.

We shall take pleasure in recommending its use to our professional friends. You will please accept our thanks, and we doubt not you will receive the thanks of the profession for your successful efforts in bringing out so valuable a com-

pound, and the liberality with which you offer it to the profession is in striking contrast with past experience.

Yours truly.

GEO. H. PERRINE, D.D.S.

B. W. FRANKLIN.

(From *American Journal Dental Science*.)

We have tested this metal in the case of entire lower sets, and are inclined to the belief that it is superior to anything of the kind which has yet been brought to the notice of the profession. We advise a trial of it by those who object to rubber. There is no doubt but that it is stronger, and will keep its color better in the mouth than any of the cast plates in use.

(From *Missouri Dental Journal*, May number.)

We have been using this metal for the past six months or more, with much satisfaction. It is undoubtedly one of the best substitutes for Rubber of which we have any knowledge. It is tasteless—does not discolor, or has not in any of the cases which have come under our observation; is more lasting than Rubber, and a plate of this metal will be found to fit the mouth as nicely as a Rubber plate can be made to do.

(From *Missouri Dental Journal*, Nov., 1869.)

This metal has been considerably used in this city for making both upper and under dentures, and has given very great satisfaction.

(From the same Dec. number.)

The cry, "What shall I do?" still comes to us, as some poor victim of the Rubber Co., who has been overlooked, is hunted up, and the strong arm of the law is raised to annihilate him. In reply, we say, try Aluminium—and Weston's Metal for partial or lower sets. We are induced to recommend Weston's Metal in preference to that known as Adamantine, (Moffit's Metal,) or the Walker's Excelsior Base, because, from the tests we have made of these bases, this seems to us to promise the best results.

Compared with Rubber, this is superior in point of strength and durability. The Weston Metal has thus far proved as tasteless as Rubber. Patients who have tried Rubber, and been obliged to give it up on account of its effect upon the mucous membranes, causing inflammation and even sloughing of the soft parts, are now wearing plates of Weston's Metal with perfect satisfaction. So far as we have been able to judge, Weston's Metal is not affected by the secretions found in the oral cavity. It does not materially change color. It may, with care, be cast almost as thin as an ordinary gold plate.

WESTON'S FLASKS—ESPECIALLY ADAPTED TO CASTING PLATES.

Being longer than the ordinary Flask, it gives more room for the reservoir, posterior to the plate, which is the whole secret of casting perfect plates. The Flask is closed with a spring steel clamp, and stands on feet to facilitate pouring the metal.

PRICE. \$1.00

THE CANADA MEDICAL JOURNAL

Issued monthly at \$3 a year, in advance.

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Dentists will find much of interest and usefulness in the above Journal.

DAWSON BROS.

159 St. James st., Montreal.

H. C. CORFIELD,

Manufacturer of Porcelain Teeth.

Having removed to the commodious building, No. 37 North Tenth Street, one door above Filbert, we are now prepared to furnish the Profession **TEETH** of superior quality, and in great diversity of form and shade. They are fully equal to any manufactured, and at

Much Lower Prices than asked by other Manufacturers.

Our Vulcanite Teeth, Gum Sections and Plain, are all fitted with Double-Headed Pins, or Pins with a head on each end.

Our Upper Central Bloc. : have each Five (5) Double-headed Pins, and the Lower Central Blocks each Four (4).

We have a full and varied assortment of all kinds and styles of Teeth in use, embracing

Gum Blocks or Sections for Rubber Base.					
"	Single Teeth	"	"	"	"
Plain	"	"	"	"	Plate.
"	"	"	"	"	Rubber.

And being willing to share some portion of the profits with the fession, have concluded to offer them at the following prices, for cash-only:

Plain Teeth \$1 00 per set of 14 Teeth.

Gum Teeth \$1 25 per set of 14 Teeth.

And by the quantity at such prices as may be agreed upon. We solicit trial of our teeth. Satisfaction guaranteed or the money refunded.

H. C. CORFIELD,
 No. 37 North 10th St., above Filbert,
 PHILADELPHIA.

RUBENCAME & BARKER,
Dental Manufacturers,

DEPOT: 825 ARCH STREET,
Philadelphia, Pa.

Gold Foil,
 Anchor Sections,
 Anchor Flasks,
 Enamelene,
 Gasometers,
 Dental Furniture,
 Instruments, Lathes.

RETAIL PRICES:

Gum Teeth, 16 cents each.

When ordered by the quantity, we will furnish them at the following prices for *cash only* :—

For \$25.00, 12 sets of 14 Gum Teeth, (168,) being a fraction less than 15c. each.

For \$50.00, 26 sets of 14 Gum Teeth, (364,) being a fraction less than 14c. each.

For \$100.00, 55 sets of 14 Gum Teeth, (770,) being a fraction less than 13c. each.

Plain Teeth, 10 cents each.

For \$25.00, 20 sets of 14 Plain Teeth, (280,) being a fraction less than 9c. each.

For 50.00, 42 sets of 14 Plain Teeth, (588,) being a fraction over 8½c. each.

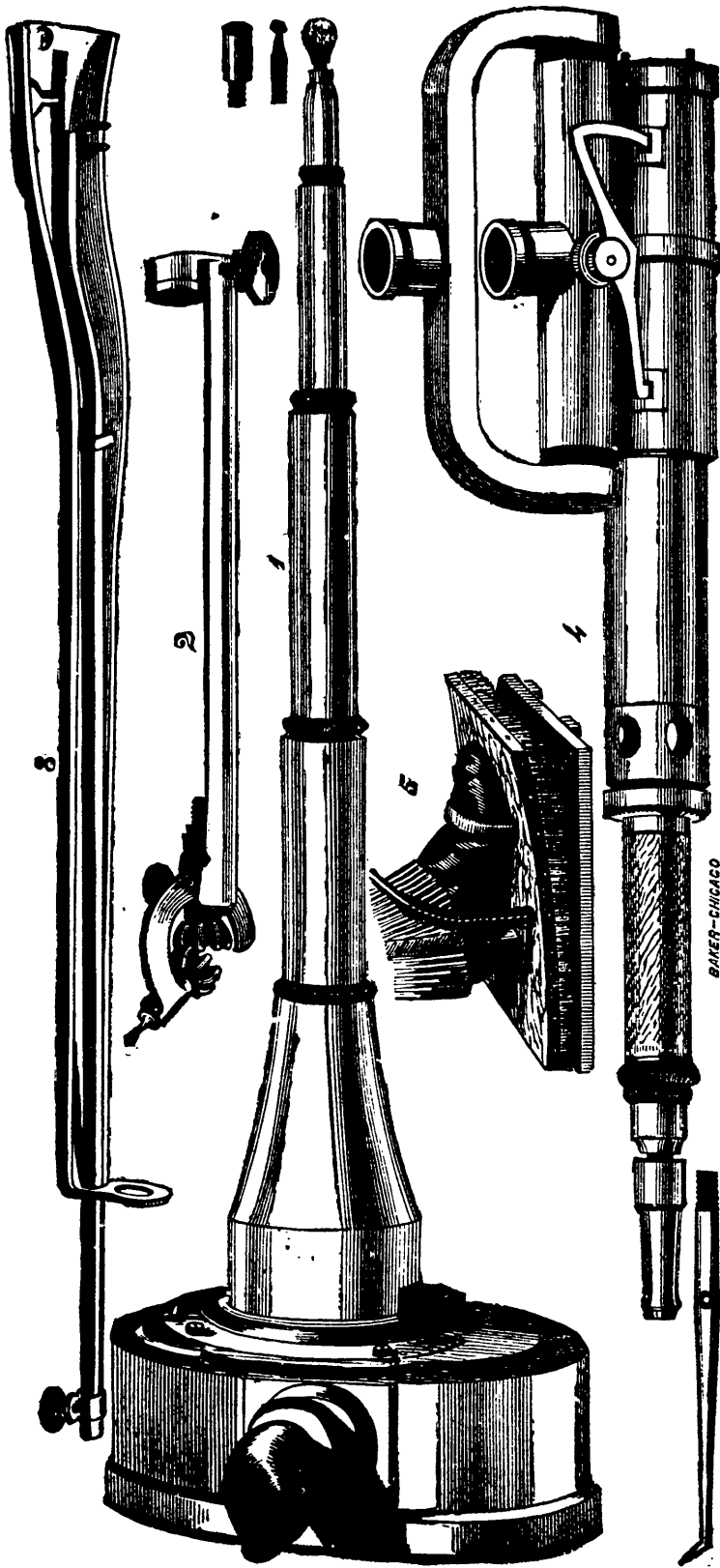
For \$100.00, 89 sets of 14 Plain Teeth, (1,246), being a fraction over 8c. each.

Assorted samples of Teeth will be furnished by mail, free of charge. These will enable the Dentist to decide as to the pattern best suited to any particular case, which can be ordered by the number on the back of sample.

Manufacturers of Rubencame & Barker's Gold Foil, Anchor Rubber, Anchor Flasks, Barker's Gasometer Mouth Piece and Hood.

GREEN'S PNEUMATIC BURR, DRILL, FILE CARRIER, POLISHER AND UNIVERSAL JOINT.

**ALSO
GREEN'S AUTOMATIC MALLET.**



SEE OPPOSITE

A careful examination of the accompanying diagrams will satisfy every practical dentist, that in the production of these instruments, the inventor has fully succeeded in supplying a want long felt by the profession. By their use tedious and laborious operations, such as usually require hours of arduous toil on the part of the operator, and entail like hours of painful positions, taxing to the uttermost the endurance of the patient, are now performed in a few moments. Multitudinous as have been the inventors of agencies for saving labor and alleviating pain in the practice of *Operative Dentistry*, but few, if any, have succeeded in perfecting a piece of mechanism that would, in its operations, even approximate the excellence of the usual hand process, and none have reached the acme of success as has the inventor of these instruments; for with these the work is not only well and quickly done, but more perfectly executed than can possibly be done by any instruments formerly in use. This fact is fully corroborated by the following named Dentists, who, among others, have used these instruments with admirable success for the past three months, and to whom I will take the liberty to refer you for any information in regard to their usefulness and efficiency:

- | | |
|---------------------------------------|--------------------------------------|
| Dr. W. H. Atkinson, New York. | Drs. Rambo & Reese, Montgomery, Ala. |
| Drs. Dwinelle & Hodson, " | Dr. P. L. Ullmer, Selma, Ala. |
| Dr. A. C. Hawes, " | Dr. W. H. Burr, Madison, Ga. |
| Dr. J. H. Race, Brooklyn. | Dr. W. H. Morgan, Nashville, Tenn. |
| Dr. F. N. Scabercy, Providence, R. I. | Dr. W. M. Butler, Louisville, Ky. |
| Prof. H. Judd, St. Louis. | Dr. A. T. Metcalf, Kalamazoo, Mich. |
| Dr. H. J. McKellops, " | Dr. E. S. Holmes, Grand Rapids, " |
| Dr. Edgar Park, " | Dr. S. L. Judd, Beloit, Wis. |
| Dr. H. E. Peebles, " | Dr. Geo. P. Kingsley, Freeport, Ill. |
| Dr. H. S. Chase, " | Dr. Geo. O. Howard, Galena, " |
| Prof. J. Taft, Cincinnati. | Dr. Chas. Henry, Jacksonville, " |
| Dr. Will Taft, " | Dr. G. H. Cuslung, Chicago, " |
| Dr. P. G. C. Hunt, Indianapolis, Ind. | Dr. E. D. Swain, " " |
| Dr. J. P. Gillespie, San Francisco. | Dr. J. C. Dean, " " |
| Dr. Chas. E. Blake, " | Dr. M. S. Dean, " " |
| Dr. Beers, " | Dr. W. A. Stevens, " " |
| Dr. H. A. Laurence, New Orleans. | Dr. W. W. Allport, " " |
| Dr. J. A. Thurber, " | Dr. J. N. Crouse, " " |
| Dr. J. B. Patrick, Charleston, S. C. | Dr. E. Honsinger, " " |
| | Dr. A. W. Freeman, Chicago, Ill. |

DESCRIPTION OF INSTRUMENTS.

Fig. 1 represents the Pneumatic Engine, with the Burr attached. These Burrs are various in size and shape, and are made to revolve with a velocity of from twelve to fifteen hundred revolutions per minute, but can be so controlled by the operator as to move as slowly as may be desired. By use of the "Universal Gear joint," (Fig. 2) which is readily adjusted to the apex of the Shaft of the Engine, the Burr or Drill may be placed in any position upon the tooth, and the most difficult posterior cavities may be worked with the same ease and certainty as those of more easy access, upon the grinding surface.

Fig. 3 is an attachment to which a reciprocating movement is given by the Engine. To this can be attached a file for separating the teeth or cutting approximate plugs, and also a piece of wood in place of the file, for polishing approximate surfaces. This file or polisher has a motion of twelve hundred strokes per minute.

Fig. 4 shown the Pneuma-automatic Engine and Mallet combined. The Mallet is worked by the same motor, and will give either a hard or soft blow, and as fast or slow as may be desired.

Fig. 5 is a diminished representation of the Pneumatic Motor with rubber air-conductor attached. This apparatus is twelve inches long, seven inches wide, and two and one-half inches deep. It is placed on the floor and worked by the feet of the operator, and affords ample power for the propulsion of either of the instruments.

With the exception of the Motor, the accompanying cuts represent the full size of the instruments and their attachments. Accompanying each case is a full set of six finishing and two undercutting burrs, two drills and two polishing sleeves, with full directions for use. Accompanying the Mallet are twelve points, assorted. These instruments are all constructed under the personal supervision of the inventor, are neat in appearance and of the most perfect mechanism; each integral part fitting to its appropriate place perfectly.

Price of Burring Engine and Mallet, all complete, with Case, \$100; or, without the Mallet, \$75. Sent free per express all over the United States east of the Missouri River.

All orders or letters should be addressed to

E. R. E. CARPENTER, Sole Agent,

Room 4 Opera House, Chicago, Ill.

CHICAGO, April 15th, 1870.

CHARLES ABBEY & SONS,

MANUFACTURERS OF

DENTISTS'

FINE GOLD FOIL,

No. 230 PEAR STREET,

PHILADELPHIA, PENNSYLVANIA.

OLD FASHIONED, (SOFT OR NON-ADHESIVE,)

FINE GOLD FOIL,

ADHESIVE FINE GOLD FOIL.

For nearly fifty years our OLD-FASHIONED GOLD FOIL has been before the Profession, and has received the unqualified approbation of most of the best Dentists. Our

ADHESIVE GOLD FOIL

While possessing all the properties peculiar to that particular article, is free from the objectionable harshness or stiffness that characterizes so much of the Gold Foil that is offered as Adhesive. All our Gold Foil (Old-Fashioned and Adhesive,)

Is Made From Absolutely Pure Gold,

Prepared with great care by ourselves, and warranted to be as represented,

Free from Alloy or Impurities of any Kind.

FOR SALE

AT THE PRINCIPAL DENTAL DEPOTS,

OR ORDERS MAY BE SENT DIRECT TO US.



ARTIFICIAL TEETH.

A GOLD MEDAL,
THE FIRST PREMIUM, AWARDED at the PARIS EXPOSITION.

MORE PREMIUMS!

AT THE FAIR of the AMERICAN INSTITUTE, NEW YORK, OCTOBER, 1869,
THE FIRST PREMIUM,

A MEDAL & DIPLOMA,

Was Awarded to us for Improvement in Artificial Teeth.

A GOLD MEDAL

Was Awarded to us by the FAIR of the MARYLAND INSTITUTE, BALTIMORE,
Exhibition of November, 1869,

FOR THE BEST ARTIFICIAL TEETH.

These Premiums were awarded for Improvements over all Teeth previously made, either by ourselves or others, and not merely for superiority over those with which they were in competition at the fairs.

The especial attention of the profession is requested to these Improvements, which were recognized by very able Committees as obviating the greatest remaining defects in Artificial Teeth for Rubber Work.

Of this Improvement the Committee of the American Institute say:

"In regard to the shape and insertion of the pin in the body of the teeth now manufactured by S. S. White, the improvement is manifestly great over those of any other manufacturer known to us."

SAMUEL S. WHITE,

PHILADELPHIA, NEW YORK, BOSTON, and CHICAGO.