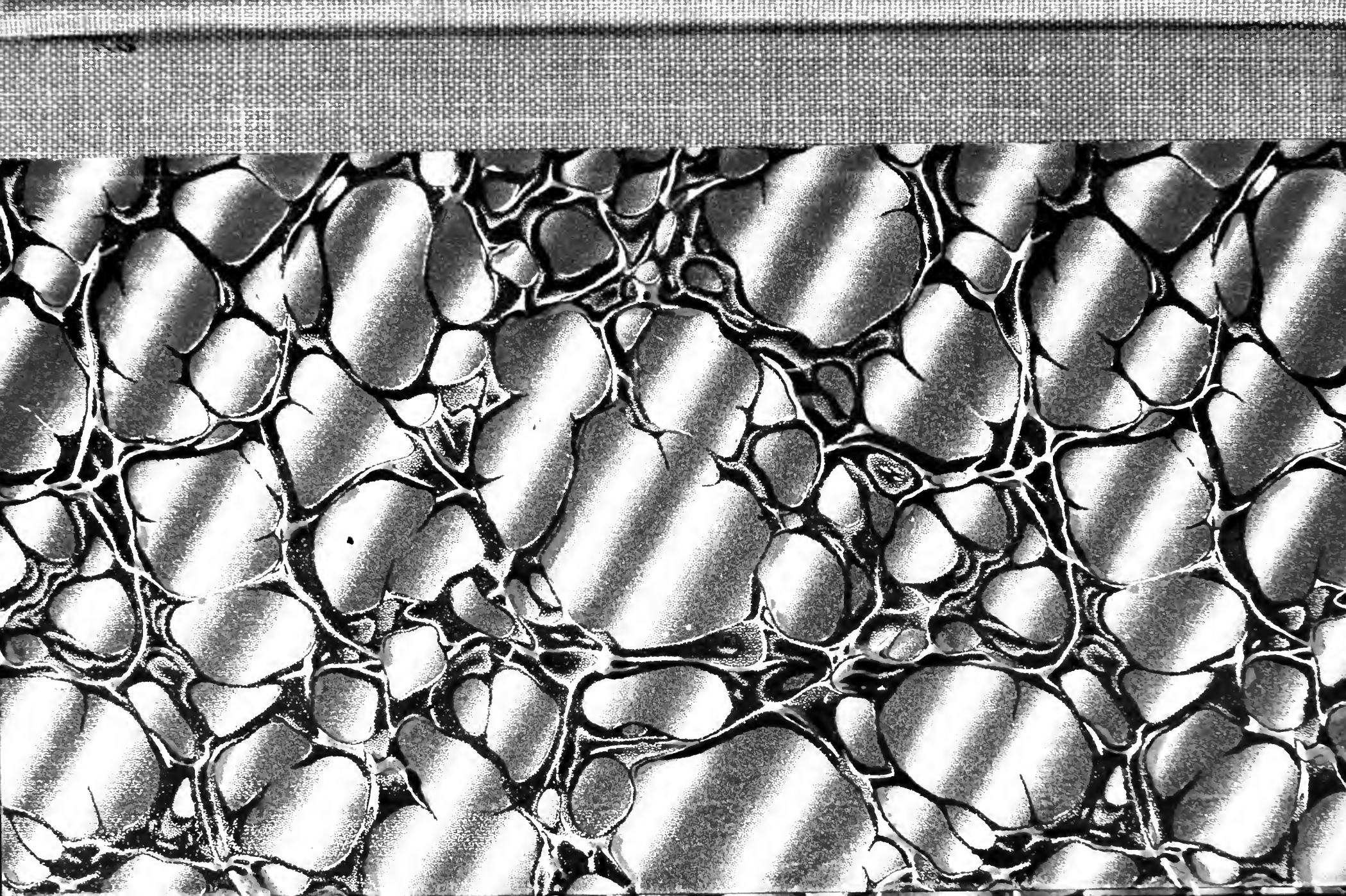

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SOME THOUGHTS ABOUT LABORATORIES.

From the point of view of investigators and teachers of the biological sciences, this may be designated the age of public laboratories.

There is indeed evidence that in Egypt, under the rule of the earlier and greater Ptolemies, there existed in Alexandria and were supported by the State, schools of instruction and research in the practical direct study of anatomy, physiology, and pathology; as well as great libraries in which every student could learn what had already been done or thought in his own department of study. But with the degeneracy of the later Ptolemies and the subjugation of Egypt by Rome, all that was good left Alexandrian science; the great museum became simply a place in which ceaseless metaphysical guesses and theories, barren of everything but bitter quarrels, took the place of the faithful and patient study of man and the rest of nature. Before the Christian era the Alexandrian school had almost ceased to be of any value to humanity.

From that time until sixty years ago, there was not a single public laboratory for scientific study in the world; that is to say, a laboratory open to all competent workers on easy terms, and provided with books, instruments and skilled assistants.

To-day such laboratories girdle the earth from Tomsk to Tokio—from Siberia westward to Japan. They are to be counted by the hundred, and States vie in building them and making each new one more complete, and even architecturally more splendid than its rivals. One of the first things Germany did after the wars which welded her into a great empire, was to build laboratories—palaces of science they have been called—in Berlin and Strasburg.

In this country the building and endowment of laboratories has for the most part been attained in a far better way—by private generosity, rather than by public subsidy, combined, as it must be with government control. Science cannot for any long period advance safely in chains, even if those chains be golden. There lurks as much danger to progress in an established national science as in an established national church.

This danger is illustrated by the comparative deadness of French science during the last forty or fifty years, in which it has been directed from a government office and centralized under bureaucratic control; and even in victorious Germany, now that the various States are consolidated into one empire, every detail of which is controlled from Berlin, many leaders of German science, especially among the younger men of talent and genius, are beginning to dread the outcome as regards the intellectual life, freedom and vigor of the empire. Political questions influence the appointment of university professors, and such influence cannot but be injurious.

In these United States there is no such danger. The National Government needs the services of scientific experts in order to protect the health and promote the material prosperity of its citizens, to undertake great geological surveys, or the investigation of the life-habits of insects injurious to agriculture, or the study of the breeding places and habits of food fishes and of their enemies, or to promote artificial fish-culture; even from time to time to undertake, not merely for prospective or immediate material gain, but for national credit and renown, great enterprises on purely scientific grounds, such as expeditions to observe solar eclipses, or Arctic expeditions. For all such purposes it has, and has had, at its disposal the best qualified scientific men in the country, and it gets their services very cheap.

But, in addition to national scientific enterprises, as a supplement (perhaps in some sense as a corrective) to them, we need independent scientific research and facilities for it. And it may be interesting to consider how we, the American people, are solving the problem of the due promotion of scientific education and research by the government, while at the same time securing opportunities for independent thought and investigation.

The problem is being solved, *has* been solved, by the liberality of private citizens. While promoting the investigation of scientific questions by the ruling powers, they have also built and endowed

laboratories, colleges and universities. They have provided rooms and appliances for study and research, in which no earnest student can be repressed or suppressed because his ideas are new or in conflict with those adopted by the officials of a central government bureau. Through such private endowments—trusts as they are for the public welfare, numerous and generous—American science promises to attain a variety and independence of thought such as no national science has ever had in the past. Its characteristic is that it is individual—it is democratic. With a solid background of traditions and established ideas it has a liberty which does not often degenerate into license; and all history teaches that such a combination is that which leads most quickly to human progress.

American science works not for the glory of a monarch, as Alexandrian science for the fame of Ptolemy Soter. Neither does it strive to promote the interests of an aristocracy, nor to fill the pockets of a plutocracy. Some such consequence may now and then follow its advance, but only as a by-result of its general contribution to the national welfare. It exists by the people and for the people. To make human life longer and healthier and happier is the result, as it is the aim, of modern science; to discover truths and to apply them to the welfare of mankind.

It is frequently asserted, and generally believed, that the first public laboratory for teaching and research was organized and set at work by the great chemist, Liebig; but this is an error. The merit belongs to Purkinje. Liebig's effort was no doubt far better supported financially, more ambitious, and more widely known; but some years before the foundation, in 1826, of Liebig's celebrated laboratory at Giessen, which is claimed as the parent of all modern laboratories, Purkinje had provided means for students to study physiology and pathology practically, to examine the working of the body in health and disease—the very subjects for whose investigation the Hoagland laboratory has been built, equipped and endowed. To every physiologist present, the name of Purkinje will call up some remembrance of the man of genius who first paid attention to the retinal images of his own blood-vessels, images ever since known as Purkinje's figures; of the man who first described the peculiar sensations of vertigo produced by rotation of the body, and attempted to explain them; of the man who is the father of psycho-physics and physico-physiology; of the man who discovered the germinal vesicle of the ovum. Such achievements are glory enough; but to all the other fertile work of Purkinje we must in justice add the foundation

of the first public laboratory (in the modern sense of the term) after the Christian era. Liebig's deserved repute and fame need no factitious prop; and as to the question who founded the first public laboratory, we need, I trust, have no quarrel with our friends the chemists. The emulation is but an evidence of the belief of all students and fosterers of science in the value of public laboratories. That the merit of having first organized them is eagerly claimed, is a proof of their public utility. Our country believes in its laboratories, and its citizens provide them.

Purkinje's laboratory was but ill equipped; it was supported at first by his private purse, afterwards by voluntary contributions from his friends. No doubt its space was cramped, its apparatus scant, its general facilities for work very limited. Thanks to the liberality and patriotism of Dr. Hoagland, we are to-night celebrating the formal opening of a laboratory with abundant space, comfortable workrooms, an excellent library, the best apparatus that has been invented, skilled teachers and assistants, and with all else that may contribute to advance knowledge as to the workings of our bodies and the laws which govern them in health and disease. It is founded to increase human knowledge in regard to the *sciences* of physiology and pathology, and the *arts* of medicine, surgery, and hygiene.

On such an occasion it is meet that we gratefully recall Purkinje's work—the little germ from which this great laboratory has sprung and which gives us a direct and glorious ancestry, while also entitling us to feel some sort of parental pride in the great laboratories of physics and chemistry now to be found wherever civilization is firmly established.

The public-laboratory idea started by Purkinje and Liebig did not quickly spread. Bacon had long before pointed out the necessity of experiment in the study of Nature; but naturalists, for the most part, had still enough to do in the mere direct observation of the phenomena exhibited by plants and animals under the conditions of their normal daily life, and under circumstances of disease or accident. There were scattered here and there a few good experimenters; but the majority of biologists were usefully busy in simply seeing accurately under natural conditions; and very excellent observers many of them were.

It came at last to be realized that mere simple external observation of animals, though a fundamental first stage towards a knowledge of physiology and pathology, did not lead far; that it required to be

supplemented by experiment. The majority of vital phenomena take place inside organisms, and therefore could only be observed by subjecting the animal to injuries, such, for example, as opening cavities of the body, in order to see the inner parts at work. The earlier experiments were mainly the removal of such hinderances to direct observation. The thoracic cavity was opened to see the beat of the heart ; or the abdominal, to observe the movements of the intestines. Soon the range of experiment was widened ; it became obvious that in biology, as in other natural sciences, to know Nature and her ways we must cross-examine her by the Baconian method, putting her to work under conditions which could be varied at will by the observer, or, as he now became, the experimenter.

As an illustration, let me take such a common phenomenon as the movements produced by shortening of the muscles. Dissection of the dead body had taught that muscles were connected by means of nerves with the brain, and observation of cases of disease or accident had proved that a muscle immediately ceased to work when its nerve was seriously injured or was divided. Such direct observation led naturally to the conclusion that every muscle got its power or strength from the nerve, which thus came to be regarded as a sort of conduit carrying force or energy to the muscle from the brain. This erroneous notion was only upset by experiment added to observation. When it was found that the muscle or a living or recently killed animal, after section of its nerve, did still contract powerfully when excited by blows or by ammonia, by heat or by electricity, it became clear that the power or energy exerted by a working muscle resided in itself, and was not something carried to it by the nerve from the brain ; that all which the nerve did was to set free or liberate energy already stored in the muscle, just as several other natural forces might do ; the nerve like them, merely pulled the trigger and discharged explosive material already present in the muscle fibres. Thus our whole conceptions as to the physiological relations of the nervous and the muscular systems was corrected.

It is needless to multiply instances. At present nearly every organ and liquid of the animal body has been isolated from the rest and its properties studied under the most varied conditions. It is not too much to say that most of what is real and substantial in our knowledge of physiology and most of our similar knowledge in pathology is based on such experiments.

Researches of value need for their successful prosecution buildings adapted for them, numerous assistants, and (in addition to the out-

fit of laboratories of physics and of chemistry) many pieces of apparatus specially constructed for physiological and pathological purposes.

Another reason why laboratories are necessary is the improvement in methods of teaching during late years ; we no longer believe that any natural science can be taught successfully by words alone even by the most learned and eloquent professor. When the conditions are such that the students cannot make experiments themselves we insist that they shall at the least have shown to them the most important facts ; that the lecture and the text-book shall have as their accompaniment, I might perhaps say as their basis, actual demonstrations, supplemented if possible by personal experimentation by the learner himself. We ridicule the notion of any real teaching of physiology to a student who has never seen a beating heart, a blood pressure experiment, a demonstration of the action of saliva on starch ; of teaching pathology to those who have had no opportunity to observe the phenomena of inflammation with the aid of the microscope ; of teaching bacteriology in its relations to disease to students who have never seen a bacillus, or had any ocular demonstration of its life history, or of the fundamental phenomena of fermentation and putrefaction.

Many of us can remember the time when all the practical instruction a medical student obtained was in the dissecting-room and the hospital wards. One outcome of that state of affairs was in the medical schools a very undue amount of time and energy spent in the study of minitiæ of human anatomy ; but the best teachers recognized that the men must have some practical training, and the dissecting-room was in those days the only means of providing it. Medicine and surgery are advancing, slowly but surely, and within the last twenty years with greatly increased velocity, from an empirical to a rational basis, both as regards the cure, and, what is infinitely more important, the prevention of disease. Now that physiology, pathology and hygiene are being yearly more firmly established on general scientific principles, and have so perfected their methods that fundamental facts in those sciences can be easily demonstrated to medical students (or even investigated by them), the dominant role which gross anatomy has often hitherto had in medical education will be lessened, and the student will get more and more of his practical training through experimental physiology and pathology and hygiene. To permit and encourage this most important advance in medical education such laboratories as the Hoagland must be provided and sustained by enlightened and public spirited men.

It is interesting to glance backward and see how slowly the idea evolved and put in action by Purkinje and Liebig took hold—at any-rate as regards physiology and pathology. Fifteen years after Purkinje's effort, the practical teaching of physiology and pathology amounted to almost nothing. Partly, no doubt, because the essential independence of those realms of human thought and inquiry had not been recognized. These sciences were still regarded as mere accessories, more or less (perhaps on the whole less) helpful in the study of medicine and surgery; they were generally considered as only worthy of attention because of their possible use in connection with the medical arts, and were for the most part taught in conjunction with other subjects by a single professor. The greatest physiologist of his time, and one of the greatest of all time, Johannes Mueller, was in 840, professor in Berlin of human anatomy, comparative anatomy, pathological anatomy, physiology, and embryology. That pathology is as distinct from pathological anatomy as physiology is from normal anatomy had not then been recognized, or another title would have been added to the list of Mueller's duties.

Among Mueller's students was Du Bois Reymond, now professor of physiology in Berlin. It is interesting to read his account of the small facilities for observation and practical work afforded in 1840 to students of scientific medicine under the greatest teacher of that time. He says:

"We were shown a few fresh specimens under the microscope, the art of putting up permanent preparations being still unknown. We had also opportunity to see the circulation of the blood in the frog's web" (something which every science student in every well conducted normal school in this country now sees without considering it any great matter). He goes on to say that he and his fellows saw the experiment of filtering frog's blood so as to retain the corpuscles and let the plasma through, and the resultant demonstration by the clotting of the colorless plasma, that the red corpuscles of the blood were not an essential element of the clot; he also had opportunity to observe an experiment in artificial digestion; one on section of the spinal nerve roots; a demonstration on reflex movements; and an experiment in pharmacology, proving that opium poisoning was not transmitted centripetally through the nerves. There was in the whole course but one demonstration on a warm blooded animal, namely, section of both vagi, to show the resulting disturbance of respiration. That the pneumogastric nerves had any influence on the heart beat was still unknown. These half a dozen demonstrations were all the

quasi-practical teaching that the student of physiology or pharmacology received in the best schools in 1840. That he should put up microscopic preparations himself or make an experiment himself were things hardly dreamed of.

Moreover lecture diagrams were not in use. Du Bois Reymond states that he first saw them employed in England, and that he introduced them to Berlin in 1850.

It is, then, very clear that but fifty years ago appliances and methods for teaching histology, physiology, and pathology were very imperfect. We may next ask, how was it as regards facilities for research? The answer is that there were none. "Did a young man desire to institute a physiological research, he had for the most part to work in his lodgings, where an account of his frogs and rabbits he got into trouble with the people who kept the boarding house, and where many experiments were quite impossible, or could only be carried out under the most adverse circumstances. No skilled assistants directed the young investigator's work ; no library was accessible to him ; no collection of apparatus gave him its precious aid. He had to buy his own books of reference and provide his own apparatus, often to make the latter himself." The student who undertook a research in those days rolled his induction coils, soldered his galvanic element, even made his rubber tubing, for that essential in every modern laboratory was not yet an article of commerce.

Some few men, those born to be physiologists, pathologists or pharmacologists, surmounted the difficulties. We need only call to mind the names of. Du Bois Reymond, Ludwig, Brücke, Helmholtz, Vierordt, Donders, Bernard, and other of their contemporaries. There was a good side to all this difficulty. Only earnest students would surmount them, and undertake biological research. Whatever was done was done by a man who had his heart in his work, and who had to work so hard to do it, that when his research was completed it was almost certain to be of importance.

No one believes in laboratories more thoroughly than do I ; they are to-day among the institutions most essential for the increase of man's control over nature and his power to harness her as his servant, his drudge—instead of master. Nevertheless the great conveniences afforded by modern laboratories sometimes lead to their abuse. It has become so easy, in fact such a pleasant amusement, to make a so-called research, that a great deal of it comes from the hands of sciolists. It may seem hard to designate as trash a considerable percentage of the work now issued from biological laboratories, but there is no other way of honestly stating its value. Incompetent and

imperfectly trained persons are almost daily publishing so-called researches, the reading of which is pure weariness of spirit ; and yet the physiologist or pathologist has to work his way painfully through them, in the hope that he may extract one grain from the bushel of straw. If I thought any considerable number of trivial or plagiarized "researches" would be the out come of this laboratory, I could not honestly congratulate you on its foundation ; but supervised by its founder, and directed by thoroughly competent men, I have no such fear. No triflers will be allowed to continue their trifling in it ; and what it may publish will be the outcome of earnest and faithful and thoughtful work.

When I entered this room to-night and saw you all here, eager to inspect the Hoagland Laboratory, the query which presented itself to me was, What went ye out for to see ? A reed shaken by the wind ? Those clad in soft clothing ? A prophetic or more than prophetic building ? Is this laboratory to be but a mere transient and unimportant element in the intellectual life of your city ? Is it to be but a place in which some teachers may live idly as those who dwell in king's palaces ? Or is it to be the seat and the training place of prophets and more than prophets, from whom intellectual fire and enthusiasm shall spread over our nation ?

These questions it is mainly for you, men and women of Brooklyn, to decide. The best equipped laboratory, the most devoted teachers, are almost impotent unless they have the active sympathy and support of the community in which they are placed.

I appeal to you, citizens of no mean city—one known the world over, as the City of Churches—and I speak with all sincerity when I urge you to cherish this laboratory as a new church. It is a temple for the study of the works of God, and to my mind as sacred a place as that in which you may meet to study the word of God.

Cherish it, foster it, keep its ideals high, so that as year follows year it shall become more and more a centre from which will spread not only vast gains in our knowledge of the laws of health and in our power to conquer disease, but examples of single-hearted devotion to all that is true and noble and patriotic. — Martin, H. Newell, *Brooklyn Medical Journal.*

CORDIAL WELCOME—HAPPY RESPONSE.

Mr. Reid Green, in behalf of the mayor and citizens of Cairo, made an address of welcome as follows :

Members of the Dental Society, Ladies and Gentlemen : I have been requested on behalf of the Mayor of the city and the citizens,

to extend to you, the members of the Illinois State Dental Society, a most cordial welcome to our city. To the citizens I extend my most ardent congratulations that we have with us to-day such a distinguished body of gentlemen as visitors.

Gentlemen, we are very proud of the advancement of our little city. You no doubt know of Cairo as Eden—Dickens' Eden. Many of you no doubt know of Cairo back in the sixties as the place from which the old commander took his start. Many of you no doubt, and as I understand, were here then. You know what our town was then, and you know it as Dickens pictured it.

Gentlemen, since that time we have developed our resources, we have overcome those obstacles, which were no doubt known to you then. We have used our every endeavor to bring our city up, and at present we know nothing in this town save advancement And, gentlemen, I must say that I feel proud, and I know the citizens here assembled feel proud, that we have such an intelligent band of inspectors present to-day, to view our city and pass upon it.

But I am very well aware that your time is precious. I would, if I had the time, speak at length of your noble calling, of the work you do for humanity, and of those good qualities which are possessed by so many who are in your ranks. But I am admonished that your time is valuable, and that it can be more profitably occupied in other matters than by listening to a long address from me. Therefore, I simply from the bottom of my heart give voice to the sentiments of every citizen of Cairo, and extend to you a most cordial and hearty welcome to our city.

This was responded to for the Society by Dr. C. R. E. Koch, of Chicago, as follows :

By the partiality of our esteemed President I have been detailed to respond to the cordial greeting the people of the historic city of Cairo have so eloquently extended to this society through you. Permit me to observe, Sir, even at the sacrifice of reputation for modesty, that no member of this society is better able to appreciate your kindly welcome than myself.

I was once a dweller among you ; nearly twenty-six years ago I paid a special assessment here. Together with some 950 other fellows, who brought their baggage on their backs, I arrived here in August, 1862. Mine host of the St. Charles hotel, unlike Mr. Parker, had no rooms reserved for us; but we were invited to hospita-

ble beds on the bottom land enclosed between the Ohio and Mississippi levees, just the other side of the Halliday house; and we were told to make ourselves comfortable on the downy surface of old mother earth, which two days previous rain had rendered particularly soft and pleasant for repose.

We were a band of Young Men's Christian Association men and Scions of the Board of Trade of Chicago,—and at once sent up a prayer for straw. In the language of the present day it would be said "we kicked for straw." Our prayer or "kick" was effectual. The straw was providentially forthcoming and we at once were no longer to fame unknown. That great army of the Tennessee, of which we soon became an integral part, knew us ever, up to the time of our peaceful dissolution, as the "Straw Regiment."

One of our guards on a bright moonlight night, saw a Cairo bovine approaching him. Having been instructed to challenge anything that might come near his post, and to shoot if the challenge was unheeded, he pulled the trigger of his Fremont Belgian rifle. The dead body of the quadruped was the result of its disobeying the command to "Halt!" The next morning the members of the guard, of which your humble servant was a member, were called upon to stand a per capita assessment to reimburse the owner of the animal. This was not done merely because the man made a terrible fuss about the matter, nor from fear of punishment, but particularly because the principles of the Board of Trade and Young Men's Christian Association, of Chicago, were so strongly rooted in our consciences, that we felt justice had to be done, even though it cost us half a dollar apiece.

Sir, it will perhaps be a surprise to you to hear me assert my claim of being the oldest Cairo dentist now in this city. My office in 1862 was in a row of sheds, situated, perhaps, twenty rods to the south of the Halliday. Uncle Sam was the landlord and I paid no rent. A camp stool was the operating chair, a cracker box (one of the B. C. kind) served as a table, and six or seven pounds of steel instruments, a book of tin foil and a bottle of amalgam, comprised my outfit. The business was not very lucrative or extensive, and really the success of those operations is still problematical. One of my patrons of those days has become one of the most noted evangelists of this country. It may seem like conceit, but somehow it has always impressed me that there was a connection between my Cairo dentistry and his evangelistic career. Permit me to assure you, Sir, that these men you see here are more skilled than I was, and should you fall a

victim to their science you would be in no danger of becoming a preacher, although it is not altogether improbable that it might make you a senator.

There are a number of our members here, Sir, who remember your city as it was during those years that tried men's souls, and who believed that times of peace would sound the death knell to the progress and prosperity of your city. In this we are glad to see we were mistaken. Providence has given to your city the key of our inter-state water communication from the Alleghanies to the Rockies, and to the Gulf of Mexico ; and when congress shall have wisdom sufficient to create a channel that shall connect your river commerce with the Gulf of St. Lawrence, there is no doubt but Cairo will still continue to grow and prosper more and more.

Somewhere I have read in sacred or profane history that "T'was here the Queen of Sheba came to Solomon of old," with a wondrous load of spices, pomegranates and fine gold, and when this lovely point she saw her heart was filled with joy ; she straightway said she'd like to be Queen of Cairo, Illinois.

We are glad to be in Cairo. Many of our members feared to come so far, but coming has taught us all a lesson of the extended wealth and importance of our state. With Cairo in the extreme south and Chicago in the north, to say nothing of St. Louis in the west, it does not seem that Illinois can take anything but a leading position in the commerce of the nation.

This society is now twenty-four years old. During this time it has met annually at different points in the State. Its sole aim and object has always been to increase the standard of attainments of its members in order that it might be able to give more comfort to suffering humanity. Unlike trade unions and many other societies the question of "The Mighty Dollar, and How to Get it in Large Quantities," has never entered in its deliberations. No corner on dentistry has ever been organized by it, nor has it ever undertaken to say how many hours a day its members should labor, or what fees they should collect.

In the fourth chapter of Genesis it is recorded, "And Abel was a keeper of sheep and Cain was a tiller of the ground," showing stock raising and farming to be the most ancient of callings. The good book speaks of many special fields of labor and usefulness, but dentists are compelled to confess that their's is a comparatively modern calling. In its brief life, however, its votaries have frequently

silenced and overawed emperors and prelates. The pulpit and the forum are alike dumb when reposing in our chairs, and the fascinating and irresistible accents of woman's melodious tongue are frequently hushed into painful silence by us.

With all this latent potency we are notwithstanding an exceedingly mild-mannered and peaceful set of citizens. I pray you, sir, assure the good people of Cairo that when we go from here our labors for this year ended, we shall take with us the recollection of time profitably and well spent, and that their kindly greeting and hospitable attentions contributed in no small degree to the success, comfort and enjoyment of our meeting.—*Transactions of the Illinois State Dental Society.*

THE EDITORIAL FUNCTION.

The exercise of the editorial function is so liable to occasion unjust reflections and unwarranted conclusions, that brief space may be permitted for the presentation of a few general statements :

First. It should be remembered that the editor has probably the advantage of a wider outlook than the writer. As to the acceptance or rejection of a paper submitted for publication, the editor is of necessity obliged to consider the interests of his journal and of its readers more than those of any single contributor. The duty which he owes to his subscribers outweighs the claims of business or friendship. If the periodical has a well-defined field, he cannot admit the discussion of irrelevant topics. Subscribers have paid for it as the vehicle of information in their specialty, and they have a right to complain of the use of its pages for matter not pertinent thereto. Even within this limitation if the subjects be of local rather than of general interest, or if it be threadbare by frequent discussion, or be dealt with in an elementary manner, due consideration for the reputation of his journal compels an editor to respectfully decline the publication of such matter, and such considerations appeal to him as they cannot to one not occupying his vantage ground, albeit an adverse judgment is frequently as painful to the editor as it is disappointing to the writer.

Second. It would seem almost superfluous to assert that the editor is as desirous to obtain a good article as a writer can be to furnish one, and no well-written paper is rejected except for a valid reason, and after a careful survey of the situation.

Third. An editor who wishes to maintain a literary character for his journal must measure every contribution by the standard which he has erected. Judged by such standard, many articles must either be rejected or made approximately to conform thereto. A reader of even superficial culture soon catches the tone of the periodical which he reads habitually, and if it pleases him he will not be satisfied with a lowering of its style; and though he may not possess the gift of writing well himself, he recognizes and appreciates it in others. While it may be impossible to maintain the same high tone in every instance, the rule is to keep the exceptions as near the pitch as possible.

Fourth. It should not be forgotten that good contributors are a necessity to the successful editor, and it is of vital interest to his journal to encourage and develop them. In this effort there is much laborious editorial work, credit for which the editor cheerfully waives in favor of his contributor; with a more mature judgment contributors subsequently recognize the value of an editorial revision which at the time they were disposed to resent as meddlesome. The reasons for this are not difficult of apprehension. The editor is constantly exercising the critical faculty; being practiced in the art of selection, he readily sees the merits and demerits of the paper before him, and makes honest effort to improve the author's presentation of his theme.

Fifth. No intelligent editor will claim the right to change the *meaning* of his correspondent; while on the other hand he will be solicitous to correct verbosity of style, inelegancy of expression, faultiness of grammatical construction, and to make plain, by modification, obscure or involved sentences,—in a word, to make the writer say concisely that which he had desired to say, but had failed to make clear by reason of inexperience or undue haste.

Sixth. The privilege accorded to the writer to revise proof of his contribution gives him the opportunity to correct any misapprehension of his meaning on the part of the editor, and should be accepted as evidence that there was no intention to be otherwise than helpful to him.

Seventh. Contributors to the literature of a profession should bear in mind that, so far from there being any antagonism between writer and editor, there is assumed to be a common purpose to present that which shall be creditable alike to author, editor, journal, and to the profession.

Eighth. Inexperienced writers should therefore accept editorial revision as well meant even if not well done, and intended as a cor-

rective for faults, or what appear as such to the editor, and as an inspiration to more careful effort.

Ninth. While the foregoing summary of points submitted for the consideration of our contributors may at first reading appear egotistic, it is not meant to assume superiority, but simply to invite thought and promote a charitable feeling for those occupying editorial chairs, whose best efforts too often bring them reproach and censure where they had hoped for appreciation and thanks.—Editorial, *Dental Cosmos.*

CARBOLIC ACID AND CREOSOTE.

It is not surprising that the following item should go the rounds of the journals that do not stop to think about what they publish :

—Creosote, as a dental application to painful cavities, is complicated with the inconvenience that the liquid is apt to give trouble by coming in contact with various parts of the mouth. This may be avoided by mixing it with collodion, in the proportion of ten parts of collodoin to fifteen parts of creosote. The mixture forms a sort of jelly, which, besides being more manageable than plain creosote, forms a varnish which seals the cavity and protects the dental nerve substance from contact with the air.

A recent issue of one of the dental journals publishes the above, and the editor adds the information that "pure carbolic acid may be used in place of the creosote." We would add that it not only may be used, but must be taken, if the collodoin is to be coagulated.

We would advise a closer study of the United States Pharmacopœia by those who have published the above item.—*Meyer Brothers' Druggist.*

THE ETHICS OF MEDICAL VISITING AGAIN.

In a former number of this JOURNAL* we took occasion to notice a letter of Dr. D. A. K. Steele, of Chicago, in which he gave some of his impressions of European surgeons. A second letter on a similar subject, published in the same journal, *The Western Medical Reporter*, again attracts our attention, and with it, it is our purpose now to deal.

Dr. Steele, of Chicago, Ulysses-like, has continued his wanderings, but unlike the crafty "Dux Danaorum," does not escape the machinations of the Circe.

Dr. Steele, we suspect, carries his Circe with him. She seems with him too much at home not to be "to the manner born." As Socrates, had his "Daimon," so has Dr. Steele, of Chicago, his Circe. Here

*See Odontographic Journal for January.

the comparison must end. Dr. Steele neither teaches as Socrates, nor laughs as Democritus. Neither, like Diogenes, does he sit in a tub, but like him he sneers and scorns. Here, too, the comparison must end, for Diogenes, we are told, *sat* in his tub, content to sneer at what came along. He neither left home to sneer, nor published his diatribes upon mankind in "The Sinope Slanderer." Once, it is currently reported, the philosopher lighted his lamp in broad daylight, and went in search of a man. Dr. Steele, of Chicago, apparently, at cross purposes with his pseudo-prototype, in a fit of pespair, girded up his loins and went into a far country, blinded by the glare of Chicago, to seek a surgeon, or rather to discover whether surgery, as a fine art, had any existence—except as a lost art—outside of Chicago. Whether Diogenes in his search came upon a man, we are left to conjecture. Not so with Dr. Steele. For him all the world—but Chicago—is one great Nazareth. And "can any good come out of Nazareth"? Like the monks of old, Dr. Steele is lost in self-contemplation. Like St. Simon Stylites, perched upon his pillar, too far from the spheres to hear their music, and too far from the earth to be a part of it, or to have sympathy with it, for him there is but one imposing figure—the perch and its occupant.

Persons, like mirrors, are faulty aids for scientific observations. By the first, one can see only what perchance passes. By the second, he can see only himself and what is behind. A combination of mirror and pedestal is particularly liable to induce self-worship. We speak plainly. We are in earnest, and have no time to waste in "patching fig leaves for the naked truth. With Dr. Steele and his methods, we have no sympathy; nor can any man or men, not blinded by a desire for notoriety, nor puffed up by vain egotism, nor altogether lacking in a respect or appreciation of "the unwritten law of medical comity," or common decency.

With Dr. Steele's former letters, both as regards Mr. Tait and other surgeons, we spoke plainly, but not harshly, hoping that a regard for the good name and good sense of Americans generally, would lead him to desist from further perpetration of boorish incivility upon those good enough to admit him to their table and their work. This he refuses to do. In the November number of the *Western Medical Reporter* he thus harangues upon Prof. Pean:

"To my surprise, I found that Pean was deficient in those qualties that mark the difference between a really great surgeon and a [sic] merely skillful operator. He became nervous, irascible, and profane, and soon had all of his assistants in the same unhappy frame of

mind. . . . . The first part of the operation was a brilliant success, ... but from the moment of hemorrhage occuring from the stump, its management was a dismal failure."

And this is the criticism of a man personally invited by the operator to his private hospital.

Hospitality, both "the unwritten law of medical comity" and the (written) law of self-defense, must soon be a thing of the past, if such conduct as this goes without condemnation and reproval. Dr. Steele's diatribes should be included in the index expurgatorius, and be burned without reading. Dr. Steele should be suppressed.—*Buffalo Medical and Surgical Journal.*

REFLEX NAUSEA.

About a year ago a lady brought me several upper sets of teeth, well made and adapted for her own mouth; but after a year's trial she had abandoned all attempts to wear them, on account of the gagging and nausea. Perseverance only led to vomiting. The strange fact was that she did not mind plaster of Paris impressions, even when they touched the pharynx, and was not discommoded by any handling of the soft plate with the fingers. You could poke your fingers down to her tonsils without provoking nausea; yet the moment she put any one of these sets in her mouth and her tongue touched it, she gasped and gagged until it was removed. In fact, it was quite painful for an unprofessional observer to witness.

The instant conclusion to which I came was that the plate must not cover so much of the hard palate, and I made a set of ten instead of fourteen teeth, reaching about half as far back as any of the others. It was a great failure. I then made the thinest possible plate, covering the tuberosities, which were like marbles, and keeping a rim not more than half an inch wide, covering the front of the maxilla. It was retained by suction from three small chambers at the heels and in the centre. The moment the lady attempted to suck it, the plate adhered, but she gagged as much as ever, and was obliged to remove it. I then reduced the plate to the smallest possible compass, with eight teeth, but it was no more successful.

I then painted the soft palate and the fauces with a four-per-cent. solution of hydrochlorate of cocaine. A very slight improvement was perceptible, but after an hour the gagging returned. We both persevered doing this, but it was of no permanent avail. Finally,

I made her protrude her tongue, and I sprayed it with the solution. To the surprise of both of us, she instantly for the first time in her experience, sucked the plate into place without the least unpleasant sensation. The effect—and the set—remained for two days, but on the third the old gagging returned, and I could not persuade her to make another effort. The interesting question is, what is the physiological explanation of the cause? Is it not exceptional as illustrating a deviation from the well-known neurosis associated with the nerves of the teeth, as an inflammation of the pulp. Evidently the tongue alone was the sentient seat from which a centripetal current travelled towards the fauces, reappearing as a centrifugal impulse, which excited reflex irritability of the nerves of the stomach, and contraction of the viscus. Yet it was not until the act of suction was performed that the retching occurred. The plate could be put into the mouth and the teeth closed on it without exciting nausea, but the instant the tongue touched it in sucking, the gagging occured. Was not the dorsum of the tongue in a hypersensitive condition, and did not the spray paralyze the papillæ, as well as by reflex action, the nerves of taste, the glosso- pharyngeal, and the lingual or gustatory? Was not the tongue the stimulation that produced the irritation?

I am indebted to Dr. T. Wesley Mills, Professor of Physiology, McGill College, Montreal, for the following hasty notes on the above :—

Case of Nausea Produced Reflexly.—In this case there seems to be little doubt but that the afferent impulses travelling from the tongue by way of the fifth nerve, were the sources of the nausea. The tongue is very readily affected by all foreign sensations, such as that referred to in the account of the present interesting case. But as the nature of reflex depends not only on the *quality*, intensity, site, etc., of the stimulus, but very largely on the *contraction of the central cells* acting as centre, it becomes a question whether in the present instance there was increased excitability (activity) of the nerve endings, of the nerve itself, the central cells, or all of these. Many facts go to show, that the central cells are of most importance in determining the issue, as witness the readiness with which cerebral events (emotions, recollections) cause nausea.

The case in question seems to me to illustrate this aspect of the subject. As in the case of other centres, so in this instance, the tetanus "vomiting centre" had, partly from repeated stimulating and partly from cerebral influences, become irritable, *i.e.*, discharged

impulses with undue readiness. This centre seems to be especially liable to get into this condition, so that even a vomiting (or regurgitating) habit may be formed.—Beers, W. Geo., *Dominion Dental Journal.*

"NO SABE."

The more I study Americans, says a Chinese correspondent, the more I am convinced that they are mentally diseased. Instead of doing everything in a common sense manner, they try all they can to do it in the very opposite way. At home, for example, you and the other members of your Mutual Health Association pay Dr. Wun Lung and his assistants a liberal salary to keep you all well, and pay nothing when you are sick. On this account he and his young men work very assiduously in regularly calling and examining every member of the union, and all of you enjoy comparative immunity from illness. Here, in New York, a physician is paid for by the amount of your sickness, and the less able you are to earn any money the larger and more onerous is his bill. As a result, many doctors, I am told, yield to temptation and keep their customers sick. The consequence is that those who have the largest number of sick and dying are the richest, most esteemed and influential, while in China they would be ostracized and not allowed to practice.—*Exchange.*

MEDICAL EDUCATION FOR DENTISTS.

I should be sorry to have this subject of the education of the dentist, or rather education for dentistry, become settled without having put my finger into the pie, metaphorically speaking. I have felt all along that there was no hurry about the matter. It will not be fixed until the "cohesive or non-cohesive gold" question, the "amalgam" question are fixed, and these or course we shall always have with us. But the education question like these others, might become quiescent for a while and I might not be here or not in condition to take an interest in it when it shall again appear on the tapis, so I seize this opportunity and plunge into the subject now.

The fact that busy and prominent practitioners of medicine and dentistry, who are not often professors in medical or dental colleges, or editors of medical or dental periodicals, are so much interested in the education, or proper preparation of those who are destined to occupy the shoes of the present race of practitioners, must have

some reason. There must be some grounds for the discontent with past and present methods of education. What are these grounds? Why are not Drs. A., B. and C., who have been successful in gaining professional favor, professional honors, and large practices, where one would suppose all their energies could be profitably engaged, not contented to let the coming doctor and dentist work out his own salvation in the same way that they themselves have? It cannot be that Drs, A., B. and C, are possessed by the foolish idea, that "now we are in, we must make it as difficult as possible for others to get in." It cannot be that Drs. A., B. and C., who have done so nobly in all other respects, can have any but the purest motives in this direction. They are doing what they consider a duty, and this duty lies at present in trying to make the fence about the dental field higher and higher, and in some cases adding a barbed wire at the top of the fence. Why this should have become a duty, I cannot answer. I must acknowledge that I do not know; nor can I see any reason or sense in it. This may be my fault, but I am open to conviction. Fences are good in their way for keeping out intruders and for defining boundaries. When the distinguished Drs. A., B, and C., entered the profession, the fences were so low and badly built that they could be stepped over with the greatest of ease, and no thoughts of the danger of rents and tears from the abominable barbed wire ever entered the intruder's mind.

Gentlemen, to be sincere, the fence was a very low one when I entered the profession. The requirements were a two years apprenticeship or studentship, and a course in a dental college. The labor, the anxiety, the sleepless nights and worried days, the study of medical science, all came afterwards when securely within the field. For several years the mechanics of our practice occupied my best thoughts. I don't think I looked or thought of anything beyond the *how* to do it, in daily practice. The *how* is just as important to-day as it was a quarter of a century ago. Clinical experience seemed to me the very first thing of value, and to acquire that required all the energy and devotion possible. It is to-day as valuable and as difficult to acquire as at any past time in our history. Cultivation of the muscles so that they shall respond delicately, and skillfully, and acurately, to efferent impulses from a trained mind, is of the first importance in our specialy. Will a medical education train the mind for this sort of work? If I should answer the question in my own way, I should say, "not particularly." Latin, Greek, the higher mathematics, the natural sciences,

all furnish gymnastic exercises for general mental development. So does the study of the science of medicine. The particular study which the dental student needs is exactly that which the best class of dental colleges of to-day offer with their two courses of lectures on anatomy, chemistry, materia medica, physiology, pathology, general and special, and therapeutics, and their present facilities for and encouragement of diligent laboratory and infirmary practice. This is all the beginner needs. Nothing more, nothing less. It is the education *par excellence* for the preparation of young men who propose to enter the field of dental practice. It is practical. It is the outgrowth of independent American directness of purpose, untrammeled by ancient precedents. It has been evolved from American necessity, and has been admired and applauded and copied (as near as possible) by special educators in other countries. We hug ourselves on account of the reputation our *young* specialty has gained in the world. The dental college is the prime factor in the good reputation—the dental college standing alone and independent of any medical faculty—the American Dental College, which has become an institution, in the broader meaning of that term, in our country and only in our country—this is the school for the dental student. It isn't the school for medical, nor law, nor theological students. Neither are medical, nor law, nor theological schools the place for dental students.

But the science of dentistry we say, is a branch of the science of medicine. Medicine is the *alma mater* of dentistry as well as of ophthalmology, gynecology, etc., etc. This is all true, and I for one have no disposition to dispute the proposition in any of its points; but when you go on to say after stating the above proposition, "therefore, the dentist like the oculist should study medecine first and dentistry afterwards," I object positively, and insist that the conclusion has no logical connection with the accepted proposition. Anatomy is a branch of the science of biology. Would it not be better for a young man who expects to become a practical anatomist to begin with dissections and the study of anatomy proper, than for him to spend a year or two in the study of biology? After the technique has been acquired and skill with the scalpel, how natural it is for the student of anatomy to extend his studies and reach back into the interesting science of biology. I don't want to multiply examples, but to insist that the study of medicine becomes a desire, a pleasure, a necessity to the dentist *after* the course in the dental college, and after manual skill has been attained in the

infirmary and in practice. Drs. A., B. and C., have pursued this course. Dental graduates are continally supplementing their dental studies by later medical studies. A dozen dental graduates in the immediate vicinity of this house have within a few years graduated at one or another of the medical colleges of this city. It is not at all an uncommon occurrence, and what fine medical students the dental graduates make! Medical education for dentists is of the greatest advantage! Medical education for dentists is becoming every day a greater necessity! We must all approve of it. But I want to make the distinction as clear as the line between black and white, that medical education for dental students is as unnecessary and as unprofitable, as the study of theology would be to a law student. It would be a waste of physiological energy at the wrong time. It is dilettanteism and harmful, instead of useful to practical students. A knowledge of the use and skill in the use of the forceps, or laryngoscope, or of any of the special instruments of specialists in surgical practice, can only be acquired by a special training, whether after a medical course or before a medical course.

The dentist, among all specialists, is the only one who has a special school devoted to this necessary training. The school has proved a success. Why then should we want to change its character and go back to older and inferior methods? Opthamology and laryngology might be very much benefitted if these specialties had their schools arranged exactly after the pattern of the dental colleges, and entirely independent of medical colleges. This may be but a matter of opinion. Many things are but matters of opinion.

"By their fruits ye shall know them." The fruit of the American Dental College has made American dentistry preeminent in the world. The medical colleges have ripened but very little fruit in the dental orchard. If you will show me one very prominent and distinguished practitioner of dentistry who has come to us from the medical schools, I will show you ten equally as prominent and distinguished practitioners who have come from the dental schools. Dr. Norman W. Kingsley looked into this subject some years ago, and stated some significent facts in regard to it. We might adopt his plan and analyze this assembly as a representative society of the State of Ohio. How many of us, members of this society, have received a medical college education first and our dental education afterwards? I suspect a straw vote would show a very significent minority of the former. Why then, gentlemen, do Drs. A., B. and C., want to change the methods of the dental college, or attach

"chairs" to medical college faculties. These dental chairs, so-called, have always seemed to me to bear about the same relation to a chair in an independant dental school, that a little wicker work child's chair, with a hole in the bottom, does to a comfortable adult arm chair. Our profession is to old for the little chair now. Let's put it away in the garret with the tin soldiers, rag-babies, and rocking-horses of our babyhood, and stick manfully to our dental schools and the chalrs filled by professors of the science and art of dentistry. —Wright, C. M., *Ohio Journal of Dental Science.*

OLD, BUT WORTH REPEATING.

How much a man is like his shoes !
For instance, both a soul may lose ;
Both have been tanned ; both are made tight—
By cobblers ; both get left and right.
Both need a mate to be complete ;
And both are made to go on feet.
They both need heeling ; oft are sold,
And both in time will turn to mould.
With shoes, the last is first ; with men,
The first shall be the last ; and when
The shoes wear out they're mended new ;
When men wear out they're men dead, too !
They both are tread upon, and both
Will tread on others, nothing loth.
Both have their ties, and both incline,
When polished, in the world to shine ;
And both peg out. Now, would you choose,
To be a man or be his shoes ?—*Exchange.*

SCIENCE AND THE DICTIONARY.—ESPECIALLY THE "CENTURY DICTIONARY"

One of the most important accompaniments of the progress of science, indeed an essential factor in it, is the increase of its vocabulary. Every advance in accurate observation, discovery, analysis, or constructive theory, brings with it a new term, or, more often, a group of new terms. This multiplication of words is largely inevitable. The new things must, of course, generally receive new names, and the new ideas will not always fit into the frames of association in which the old words are set. The scientific demand for precision and brevity must be satisfied, even if linguistic purity

suffers. It thus happens that every year the language of science receives a large addition which students of science must understand and use. How very large this increment is, it is difficult, even for those who are familiar with several departments of science, to appreciate. Moreover, the process of growth does not stop with what is necessary. Unfortunately, the liberty which in many cases must be taken with the language has led many reputable scientific men to feel that they are free to do what they please with it, in any case. The result is a vast number of coinages which might have been dispensed with, but which must be learned and remembered, since they often become current through the reputation of their inventors. The number of such words increases at the rate of probably several thousand a year.

To this increment through direct coinage must also be added the numerous, and not less significant, specializations and enlargements of the meaning of established and even common words, such as "energy" and "potential." Every movement of science unsettles much that has been done before, and of this continuous re-adjustment its language is a true reflection.

It is obvious that at this point science can receive a great deal of help from competent lexicographic aid. While the dictionary is not, in many respects, an adequate exponent of scientific knowledge, it may be an invaluable record of the greater number of the elements or details of that knowledge. Its aim is, of course, necessarily to state merely what is or has been in the language it describes, not what scientifically ought to have been; but, if it is accurately and intelligently performed, this historical labor approaches in its value to science very near to original work. It is true, also, that the utility of the ordinary dictionary is limited by the narrowness of its definitions and the formalism which marks its treatment of its material; but these defects are largely conventional, and it is quite possible for an editor who understands the wants to be met, and who has the necessary disregard of traditions, to model a dictionary which will satisfy every reasonable scientific demand. In a word, the impossibility now felt of keeping track of the linguistic developement not only of science as a whole, but even of one specialty, and the difficulty of guarding even established words from misuse or abuse, make the construction of a dictionary which will not only record the entire vocabulary of the sciences, but will record it and define it so fully and accurately as to conform to the needs of scientific men, one of the most urgent

requirements of the time. It is, therefore, worthy of note that the attempt has been made in this country, and by American scientists, to produce a book of this kind. It is announced that the "Century Dictionary," which has been for some years preparing, under the editorship of Professor W. D. Whitney, is to be not merely a complete general and historical dictionary of common English, but also an equally complete dictionary of technical terms; and that this technical material, which has been obtained by searching all branches of scientific literature, has been put in shape by competent specialists, who have had in mind the necessities of their fellow-craftsmen, as well as the wants of laymen. It appears, thus, that an effort is seriously making to embody for the first time comprehensively, in lexicographic form, the scientific spirit and work of the nineteenth century; and while it is to be expected that the most direct result of the attempt will be the promoting of popular intelligence, it is also to be expected—from the reputation of the distinguised editor-in-chief and of his co-laborers, among whom are Professor J. D. Whitney, Professor E. S. Dana, Dr. Sereno Watson, Dr. Lester F. Ward, Professor C. S. Peirce, Professor T. C. Mendenhall, Professor R. H. Thurston, Dr. Eliott Coues, Professor Theodore Gill, and many others—that the interests of pure science will not be neglected.—*Science.*

HOW DRUGGISTS DO BUSINESS IN ILLINOIS.

We have the duplicate of that New York medical law here in Illinois; but let it be known we have been so fortunate as to have among the druggists a few resolute men who did not fear Dr. Rauch, the secretary, and his medical board of health. They told him, in plain and unmistakable English, "You enforce this counter prescribing clause of your medical law against the druggists of the state of Illinois, and we will compel your board to register every druggist of the state as a physician. For, if the law decides counter prescribing as being the act of a physician, then we are entitled to registration as such, as it is a legitimate part of the drug business, and we have been practicing counter prescribing ere this medical law was passed and went into force." This has had the proper effect on the pompous secretary of the board of health, who had previously been making his boasts how he was going to do up the druggists who had become so important in their own estimation as to have deprived physicians becoming registered under the pharmacy law unless they passed an examination. Just for a moment think of the audacity of a druggist

requiring a physician to pass an examination, and especially before a board of druggists. What an outrage! No wonder the secretary of the doctors' law tried to get even with the druggists for this. Yet, we must give the secretary of the board of health credit that he used policy and did not enforce, nor does he intend to enforce it, at least so some fellow who styles himself a druggist says, and that Dr. Rauch did not wish to add 4,000 more quacks to the medical profession of the state of Illinois by being compelled to register these druggists.

So we do things in this "sucker state," and, thanks to our resolute pharmacists, we were not in the hole that our colleagues are in the empire state.—*Meyer Brothers' Druggist.*

"PERRY'S CHASM"—TAKING OFF THE ENAMEL.

If the teeth chanced to be of good structure and the cavity small, how much better to spread them with a separator the thickness of a sheet of thin sand-paper, and cutting with small burs, or specially shaped, delicate excavators, from the grinding, lingual or buccal aspect, fill them with gold or copper amalgam, and allow them to go back to their natural positions, with their contour absolutely untouched.

Following this plan, it would not be probable that a patient would come in saying, as one did to me some years after the Arthur aberration: "This space between my teeth is giving me no end of trouble and annoyance, and I think there must be a cavity there. I have named it 'Perry's Chasm.'" Nor would there have been made to me the following remark: "Doctor, do you notice that on the left side, where many years ago separations were made between the back teeth, nearly all the cut surfaces have had to be filled; while on the other side, where no cutting was ever done, the teeth have never been filled and are still in good condition."

Only a few days ago a lady said to me: "Do you remember that many years ago you wanted to cut between some of my back teeth because you thought there were or would be cavities there, and mother begged you not to do it, and it was not done; and do you see that all of those teeth are still sound? Mother knew; did she not?"

I tell you, gentlemen, mothers do know; the public knows, and you may reason with all the plausibility at your command and you cannot overcome the widespread, instinctive dislike of that practice.

You may flatter yourself that you have made a good argument, and as the patient does not get up and leave at once, you go on with your cutting and filing. But a year goes by and your patient does not re-appear ; he has quietly slipped away to some one of those men who try to leave the teeth as nature made them.

The public calls this filing "taking off the enamel." It is more than that. It is taking off from the operator the armor of courage and confidence in his own ability to make his work a real blessing to his patient, and leaves him bare and unprotected against the temptation of doing hasty, botchy and inartistic work. The evil effects of this practice are not felt by the patient only, but indirectly by the operator, who becomes demoralized and ready to cut out and hack with the reverence of a bull in a china closet, unmindful of the fact that nature, in her constructive processes, has produced in the teeth of man a marvelous example of the adaptation of means to ends—of means by which a given amount of tooth material is distributed so as to secure a combination of the greatest amount of strength with the greatest amount of beauty of form and outline.—Perry, S. G., *International Dental Journal.*

THE INTERNATIONAL TOOTH CROWN COMPANY, vs. THE DENTISTS OF THE UNITED STATES.

What is the International Tooth Crown Company? What is it doing? It is a corporation not composed of dentists, but whose stockholders and active officers are parties recently connected with the Goodyear Dental Vulcanite Company, who for many years waged war on the individual dentists throughout the country ; and its demands and *methods of operation* are very similar to those pursued by the old Goodyear Dental Vulcanite Company. There is this difference, however : the International Tooth Crown Company does not confine itself to any *one* patent, but is on the lookout for letters patent relating to dentistry when taken out by any person in the United States. It purchases such patents when practicable and then makes monied demands against dentists under them ; and, if not submitted to, harasses them by suits in the United States Courts. It has recently, if we are correctly informed, added two new patents on removable bridges to its list.

Those of the profession who consent to pay the royalty demanded are compelled to sign a license full of offensive agreements, and

which is little less than a species of blackmail to say the least, or take the alternative of an expensive lawsuit.

The principal patents now owned by the International Tooth Crown Company are several patents known as tooth crown patents, which cover practically most of the successful operations in tooth crowning in use by our profession, and patents relating to bridge work, the principal one of these being the Low patent, under which they practically claim all bridge work.

The International Tooth Crown Company has suits now pending against members of our profession in the States of Maryland, New York, Connecticut, and Wisconsin, and are about to commence suit in other States, or are threatening to do so.

A Connecticut and New York case was heard over two years ago, in which a voluminous record was made up on behalf of the complainants and defendants. Upon that record as made, the patent on bridge work was sustained, and an injunction issued against the defendant dentists. The bill, however, was dismissed as to the several patents on crown work, and an appeal was taken by the complainant, the International Tooth Crown Company, to the Supreme Court of the United States, where such patents are now pending.

To our personal knowledge the International Tooth Crown Company claims that the tooth crown patents will be unqualifiedly sustained in the coming trial before the Supreme Court of the United States, and that every member of our profession who has done tooth crown work will be subjected to litigation, put under injunction, and compelled to pay costs, damages, and profits for infringement of these patents ; and by reason of the voluminous and confused record on the part of the defendants in that case, there is great danger that this will be the result.

Our present annoyances from litigation are the claims of the Company on bridge work under the Low patent. The greatest danger, however, is that we will remain idle until the Supreme Court's decision on what are known as crown patents ; then, if the decision is in favor of the Company's patents, as we anticipate, we will not be ready to meet them.

Now for the remedy. The only way to meet this problem is to get ready beforehand for the worst, viz.: the sustainment of these crown patents by the U. S. Supreme Court.

The profession should be in such shape that any member, however humble or obscure, or however remote from the large centers he

may live, can step forward in any court, on short notice, with full and complete testimony to defeat these tooth crown patents, irrespective of and additional to any evidence presented in the case now pending in the U. S. Supreme Court.

To accomplish this single-handed and alone will involve the dentists in endless expense and trouble, and probably result in victory for the Company. *Concerted action is imperatively needed.*

With this end in view, at the earnest solicitation of many prominent members of the profession, "THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES" has been formed. Its object is to contest, in a lawful and equitable manner, the patents of this Company or any other patents relating to dentistry, where the validity of such patent has not been fully established. After competent legal advice it was incorporated. This was accomplished under the name above set forth, and the undersigned consented to act as the first Board of Directors. The number of Directors was fixed at three, as it will be obvious to all that the work of such an organization to be prosecuted successfully must be in the hands of a small number, not widely separated, so that there may be concerted action without delay.

By-Laws have been adopted, a copy of which we will forward to you.

THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES proposes to take charge of *all* suits commenced by the Company against any of its members *who unite themselves with this Association before such suits are commenced.*

And we state *unhesitatingly* and *advisedly* that with the evidence we now have in our possession and procurable, we will be able to defeat this Company in their suits against any member of the PROTECTIVE ASSOCIATION on a claim of either bridge or crown patents.

In order to do this we must have funds to engage the best legal talent, and to collect all the required evidence and place it in a form to be used in any part of the country. We therefore ask a general response from the profession. The membership fee is only $10.00, which will entitle the member to protection against this Company, or against any unjust prosecution on doubtful patents relating to dentistry.

The names of the members will not be made public.

We beg the hearty co-operation of every dentist in this movement. The benefits will be shared by all, while the work must mainly

devolve upon a few. Dentists can greatly aid the Directors by *responding promptly*, and by inducing those whom this circular may not reach to join the Association. *Do not lay this upon the shelf until you have mailed your reply enclosing* $10.00.

We further desire any one having evidence, relating to either crown or bridge work, which evidence relates to crown and bridge work done before the year 1881, to send to us a detailed description of such work, enclosing a drawing and sketch of the work when completed, if possible, no matter how roughly such sketch may be made, and giving the name of the party for whom such work was made, and for how long a time used.

Please sign the enclosed By-Laws, and send name and address, *plainly written*, with membership fee, to J. N Crouse, Chairman, Board of Directors of the Dental Protective Association, 2231 Prairie Avenue, Chicago, Ill., who will forward you a receipt.

Lyman J. Gage, Vice-President of the First National Bank of Chicago, has kindly consented to act as Treasurer for the Association.

J. N. CROUSE,
T. W. BROPHY, } Board of Directors.
E. D. SWAIN.
LYMAN J. GAGE, Treasurer.

P.S.—To avoid unnecessary confusion and delay, *all communications should be sent to*

J. N. CROUSE, 2231 Prairie Avenue, Chicago, Ill.

Chicago, March 4, 1889.

SOME LABORATORIES ABROAD.

Dr. Bary's laboratory remains in nearly the condition in which he left it at the time of his death in January. It is housed in a fine stone building standing a few hundred yards back of the main building of the University of Strassburg. Of the building itself nothing more need be said than that while it is very strong and durable in construction, there can be no doubt that the architect had more to do with directing the expenditure of money than had Dr. Bary. The rooms are not particularly well suited to the work intended to be done in them, and much money was expended for architectural effect alone. The large lecture room is finished much after the manner of such rooms in this country. The lecturer's table is a long one, well provided with accessories, and with ample room underneath for charts and maps. Back of the lecturer are a couple of small

preparation rooms, in which material and apparatus are brought together to meet the demands of any particular lecture. Connected with these preparation rooms, by doors, are the rooms containing the botanical cabinet.

The herbarium is stored in a long, narrow room, well filled with rough shelving. The specimens themselves are contained in boxes, and these are slid upon the shelves. A label on the front of the box gives one a clue to the contents.

The laboratories proper occupy several moderate-sized rooms, well lighted. The tables are firm and solid, most of them being fastened along the wall just under the windows. Such tables as are not attached to the wall are simply placed upon the floor, no devices being resorted to in order to reduce the danger of jarring. The tables are of heavy oak construction, but not remarkable otherwise.

The instruments in use in the ordinary student laboratories are all of the usual continental form, *i. e.*, with the simple, low stand, plain stage, sliding-tube and the useful fine adjustment. Mechanical section-cutters are used very little, if at all, the work being done by means of good razors, with the specimen held between the thumb and finger, or imbedded in cork or pith. Facilities for maintaining constant temperatures are supplied, as also for the growing of aquatics, etc.

Taken altogether, one is struck with the extreme simplicity in the outfit. High powers of the microscope are not apparently much resorted to, the objectives usually ranging from our $\frac{3}{4}$ or $\frac{1}{2}$ inch to $\frac{1}{5}$ or $\frac{1}{8}$. Books and periodicals abound, and the student is evidently expected to make good use of them.

Pfeffer's laboratory in Leipzig is in an old building a mile or more from the University. The building has been repaired and altered so as to better fit it for its present uses. One cannot here, any more than at Strassburg, see an ideal arrangement of space for laboratory purposes. Small rooms have been utilized for various purposes, or, where the construction of the building would permit it, they have been thrown into larger ones by the removal of walls. The small rooms are used for special work, and particularly for advanced students. These rooms have oak tables of solid construction standing near the center, and at these the work is done for the most part. A low table runs just under the window, attached to the wall. There are glass cases against the wall in the back part of the room, and in these various kinds of apparatus and glassware are kept for use. The larger rooms are used by beginners. Here long oak tables of

quite rough construction are used. These stand directly upon the floor, and no attempt is made to guard against jarring in any other way than by the weight of the tables themselves.

The microscopes are of the usual continental forms.

At Berlin, Schwendener has rooms in the second story of a building which appears to have been built for some other purpose than of serving for a botanical laboratory. Small and large rooms, with little or no economy of arrangement, are used for offices, private laboratories, laboratories for students, and laboratories for beginners. One of these rooms nearest to the professor's study looks southward, some look westward, some eastward. There is little, if any, north light. The use of large tables in the interior of the room, standing on the ordinary floor, is a marked feature here, as in the preceding laboratories. Side tables against the wall are found in most of the rooms, but the greater part of the work is done at the floor tables. The microscopes are practically like those in Leipzig and Strassburg Culture apparatus and facilities for maintaining constant temperature are amply provided. Books are at hand, and apparently consulted freely.—Bessey, Chas. E., *The Microscope.*

HAM vs. TURKEY.

Ham, like death, has all seasons for its own. You can write about ham in July with as much *sang froid* as in January, and without the slightest seeming of having committed what a friend of mine would have called "a fox pass." (He spoke French "as it was wrote.")

Ham is superior to turkey in this respect. It is not hollow-chested, and there is no place vacant in its anatomy for the cook to shove into it a hod full of soaked bread, canton flannel and parsley. When you harpoon a whole roasted ham it does not jump into the jar that holds the gravy, as a turkey frequently does ; ham is naturally more sluggish in its movements.

The prime essential in ham as a food is that it should be like Cæsar's wife—above suspicion. A ham that is not entirely dead should be shunned, as Bismarck said, like "the deadly upas." The count may be prejudiced against the American hog, but it is as well to be on your guard. The first thing to do, therefore, in carving a ham gracefully is to take a butter tryer and ram it from bow to stern throughout the ham ; then thrust and pull again from starboard to lardboard and get out another sample. Then carry them out to the

back porch and apply a large microscope. If satisfied that the meat is entirely deceased you can safely proceed with the carving. Turn the ham on its back diagonally with the right hand of the table, with the rump pointing in a southwesterly direction ; remove the wings, tear the limbs asunder, and then peel off long juicy slices of the cured dainty.

In carving and serving a ham tedious formulae are avoided. There is no foolishness about getting some of it without going through a civil service examination.—*Daily Paper.*

A MATTER OF TASTE.

Large, full eyes, widely opened, are esteemed a beauty in certain countries ; the Laps and the Esquimaux, on the contrary, admire half closed eyes. Among the Chinese, eyes placed obliquely, with the upper eyelid long and overhanging, are considered most beautiful.

A projecting nose is hideous to the Tartars and the Mongolian races ; so that the mothers take pains to flatten their infants' noses. The negroes and black races regard a broad and frightfully large nose as a perfection. To the Persians the beauty of this feature consists in a noble length. Several nations and tribes pierce the tip of the nose and hang ornaments to it, as is done with us to the ears. The objects attached are sometimes so heavy that the nasal cartilage is prolonged until it falls over the upper lip ; this hideous enlargement is to these people a beauty. In other countries it is the lower lip which enjoys the privilege of being pierced with a hole for the reception of various jewels which fashion obliges them to carry.

White and evenly placed teeth appear to us the chief ornament of the mouth ; but all nations have not the same opinion. To the Siamese black teeth are the handsomest ; it is their daily care to blacken them. In Macassar yellow and red teeth are esteemed above white or black ones. The women of Macassar spend a part of the day in painting their alternate teeth red and yellow. Among the Jaggas the absence of the two upper incisor teeth is a condition of beauty. The woman who lacks sufficient courage to have them drawn would be despised and would be unable to find a husband. Many women, led by coquetry or a desire to please, have four front teeth drawn instead of two, and are sure to find adorers.

In one country a thick neck, short and buried between the shoulders, is admired ; in another, it is a long and slender neck that is most esteemed. In certain localities in the Alps an enormous goiter has its charms ; a woman without this appendage could not be married.—*De Drurey.*

DARWINISM IN THE KITCHEN.

I was takin' off my bonnet
One arternoon at three,
When a hinseck jumped upon it
As proved to be a flea.

Then I takes it to the grate,
Between the bars to stick it,
But I hadn't long to wait
Ere it changed into a cricket.

Says I "Surelie my senses
Is a gettin' in a fog,"
So to drown it, I commences,
When it halters to a frog.

Here my heart began to thump.
And no wonder I felt funky,
For the frog with one big jump,
Leaped hisself into a monkey.

Then I opened wide my eyes,
His features for to scan,
And observed with great surprise,
That that monkey was a man.

But he vanished from my sight
And I sunk upon the floor
Just as missus with a light
Came inside the kitchen door.

Then beginnin' to abuse me,
She says, "Sarah, you've been drinkin,".
I says, "Mum, you'll excuse me
But I' merely been a thinkin'.

But as sure as I'm a cinder,
That party what you see
A-gettin' out the winder
Have developed from a flea!"—*Leisure Hour.*

"TOUCH 'ER LIGHT."

Dr. Benjamin J. Balwin, of Montgomery, Ala., tells the following story :

There came to consult me a man from the "Piny Woods." He was plain, honest, candid, and rural. A jeans coat, home-spun hickory-shirt, red copperas breeches, and long straggling hair constituted his makeup. He entered without ceremony, and made known his wants at once.

"Doc, I'se hearn tell that you fix people's years," he said.

I remarked that I confined my practice to the eye, ear, and throat.

"Well," said he, "I've been er gitting deefer an' deefer for now guine on fore yeer, and I hearn that broth' Josiah Sykes had his years fixed up by you, and I come all the way from Pike to see ye."

I asked him to sit down, and said that I would examine him and tell him what I could do. Upon examination I found both ears tightly packed with wax. I told him I thought I could relieve him, and, after saturating the wax with sweet-oil, the *excavation* and *dislodgement* began. An enormous amount of wax was gotten off each ear.

The old fellow saw it and to him it was incredible.

"Doc, you didn't git all that thar corription outen my head, did ye?" I replied that I did.

"Well, by grannie, if you don't lay o'er anything I ever seen in Pike, I gin it up."

After such an effusive compliment, of course, I felt better. *It had been a great operation.*

"Now, Doc, how much is ye guine to tax me?" he said.

"Oh, I hardly know what to charge you," I replied, seeing he was very limited in means.

"Well, Doc, if I had a thousand dollars I'd make ye rich. I ain't got much, but I'll do my bess."

"Never mind about that, it's all right, you can pay me some other time."

"No, Doc, I muss pay ye. *Here's a dollar, but touch 'er light, I've got to git back home on the train.*"

The fare was sixty-five cents.—*Medical Record.*

ORIGINAL COMMUNICATIONS.

FERMENTATION—PUTREFACTION.

1. What is fermentation?
2. What is putrefaction?
3. When does fermentation become putrefactive?

Not long since the Conductor of this periodical formulated and forwarded to the several gentlemen whose replies follow, the above series of questions, every one of which has at some time suggested itself to, if it has not been actually asked by, all who have followed in even a desultory way, the discussion of questions involving a consideration of ferments and fermentative processes and products.

The outcome of this effort is eminently satisfactory to the ODONTOGRAHHIC JOURNAL, every man asked responding promptly, and in two instances when all but buried in other, and to them more important matters. The replies appear in the order in which they were received through the mail :

DR. GEORGE M. STERNBERG, U. S. ARMY, WASHINGTON.

Fermentation and putrefaction are processes of the same nature—induced by micro-organisms during their development in organic material suitable for their growth.

Fermentation is the more general term, and we speak of :

Alcoholic fermentation ; acetic fermentation ; putrefactive fermentation, etc.

By putrefaction, or putrefactive fermentation, we understand that form of fermentation which causes the decomposition of animal or vegetable material, and is attended with the evolution of offensive volatile products—odor of putrefaction.

DR. C. T. STOCKWELL, SPRINGFIELD, MASS.

To your first question : "What is fermentation ?" I should say it is the changing of non-albuminous matter into other non-albuminous, and is not offensive.

To the second : "What is putrefaction ?" I may suggest that it is the fermentation or changing of albuminous matter into other albuminous matter, which process is offensive to our senses. Further, that both fermentation and putrefaction are the result of the action of micro-organisms.

To the third question : "When does fermentation become putrefactive ? I am "agnostic," unless it be when the process begins to "stink." In other words, fermentation and putrefaction are, practically, identical processes, dependent upon a common cause, and distinguishable only by the presence of an odor. If there is an odor, we *call* the process putrefaction ; if no odor is present, we call it fermentation. And the presence or absence of an odor depends upon the substance acted upon. There may be, however, some occult chemical difference. If so, I, for one, must leave it to your chemical experts to determine just what it is.

DR. WILLIAM H. ATKINSON, NEW YORK.

From my earliest boyhood molecular activities have been the charm and puzzle of my life, being coupled with an almost insane

reverence for the spoken or written sayings of teachers who had undertaken to grapple with, unravel and formulate mental and bodily activities.

There has always been a singular inconsistency in the desire to have my own mental make up satisfied by the formulæ of word and text of the teachers, abject fealty to which, I had been taught was the only open door to scientific certitude in conscious ratiocination and a sort of a loyalty to this domination, that I but half acknowledged as legitimate over my own psychic and affectional mode of consciousness had made me timid on the one hand, and aggressive on the other, in every effort to get at finalities.

This mixed state of a desire to be first, right myself that I may, second, be useful to help others to be right, has caused me to hesitate as to the form of expressing what views I have on these questions.

First—"What is fermentation?"

Second—"What is putrefaction?"

Third—"When does fermentation become putrefactive?"

At the very outset it is necessary to comprehend this group of three questions that are but the outcome of the first, namely, fermentation.

That I may not be tediously analytical, I will endeavor to confine myself to the mental processes through which I am carried to arrive at what to me is an understanding of the simple and complicated process of contact, interpenetration and churning of prime elements within the sphere of influence of the power through which these molecular changes are affected.

What is fermentation? Answer. Boiling. This may be of many varying degrees, from the slightest disturbance of the molecular mass (by which currents of incoming energy, known as heat, transport portions of the mass from one site to another, without molecular disruption, thereby increasing the bulk at the new site), to the setting free of fine particles in the form of vapor, retained within certain limits forming a chamber, the upper part of which, is occupied by the vapor set free, still without disruption of the molecule. This would hardly be complete without having something more than water in the chamber, namely a fermentable sugar.

To study the process of fermentation we must have a fermentable body dissolved in water, to which to add a substance, in the presence of which, the change known as fermentation takes place.

This is a microscopical plant the common example of which is the yeast plant (*Torula cerevisium*).

So long as there is sugar enough to support the multiplication and growth of the torula the plant will live upon the sugar by converting the carbon and hydrogen of the sugar into its own body on the one hand, and either alcohol or carbonic dioxide or both, on the other, according to the degree of heat, pressure and length of time in contact. As soon as the fermentable sugar has been consumed the process of fermentation ceases and the alcohol and carbonic dioxide will not again appear until more of the fermentable body be added to the mass.

The products of this molecular activity are not offensive to the smell. Putrefaction or the production of aromatic bad smelling vapors, appears when nitrogen is in the fermentable body.

It is only in this sense that fermentation can be said to change into purtrefaction by reason of the retrogressive metamorposis breaking up the old and forming the new bodies known as Ptomaes—alkaloids—elaborated in the presence of the much-talked-of bacteria. Thus the fermentative process presents us under the various circumstances with vinous, acetic and cadaveric products, some of which are very destructible to vegetable and animal bodies.

DR. F. Y. CLARK, NEW YORK.

When any liquid substance or matter begins to decompose or change, it is in a state of fermentation. This agitation or condition is brought on by a set of micro-organisms called bacteria. It appears the purpose of these organism, by a system of action, not fully or intelligently understood, to break up or convert all matter appropriating to themselves therefrom, by absorbtion, what is necessary for their own sustenance and propagation. When all the nutriment necessary for any species of bacteria is exhausted or absorbed from the liquid or matter in which they are found, their mission seems to end, and through some undiscovered law, other species are introduced, and a new fermentation begins. Thus through the agency of these organism, one ferment follows another as long as there is anything to be acted on. Therefore it seems as though we may safely say *fermentation is the breaking up of, and the changing of one substance into another, through the agency of micro-organisms called bacteria.*

Putrefaction is the last stage of fermentation, and is inaugurated by a species of organism called *Bacterium termo.* As these organisms

are rarely seen until putrefaction begins, and are always present in all stages of this ferment, it may be safely said they are the true putrefactive bacteria, and that no putrefaction can take place or go on without their presence. When all matter in any liquid in which they are at work is broken up and decomposed, disagreeable gases cease to form ; the liquid becomes clear, and a new fertile compound may be seen at the bottom of the vessel. In short, then, we would say *putrefaction is the last stage of fermentation inaugurated and consumated by bacterium termo.* Of course there are many things and conditions pertaining to and connected with this ferment, such as temperature, air, moisture and particulsrly the matter undergoing decomposition that influlence the agents at work. We might almost say that *putrefactive fermentation is the final process by which nearly all, if not all organic and inorganic matter is reconverted back into —so far as we know—original first matter—compounded through this process into fertile innocuous elements ready for the seed of new life.*

Fermentation becomes putrefective when the matter undergoing this process tastes or smells disagreeable, when nitrogen and other foseted gasses are rapidly evolved or liberated and ammonia formed, the process is at its height. Any one kind of matter under the same conditions of light, air and moisture, will, unless molested by some antiseptic agency, begin to putrefy almost the same time, and go through the process about the same way. *Unless we accept the first appearance of bacterium termo as the initatory stage of putrefaction*, it would be difficult to say exactly when this process begins, unless we adopt that of smell and taste.

MR. GEO. W. RAFTER, ROCHESTER, N. Y.

The editor of the ODONTOGRAPHIC JOURNAL having propounded a series of questions, I shall exercise the usual privilege of asking others in return.

As presented, the first is, What is fermentation ? Should it not be what are simple ferments ? The second stands, What is putrefaction ? Shall we not say, what are putrefactive ferments ? While the third, When does fermentation become putrefactive ? would, it appears to me, be more satifactorily expressed by, when does simple fermentation become putrefactive ?

Answering in the order indicated it appears that simple ferments are minute vegetable organisms, allied to the algæ, which possess the power of decomposing or oxidizing certain organic substances, pro-

ducing thereby new compounds, the operation usually accompanied by the formation and liberation of carbon dioxide.

Putrefactive ferments are likewise vegetable organisms which under certain conditions promote the reduction of albumenoids to more simple elements.

Fermentation may also be defined as a process, in certain unstable compounds, of rearrangment of molecules, the outcome of which is the production of permanent compounds; while putrefaction is a breaking down process, resulting chiefly in a reduction, biologically, to primal elements.

This leads us to a view elegantly expressed by Magnin, that the agents of fermentation are two groups of micro-organisms—one oxidizing, the other reducing.

To the third question I answer frankly, I don't know, but in making this answer I desire to qualify it by the following from Schutzenberger, "Everything leads us to believe that putrefaction is a complex phenomenon, that it is only a successive series of fermentations, exerted on more and more simple products."

These answers are without pretense to scientific accuracy, and have no significence other than as crude guide-posts to beginners in biology. They may also indicate how poorly a busy civil engineer is qualified to discuss a delicate question in pure science.

CHAS. MAYR, SPRINGFIELD, MASS.

If we have to answer these questions, not from what the books say, but from actual observations of the series of facts which we connect with word-sounds, the two words lose distinctive meaning and a definition becomes quite complex.

We may class all processes in which organisms and organized plants play a part as fermentation and putrefaction; thus, the action of the pancreas which produces pancreatic juice is nothing but the breeding of certain putrefactive and fermentative bacteria which, acting upon the food by means of a certain principle, trypsine, prepare this food so that it can be absorbed by other cell-amœbæ, changed by them and used by others. The process of the pancreas is a truly putrefactive one, having even the essential requisite of smell. On the other hand, a fermentative process, at least according to former chemists' definition, is the changing of non-nitrogenous substances into others of the same kind by low organisms. Thus, the changing of cane sugar into butyric acid is classed among the

fermentative changes, yet the odor arising from it would be classed by everybody as very stinking. To take a laymen's conception :

Fermentation would be the "breaking up" of hydro-carbons by the action of low microscopic plants producing what is called ferments. Another requirement for the term fermentation would be to the layman that the product must not display a very nasty odor. On the other hand, putrefaction is the "breaking up" of albuminous compounds by the action of micro-organisms. The product of this "breaking" would have to be mal-odorous to fit the layman's idea of putrefaction.

To the exact scientist both terms are replete of vague and inaccurate ideas, and are taken from the babyhood of chemistry and physiology when men hastened to classify and generalize from insufficient foundations. Both terms ought to be abandoned and a new term, like micro-action, be used to designate the processes as brought about by micro-organisms.

DR. W. C. BARRETT, BUFFALO, N. Y.

You have propounded questions to which it is difficult, yes even impossible, to give precise and definite answers. The scientific world has but barely entered upon a thorough investigation of this subject from the proper standpoint. The influence of Liebig was so long paramount, and he so befogged the world by his specious reasoning, that investigation did not, until within a few years, find the right road by which it might hope to arrive at a scientific conclusion. In my early student days, "catalysis" was a general term for the changes induced by the presence of what were called "catalytic bodies." We now know that this was but a term invented to hide the ignorance which could not explain certain phenomena. Schwann discovered and described the microscopic cells of the yeast plant, and indeed witnessed their proliferation, but he failed to note the true significence of what was unfolded to him. Other observers barely missed the great discovery of the biological development of micro-organisms, and it remained for Pasteur and Koch to lead the world of science in the true path. Now the field has become so wide that I do not know of any one who even pretends to have mastered it.

There are so many kinds of fermentation, and the chemical involutions which are induced are so intricate and involved, that it is impossible at the present day entirely to systematize them. In general terms, however, fermentation may be said to be the

changes brought about in a fermentable medium by the presence of a ferment. This is very indefinite, but I do not know how to make it less so.

There are organic and inorganic ferments. There are those which are peculiar to the process which we call digestion, and there are others, the office and character of which it is impossible to determine. The organic ferments comprise micro-organisms, and of these the yeast-plant fungus is typical. By the growth of this microscopical plant we obtain what is called alcoholic fermentation ; that is, sugars of the formula $C_6 H_{12} O_6$ (Dextrose, Levulose, Lactose), are converted into alcohol and carbonic acid. $C_6 H_{12} O_6$ (sugar) $= 2C_2 H_6 O$ (alcohol) $+ 2C O_2$ (carbonic acid).

Acetic fermentation is the oxidation of alcohol to acetic acid by the Vinegar plant (*Mycodermi Aceti*), and the formula of the change is as follows : $C_2 H_6 O$ (alcohol) $+ O_2$ (oxygen) $= H (C_2 H_3 O_2)$ (acetic acid) $+ H_2 O$ (water). This change takes place to a limited extent without the ferment Vinegar plant, when porus substances like carbon, platinum-sponge, etc., are saturated with alcohol and exposed to the air. In Lactic acid fermentation we have the following changes : $C_6 H_{12} O_6$ (sugar) $= 2C_2 H_5 O_2$ (Lactic acid). By the action of the ferment which the fungus produces, or by direct action of the protoplasm of the fungus (the exact manner is yet undecided), the sugar is split and lactic acid is the result of the change.

These are enough to indicate something of the complexity of the process, and it must be remembered that in each of the many different fermentations the changes are different. The number of ferments cannot be told. Emulsine, diastase, myrosine, papaine, invertine, ptyaline. pepsine, etc., etc., are all ferments belonging to the so-called digestive class, and each has its peculiar characteristics, which are often shown by one or more of the others. For instance, diastase converts starch into sugar. But so do certain organic ferments and fungi, and so also does ptyaline. Inverotine converts cane sugar into fermentable sugar, or glucose, but so also do many fungi. Pepsine converts albumen into peptones, and this office is also shared by many fungi.

From this brief exposition one may be able to comprehend something of the vastness of the subject, and to see that it must be studied by detail, and the final result, if such is ever attained, be deduced from synthesis. The wonderful products of nature's laboratory are largely the effects of the chemical changes induced by the

action of ferments. The pabulum which supplies the growth of the minute bacterium or micro-coccus and the monster elephant or leviathan of the deep, is prepared by the action of ferments. Not an ephemera whose life's span covers but a single day, that is not dependent upon the ferments for its sustenance. Our own existence is directly dependent upon the changes induced by them. Their work is as broad as the face of nature, and their number no man can tell. They perform their office in secrecy and silence, and we can only claim to have just begun to recognize their importance, and their omnipresence wherever nature is at work. Judge then, if it be possible at present to sketch their character and functions, and to reduce the fragments of knowledge to a systematised science.

Putrefaction is identical with fermentation, and yet it is entirely unlike it. It may be called the rapid and intense decomposition of nitrogenous substances through certain fungi, with the formation of gaseous and offensive products in large quantities. Like fermentation, it is a chemical change induced by the presence and action of an extrinsic agent. But a ferment organism will produce only fermentation. The putrefactive organism is entirely distinct. Fermentation never degenerates into putrefaction, for they are separate processes. It is true that a putrefactive agent may become an inhabitant of a fermenting mass, and may destroy and supplant the ferment, setting up its own active changes. But it is also true that one ferment organism may supplant another, and induce a new process, with its definite results. The popular understanding of the difference between fermentation and putrefaction is, that the former is progressive while the latter is retrogressive—that the former builds up while the latter tears down. But this is only an apparent distinction. Both build up and both destroy. Putrefactive changes, however, take place in a more limited range of media than do those of fermentation. Both are alike the agents which our great mother nature employs in the destruction of one part of her work for the building up of new structures. Whatever has a complete existence is in process of demolition, that new growth may be the result. Nature is never idle, never quiescent. No sooner has she built a structure than she immediately commences its destruction, and lays the foundation for a new structure into which the old is incorporated. Her grandest works crumble into fragments, and as fast as overthrow progresses the bricks and the mortar are built anew into another fabric. The most active of the agents in this ceaseless work are fermentation and putrefaction, but until we are admitted into the secret workshop of nature we shall never fully comprehend their character and action.

ORIGIN OF CÆSAREAN SECTION.

Julius Cæsar first attracted attention through the Roman papers by calling the attention of the medical faculty to the now justly celebrated Cæsarean operation. Taking advantage of the advertisement thus attained, he soon rose to prominence, and flourished considerably from 100 to 44 B. C., when a committee of representative citizens and property owners of Rome called upon him, and on behalf of the people, begged leave to assassinate him as a mark of esteem. He was stabbed twenty-three times between Pompey's Pillar and 11 o'clock, many of which were mortal. This account of the assassination is taken from a local paper, and is graphic, succinct, and lacks the sensational elements so common and so lamentable in our own time. Cæsar was the implacable foe of the aristocracy, and refused to wear a plug hat up to the day of his death. Sulla once said, before Cæsar had made much of a showing, that this same young man would be the ruin of the aristocracy, and twenty years afterward, when Cæsar sacked, assassinated and holocausted a whole theological seminary for saying "eyther" or "nyether," the old settlers recalled what Sulla had said.

Cæsar continued to eat pie with a knife, and in many other ways to endear himself to the masses until 68 B. C., when he ran for Quæstor.—*Bill Nye.*

ARTISTIC PHOTO-MICROGRAPHY ATTAINED.

BY DR. W. X. SUDDUTH.

[Reported for the ODONTOGRAPHIC JOURNAL by DR. RODRIGUES OTTOLENGUI.]

Dr. W. X. Sudduth entertained the First district dental society, the evening of March 12th, with a highly instructive lecture on histology, illustrating with the aid of the steriopticon. He exhibited the results of his experimentation in coloring slides, in *fac simile* of the stained specimens which had been photographed. The microscope is undoubtedly valuable in investigating tissues; nevertheless, the reported discoveries of microscopists are not always reliable. Great obstacles arise in the use of the instrument, even after the specimen has been mounted, not the least being the fact that focusing is necessary, and that no two men see exactly alike. Therefore, when A focuses on a specimen to show a certain peculiarity, which he claims to be able to discern, he finds it difficult to demonstrate his discovered fact to B, because B cannot tell when he focuses

whether he is viewing the same plane seen by A. Of course, when examiners are experienced microscopists, the difficulties are lessened, because the trained eye is familiar with the appearances of different tissues, and this materially assists in obtaining the true focus. For example: suppose A claims to show lacunæ and cannaliculi in a specimen of cementum. B is acquainted with the microscopic appearance of dentine, and in focusing aims to get the tubuli of the dentine which is adjacent to the cementum distinctly outlined, and having done so, knows that the cementum also is in focus, and should be able to see the lacunæ if present. Again, it is only the trained eye which is able to distinguish breaks, tears, or foreign bodies, (as shreds of lint, etc.), and the surfaces of the tissues from the sides, or thickness; profile views look flat, not only at the edges of the specimen, but at all points over the surfaces; shadows become lines and resemble special features of tissues. To lessen these difficulties various methods of staining are resorted to, it being known that different kinds of tissues are differently acted on by the same agent, thus producing various tints, and materially aiding in the differentiation of tissues, which may thus be recognized by their known colors if the stain used be known. It also shows plainly breaks, tears, and foreign bodies.

Having prepared and mounted a specimen, in order to show what he sees with his instrument, the investigator may reproduce as accurately as possible with his pencil the picture in the field of his vision. These drawings from specimens, however, only carry weight in proportion to the honesty and ability of the artist. Therefore, as Dr. Sudduth truly says, drawings made by photo-lithographic processes are the more valuable, being above suspicion of inexactness or perversion through bias. The tissues themselves have been used as lantern slides, but high lantern power and intensity of light are requisite, and he knows of but two lanterns capable of such demonstration, one being the Stricker lantern, the cost of which was $3,000. One of these Dr. Carl Heitzman brought with him from Europe, but has never used; failing to procure here a suitable dynamo. Professor Seymour in America has invented a lantern which is excellent for showing tissues, but it requires the presence of the Professor to use it.

Having stained a specimen, and thus made distinct the differentiation of tissues, the advantage is again lost in the photo-micrograph, because, of course, the coloring is not reproduced, the picture being only one of lights and shades. This has been remedied to some extent by having the lantern slides painted by hand, and by retouch-

ing, thus making more prominent the outlines. Some have attained high excellence in this art, but it is open again to the objection of bias. An artist might color his slide to prove his theories. Dr. Sudduth has experimented arduously, hoping to find a method by which he could color slides by such a process as would dispose of this objection, and enable him to project on the screen *fac similies* of the stained specimens, making the lantern picture appear as does the specimen itself under the microscope. His exhibit proved that he has succeeded marvelously well. He has done this not by hand-work, but by a process of toning in the dark room. He has been specially successful in reproducing the purple and pink of hæmatoxylon and eosin, Bismarck brown and gentian violet.

He showed on the screen not only colored slides, but also some untinted. Conspicuous among these were beautiful specimens of the forming blood corpuscles in the mesoblast of the pig embryo, white and red corpuscles of human blood, oval corpuscles from the thrush, similar but larger ones from salmon, oyster-shaped corpuscles from the frog, and a most beautiful slide showing the enormous corpuscles from the *Amphioma* (a species of lizzard). As showing comparative analogies and differences between blood of various species these slides were specially gratifying.

Next in order came a section through a central incisor from a human fœtus of eight months. The dental follicle had been imbeded and cut in celloidine, and the pulp was so beautifully distinct that this slide alone testified to marvellous skill in the preparation of these minute and delicate tissues. Not an imperfection was apparent at any point, the odontoblastic and ameloblastic layers, the stellate reticulum, as well as the forming hard tissues, being specially well shown. The doctor claims with this and other specimens, to be able to show that the generally accepted theory of the vascular supply is incorrect. It is now held to be from a single vessel, a branch of the dental artery. This, says Dr. Sudduth, is incorrect, the facts being that the blood passes into the bone tissue, thence around and into the dental follicle, entering from the sides.

A fine specimen of dentine followed, and then a most excellent one of enamel. The enamel rods were very plain, appearing as parallel prisms with a dark line between. This specimen attracted my attention more than all others. I have heretofore admitted that Dr. Heitzman had convinced me that his theory of the existence of an organic reticulum in enamel is correct. I have seen his specimen under high power (1,000 diameters), and though not very distinct

(focusing with high powers is not easy), nevertheless the lines claimed to be enamel fibres were readily discerned. This specimen shown by Dr. Sudduth, was very similar in appearance to what I saw at Dr. Heitzman's, but Dr. Sudduth claims that the dark lines, the enamel fibres of Heitzman and Bodecker, are not organic matter at all, but simply shadows cast by the prisms. If the reader has not seen such a specimen, let him imagine a number of round or prismatic rods lying side by side; if photographed it is evident that the picture would show alternate lines of light and shade; the highest points of the rods would produce the "high light," and the depressions would appear as dark lines. This is what Dr. Sudduth claims is shown by his specimen, and it must be admitted, that looking at his lantern picture, the appearances are in favor of his being correct. Nevertheless, a gentleman next to me, who has had much more experience with the microscope than I, remarked that to his eye the lantern picture shown by Dr. Sudduth proved the correctness of Dr. Heitzman's theories. Each must see and judge for himself.

The next slide showed fine specimens of cementoblasts, the one after showing the lacunæ of bone. By comparison, Dr. Sudduth seemed correct in his claim that cementum is but modified bone. A transverse section of a five months' pig showed Meckel's cartilage, the premolars forming, developing bone, the Rete Malpighii, etc. An interesting point was the forming hairs. Dr. S. explained that the hairs and teeth are formed simultaneously and analogously, if not similarly. After this he showed slides taken from different portions of the same specimen, to demonstrate the use of higher powers, the highest being 2,500 diameters.

Then began the specimens in color. A slide showing stellate reticulum exemplified how well he reproduces the hæmatoxylon and eosin stains. Next followed the apex of a tooth, showing Tomes' fibres retouched.

Several slides were shown of the Rete Malpighii colored by hand, and also by the doctor's method, which latter seemed vastly more satisfactory and truthful. One of these in Bismarck brown demonstrated how a single stain may be used, the lights and shadows being differently affected; for which reason he thinks this particular stain will prove most valuable. A specimen showing the pigment layer of the retina, in gentian violet was much admired. A segment from the messentary was very clear and distinct. Stained with silver the result was dark lines against a yellow back-ground. Nuclei show as brown points. A few slides in gentian violet were shown, but this

we were told is the most difficult of the colors to manage. A very beautiful slide was from a macroscopic specimen, stained methyl green, a section of the finger showing the soft tissues and the bone, also the forming nail of a three months' human fœtus. This was shown because it is the only color with which he has succeeded in differentiating the nail, which usually appears so light that it is very indistinct. In this picture it was quite plainly seen. Some slides followed showing developing bone cartilege, etc., and then one of special interest, showing the mesoblastic tissue forming periosteum and pericementum, which is the first differentiation into a membrane; these two tissues, which so many claim to be different, are shown to be similar, being similarly developed.

In the discussion which followed the termination of Dr. Sudduth's talk, Dr. Allen admitted that much credit was due to Dr. Sudduth for his success in coloring slides, but whilst the staining of specimens was of value as aiding the differentation of tissues, he, Dr. Allen, could not see what was gained by coloring slides. Whilst this is undoubtedly true, the plain photomicrograph being perfectly intelligible to the trained eye, it was the general opinion among the members present, that the colored pictures were more satisfactory to those not so well acquainted with the tissues. Dr. Sudduth was most heartily applauded, and well deserved the praise bestowed upon him.

BY-LAWS OF THE DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES.

OFFICERS—HOW ELECTED.

SECTION I. The Officers of the Association shall consist of a President, Vice-President, Treasurer, Secretary, and Board of Directors, who shall hold their respective offices for one year, and until their successors are elected and qualified; *Provided*, that any officer may be removed by the Board of Directors whenever the interests of the Association shall require, and the Board of Directors shall be the sole judges of the interests of the Association; *and provided further*, that the office of Vice-President and Secretary may, at the discretion of the Board, be held by one and the same person.

ANNUAL ELECTION.

SEC. II. The annual meeting of members shall be held in Chicago, on the Third Monday in December of each year. A notice designating the place of such meeting shall be signed by the President and Secretary, and published in a public newspaper in Chicago, and in such of the Dental Journals as the Board of Directors shall select, and the Secretary shall also mail a written or printed notice to each member at least ten days before said day.

SEC. III. A Board of Directors, who must be members of the Association, shall be elected annually at the annual meeting of members, by the members to serve for one year, and until their successors shall have been elected.

SEC. IV. The Board of Directors shall consist of three members of the Association, to be selected and chosen by a majority vote of all the members of the Association. Every member shall have the right to vote at the regular Annual Meeting for three Directors, either personally or by proxy, and in case of the member not appearing personally at the regular Annual Meeting to vote and no one being designated as proxy for him, the President, and in his absence, the Vice-President shall be authorized to vote as proxy for such member.

MEETING OF DIRECTORS.

SEC. V. Immediately after the annual election of Directors, the Board of Directors elected, shall meet and select a President, Vice-President, and Secretary and shall be members of the Board of Directors.

SPECIAL MEETINGS OF THE ASSOCIATION.

SEC. VI. The President and Board of Directors may call special meetings of the members of the Association, which shall be held at its general office at such time as shall be designated in the call; and, in such case, it shall be the duty of the Secretary of the Association, at least ten days before the time fixed for holding such meeting, to mail to each member entitled to vote, whose address is known to the Secretary, a notice specifying the time and place of holding said meeting, and briefly stating the object of the meeting, if the same has been mentioned in the call; and the Secretary shall also cause to be published in a public newspaper in Chicago, and in such of the Dental Journals as the Board of Directors may name, at least ten days prior to the time of holding the meeting, a notice of like effect.

REGULAR MEETINGS OF THE BOARD OF DIRECTORS.

SEC. VII. The Board of Directors of this Association shall hold their regular meeting at its general office in Chicago on the fourth Monday of each month at the hour of 4 o'clock P. M. A majority of the Board shall constitute a quorum for the transaction of all business; and in case there be no quorum on the day fixed for their regular meeting, the member or members present may adjourn the meeting from time to time until a quorum be obtained, or may adjourn such meeting *sine die*.

SPECIAL MEETINGS OF THE BOARD OF DIRECTORS.

SEC. VIII. The President of the Board of Directors shall have the power to call special meetings of the Board, whenever he deems it expedient so to do; and it shall be his duty to call special meetings of the Board at the request of one Director of the Association; in either instance a notice of time and place of meeting shall be served or mailed to each Director, giving at least one day's notice thereof, exclusive of the pay on which said notice is mailed.

DUTIES OF PRESIDENT AND VICE-PRESIDENT.

SEC. IX. The President, and in his absence the Vice-President, shall preside over all meetings of the Association and over all meetings of the Board of Directors at which he may be present, to preserve order and regulate discussion according to parlimentary usage.

The Vice-President shall, in the absence of the President, perform all the duties of the President. (In case of absence of the President and Vice-President from any meeting of the Association, a President *pro tem.* may be chosen to preside).

DUTIES OF SECRETARY.

SEC. X. The Secretary shall attend all meetings of the Association and Board of Directors, whether regular or special; he shall keep, in a book prepared for that purpose, a true record of the proceedings of all such meeting. He shall have the custody of the corporate seal, and shall attach the same to all documents which require sealing.

DUTIES OF TREASURER.

SEC. XI. The Treasurer shall receive, have charge of and disburse, upon proper vouchers, the funds of the Association under the direction of the Board of Directors, and he may be removed at any time, by the Board of Directors, for any misconduct in the affiairs of his office, and may be required to give bonds for such amount as the Board of Directors may designate, with one or more sureties to be approved by the Board of Directors.

DIRECTORS AND THEIR POWERS.

SEC. XII. The Board of Directors shall consist of three members, to whom the policy, conduct, property and affairs of the Association and its membership shall be confided. The Board of Directors shall have power:

To accept or reject applications for membership in the Association;

To fill any vacancy that may occur in any office;

To levy and collect, if necessary, assessments which, in all, shall not exceed ten dollars per member;

To take entire charge of the defense of members of the Association in any of of the States or Territories, when prosecuted for the infringement of patents the validity of which has not been fully established, and with the funds of the Association to retain and pay one or more counsel of their own selection, and with the funds of the Association to pay and defray all necessary and proper expenses of such litigation.

MEMBERSHIP.

SEC. XIII. Subject to the approval of the Board of Directors, any member of the Dental profession may become a member of the Association on payment to the Treasurer of a membership fee of ten dollars, and subscribing to the By-Laws of the Association.

VACANCIES.

SEC. XIV. Whenever a vacancy shall occur in the Board of Directors, from any cause, it shall be filled for the remainder of the term by the Board of Directors.

BOARD OF DIRECTORS TO MAKE REPORT.

SEC. XV. At the regular annual meeting of the members for the election of Directors, the retiring Board shall make, through their officers, a full report of the condition of the Association, including a financial statement showing all assets and liabilities, and the amount of money received and disbursed during the year.

SEC. XVI. It is understood that all officers of the Association are Amenable to the Board of Directors, supreme authority upon all points affecting the the Association or its management being vested in said Board.

ALTERATION OR AMENDMENT OF BY-LAWS.

SEC. XVII. These By-Laws may be altered or amended at any regular meeting of the Board of Director, by a vote of a majority of all the members; *Provided*, that a copy of such proposed alteration or amendment shall have been submitted to the Board in writing, at least one week previous to the adoption thereof.

SEC XVIII. Upon all questions of construction of By-Laws the decision of the Board of Directors shall control until overruled by a vote of the Association. Any By-Law may be suspended by two thirds vote of any regular meeting of the Association.

SEC. XIX. The presence of ten members shall be necessary to constitute a quorum at any meeting of the Association; which number may be increased or diminished by any subsequent By-Law.

SEC. XX. At each stated meeting of the Association the order of business shall be as follows:—

1. Reading of minutes of preceding meeting.
2. Reports of officers.
3. Reports of Committees.
4. Unfinished business.
5. New business.

To the Dental Protective Association of the United States:—

I hereby subscribe to the By-Laws of your Association and wish my name placed on the roll of membeos.

Name .....

P. O. Address .....

.....

At the regular meeting of the Chicago Dental Society, held Tuesday evening, March 5, 1889, the following resolution was adopted:

Resolved, That it is the sentiment of this society, that it would be of interest to the members of the dental profession to become members of the Dental Protective Association of the United States.

LOUIS OTTOFY,
Corresponding Secretary.

MIND AND MATTER.

ELTON R. SMILIE, M. D., SAN FRANCISCO, CAL.

A close inspection and analysis of matter and mind in all their varied connections and bearing, show themselves in fact as parts of a disunited whole, each essential in some form of extension or divisibility to the completeness of the body corporate of the universe.

Animate and inanimate matter owe to each separate constituant an allegiance in definite kinds and proportions; attraction of cohesive and repulsive forces required to preserve in assimulation a counterpoise of reciprocal action for an equilibrium necessary to preserve their mutual relations toward each other, are each in like method assigned their parts. No matter how small or insignificent the duty or function may appear in the abstract, in combination and appropriate connection they will prove essential to the working completeness of the whole. A woman and man in their sphere are the sex representatives which play the most important role in the scale of creation. Of their known normal relations and capabilities no exact interpretation has yet been reached. Enough, however, has been determined to show that they are mating parts, at least mentally, quite out of keeping with the indications of original intention. Woman in her physical organization shows conclusively that nature never intended her for an amazon in any respect. All the outlines of her form were evidently modeled and designed to express the highest degree of beauty possible; and in her other conformations everything tends to confirm her capability of extending her endowment by cultivation to an irresistable degree of fascination. Even the mobile pliancy and grace of her movements unincumbered by the restrictions of dress proclaim the unlimited possibilities of her attractive supremacy; while her countenance in the full glow of maidenly reserve plainly declares a persuasive power and gentle influence that inspires with kindly motive her entire sentient being. But since she has become subject to the abnormal changes of heedless habit and customs, there have been marked eras in the continued relapse in her physical and mental powers, which denote the gradual decline of her perceptive discernment to realize whether her mental condition is retrogressing or advancing. This doubt occasionally inspires among the leading of her sex an inquiry into the merits of her exact status; one of these recently inaugurated by the introduction of physological investigation promises to incite a more active and permanent interest for the advancement of woman into the sphere that nature intended she should occupy. This is not intended to advance the amazonian or strong minded element in woman's character; but the opposite, that recognizes her superiority as it resides in her genial and sympathetic powers of ingratiation, through the avenues of intellectual correspondence.

Once engaged in this legitimate enterprise so agreeable to the natural instincts of her nature, and it will reinstate or induct a force

of loving attraction that will gradually controvert all the illusive pagentries of war and fashion, and raise woman by elevating her intellect to the supreme power of affectionate control. Then if fashion is still to exist it can be made subversive to deleterious tendencies.

A FEW PRACTICAL POINTS IN DENTISTRY.

BY A. M. HOLMES, D. D. S., MORRISVILLE, N. Y.

[Read before the Rochester Dental Society, March, 1889.]

To make a point has been the object and aim of mankind in the various pursuits of life since his earliest history, and passing by all the diversified features of this question, a consideration of which would prove very interesting and profitable, we will refer to a few features of it that possess a peculiar interest to the dental practitioner. With him a point has often a double significance, and taking a mechanical construction, comes to his aid in the pursuit of his vocation ; and on a single point hangs often his success or failure. If it answers his expectations, and accomplishes the object for which he designed it, in a satisfactory manner, then all is harmony : operator, patient and instrument blend in harmonious accord and ultimate success ; but if it is ill-suited for his purpose, and intervenes between him and a full ideal of success, only partially accomplishing the object desired, all is ajar. Unrest seems to pervade the entire surroundings, for "trifles light as air" often possess and guide us, and react upon our patient.

We all realize that the ultimate success of our operations depends largely upon the manner of preparing the cavity for filling, as well as the degree of suffering which we must inflict upon our patient, and there are a variety of methods employed for its accomplishment.

I have heard operators of repute say that they did not "care what kind of excavators they had for fitting cavities, anything would do," etc. But, gentlemen, in my experience I find a wonderful difference in the time required, the pain inflicted, and the risk of injury to the surrounding tissue in the use of different forms, and for the purpose I have found no excavator point equal to the scoop or spoon shape. But much depends upon its construction ; with the face of just the right curve and temper, it will cut away diseased dentine with greater rapidity and less pain, than any other instrument in my experience. This form of point is preferable to the plain-faced and square-ended hoe, for the reason that the curved face gives a

cutting edge, which accomplishes the object with less pressure and consequently less pain. Simply drawing the instrument along the cavity walls accomplishes the object; requiring but little pressure and, with the neck flattened for narrow spaces, producing very slight vibration, which is a fruitful cause of pain in operating upon sensitive dentine. Again the cutting edge, oval in form, diminishes the danger of checking frail enamel walls, which is liable to result from square edged, sharp cornered instruments.

And few instruments, comparatively, are needed for all ordinary purposes. With a straight point or face on a line with the handle, a point at right angles with the handle of various sizes, length and curve of neck, and with a peculiar hatchet, with lip, to reach those surfaces or under-cuts which are not accessible to the ordinary instrument, combined with a little experience in their use, it is remarkable how seldom one is required to call upon his "reserve corps" to help out of an extreme case in practice.

These instruments should be left very hard on the cutting edge, and drawn to a light purple in the neck to prevent breaking in use, and should be edged, or sharpened, in just one way, which is easily done, and always insures a perfect cutting instrument. You have only to draw your instrument over the stone, or the stone over the instrument toward the cutting edge; whereas, if you reverse the order and draw the instrument from the edge, you are very likely to turn the edge over, or "wire it" as it is termed, and defeat the desired object.

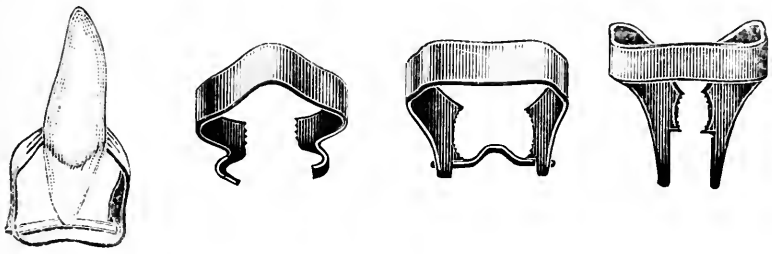
Then we have another point which is indispensible to success in the practice of our profession, the burr. That does its work rapidly and well if properly treated, if not, causes much perplexity and pain. The greatest care should be exercised to insure sharpness and keenness of cut to our burrs.

Our success in the use of the dental engine depends mainly upon the proper use of the burr. A dull burr or drill should never be used, on account of the heat which must result from friction caused by the pressure applied to make it cut, causing great and unnecessary pain to the patient, besides a delay and waste of time for which there is no excuse. We have only to provide ourselves with oil-stones of suitable shape, furnished by dealers, and exercise proper care in the management of this efficient instrument to do justice to ourselves and to our patients.

With that great blessing and indispensible appliance, the rubber dam, securely in place, and sharp burrs, a cavity can be prepared in

a brief space of time, and usually with slight pain and inconvenience to the patient. But we are often required to operate where there is recession of the gums on the labial or buccal surfaces, and where the decay has progressed below the soft tissue to an extent that renders the use of the dam complicated, its retention in place difficult and attended with suffering to the patient and injury to the gums and process surrounding the tooth.

Much can be done to relieve this condition by a clamp constructed with special reference to these cases, which can be so applied as to set the jaws at any desired angle and hold them securely in place, by an adaptation of the bow or spring to the crown of the tooth. To



this end holes or slots should be made in the sides near the top of the bow, for the introduction of slips of wood, which can be cut to fit the cusp or crown when the bow is too long to fit.

To render the clamp still more adjustable, the jaws which surround and rest upon the tooth, may be constructed with a view to conform somewhat to the form of the tooth, by the action of the spring when applied. It relieves in a measure the severe strain at given points, caused by clamps in the old form, and lessens the liability to injury by distributing the pressure more evenly around the tooth.

The use of the rubber dam has demonstrated its value and great advantage in general practice, but there are cases where its use is indispensible to success and in which its application has proved most difficult. I refer to cavities on approximal surfaces located beneath the soft tissues and alveolar borders. Cases of softening of tooth substance beneath large fillings, etc., where the gums are congested to a degree that the slightest contact results in copious bleeding.

The question is how to construct a coffer-dam in such cases to include the tooth or teeth to be operated upon. To this end I have been most successful for the last ten or twelve years, with a clamp so constructed as to place a bar of suitable form against the dam,

holding it securely above the cavity, thereby excluding all moisture and rendering an otherwise complicated operation of doubtful result, simple and positive.

These bars may be made of any strong metal, but steel has given the best results. Such bars can be easily changed in form to fit any case, and are sufficiently strong, while they occupy but little space. They can be straightened when necessary, and easily removed. With a properly constructed clamp, these compress bars are applied with the ease and falicity of a simple clamp.

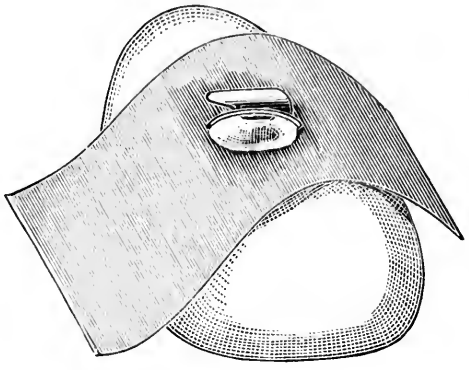
I have also used matrix clamps for this purpose. While in some cases they accomplish the object perfectly, the bar is the more simple in application in treating approximal cavities, and when applied is least in the way of the operator. Any degree of pressure desired may be applied to this compress bar by blocking between the bow of the clamp and the crown of the tooth in spans.

The matrix clamp referred to is of various sizes, and made to rest against the tooth at the matrix part and at the end of the arms, and is often a valuable adjunct in practice in a class of cases where the matrix is desirable and the ordinary matrix cannot be successfully applied—cases where an adjoining tooth has been extracted, with cavity extending beneath the alveolar borders on the one approximal surface, and the other resting firmly against a neighboring tooth. This clamp matrix can be as easily and quickly applied as a simple clamp, avoiding the trouble, inconvenience, pain and loss of time often experienced in acquiring space on the opposite side to adjust a fixture entirely around the tooth.

In that class of operations where it is desirable to fill the portion of the cavity extending beneath the gums with amalgam and finish the filling with gold, this form of matrix is available by cutting it away to expose the part of the cavity above the gums, while it covers the lower or part of cavity beneath the gums.

In the ordinary use of the matrix, a simple and effective method which I have practiced is to cut a strip from steel plates that are prepared for making clamps, or buts of operating files, bind it to the form of the surface of the tooth to be treated, and secure it firmly in place by the use of a metal wedge between it and the adjoining tooth. These wedges should be so made that they can be used on the posterior or anterior surfaces of the teeth ; one wing between the tooth and matrix, and the other resting on the masticating surface of the tooth to prevent their sliding out of place. When sufficient

space is available between the teeth, a strip of sand-paper should be placed with the sanded side next the matrix and the wedge placed between it and the adjoining tooth; or, double a strip of sand-paper,



letting the sanded face rest on the matrix and the adjoining tooth, and slide the wedge between the fold of the paper. This gives a matrix that will stand any degree of pressure and that cannot be forced out of place.

One more point and my ramblings are at an end. It is a great help to me to have the handles of my instruments (pluggers and excavators), so formed that each has distinctive features, by which the eye can distinguish at a glance those representing different points; and I am confident that a little attention given to this idea will prove beneficial to all in saving time and relieving the eyes in a measure from the severe strain to which they are subjected, and which is intensified by selecting instrument after instrument with the point only as a guide. Since our success in practice depends so much upon our eyes, any suggestion to relieve these very important organs from unnecessary strain, in however slight a degree, furnishes a proper subject for consideration.

I refer to this feature in practice, not from a desire to claim its originality, but for the reason that I do not think sufficient importance is given to it, and from the fact that I have had its benefit thoroughly emphasized in my own personal experience.

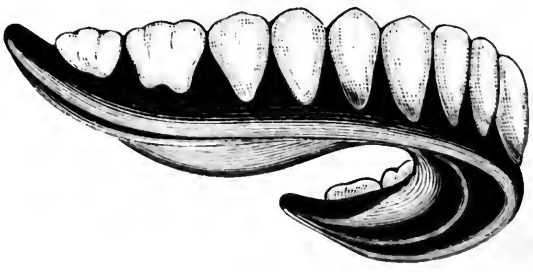
After the use of instruments of the character suggested for a long time, and on the theory that to accustom the hand to the use of instruments which should ever occupy the same relation to it, would result in a higher degree of skill in their manipulation, I had a set of pluggers made from the same pattern, every instrument precisely alike except their respective points. But in practice the idea proved, like many of our theories, a fallacy. The confusion attending their

use resulted in loss of time, in weariness to the eye in selecting instruments, with no guide but their often-times minute points. As the instruments increased on my table, this embarassment increased, and I was delayed from time to time by picking up the wrong instrument in pursuit of a desired point. In the use of instruments with general design indicative of their respective points, the desired one is grasped at a glance.

And this may be accomplished by a slight variation in form or color, without materially changing their balance or grasp in the hand; and yet, after a short acquaintance with them in practice, each individual one will be as readily recognized as an old familiar friend.

FLANGE PLATE.

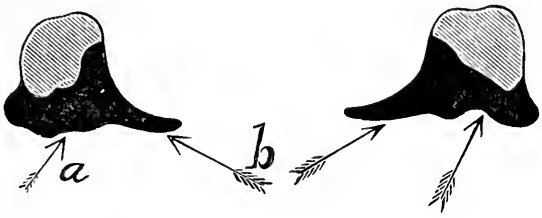
Plates constructed with flanges or wing-like projections to extend down beneath the tongue, in the treatment of those troublesome cases where the absorption has progressed so far as to obliterate the alveolar ridge to a degree that only a bed of muscles remains for the plate to rest on, or where the attachment of the muscles is so near the top or center of the jaw as to displace and render the plate unsteady in use. And where the sensitiveness of the tissues, or normal condition of the patient is such that heavy plates are not tolerated in the mouth. In those cases, where the form of the jaw that the plate rests on is highest next the cheek, slanting downward and inward toward the tongue, giving the plate a rocking, sliding motion from side to side in use, the flange plate has proved more satisfactory than any other in my experience.



The flange should be joined to the plate a little above the edge, and extend beneath the tongue, as far and as low as the muscles will permit. It may extend entirely around the front, or only on the side, in wing-like shape, as the condition of the muscles will allow.

The plate exhibited (fig. o and o), is a duplicate of a case that has been in use over ten years in the mouth of a nervous patient. She

had tried various light and heavy plates in vain, and was not able to use any kind of plate in masticating food until the flange plate was inserted. This plate was used with comfort and proved a success in masticating food.



a. Covering on ridge of jaw.
b. Flange.

The tongue and other muscles prevent the plate tipping and sliding, by their action on the flange when in use for the purposes of mastication. The important part of the construction of such a plate is the placing of the flange so that it will not irritate the several muscles. It should be as low down as the muscles will allow, but if placed too low the muscles will lift and displace it.

CHICAGO DENTAL SOCIETY.

The 25th Anniversary was duly celebrated at Chicago in February, guests from long distauces attending in goodly numbers. Sessions were held at the Grand Pacific, clinics held at the Chicago Dental College, and at the close of the meeting a banquet at the above hotel. For a complete report of all that was said and done read the February-March number of the *Dental Review*, now published by A. D. Justi.

DR. MAURICE N. MILLER.

The following kindly notice is from the recently issued annual report of the American Postal Microscopical Club. Our recollections of Dr. Miller are as we met him in his laboratory at University Medical College :

Maurice N. Miller, M. D., of New York, whose sudden death early in the winter deprived us of one of our most capable, distinguished and generous associates, had been one of our circle for several years. In his intercourse with the Management and his dealings with the Club, he never failed to do everything that could be possibly expected

or reasonably desired, and never ceased to respect and encourage the efforts, however inexperienced and crude, of his fellow members. A busy man in the midst of public life, and a prominent teacher and acknowledged expert in microscopy, he always found time to perform every duty of membership exactly according to the rules ; to contribute slides of rare interest accompanied by scholarly descriptions and elaborate drawings, and to examine the most commonplace contributions by inexperienced members with such care as to be able to add interesting and instructive comments. While the pleasure and profit derived from his liberal contributions will long be remembered with appreciation and gratitude, yet he will doubtless be most cordially esteemed as the friend who was always ready to encourage and assist, who answered a harsh criticism by adding "Why discourage the member? Better by far it would be to help him by advice. He'll do better next time," or another with the characteristic words "If *** will correspond with me I will try and help him do better work." Such a man the world, as well as the Club, could ill afford to lose.

STATE SOCIETY.

The New York State Society will hold its 21st annual meeting at Albany, May 8th and 9th. The Board of Censor will meet the day previous for the purpose of examining candidates for the M. D. S. The preliminary call is out ; the program in preparation. Dr. A. R. Starr, of 164 E. 91st St., New York, is Chairman of the Business Committee.

FIRST DISTRICT SOCIETY.

At the February meeting the program included clinics by Drs. Kirk, Van Woert, Canaday and Rhein, and a paper entitled, "The Different Methods of Bleaching Teeth," by Dr. Edward C. Kirk, of Philadelphia.

CHICAGO COLLEGE OF DENTAL SURGERY.

The seventh Annual Commencement of the Chicago College of Dental Surgery was held at the Grand Opera House, March 26th. Dr. Swain presented the annual report, Prof. Brophy conferred the degrees, Dr. Eshelman delivered the valedictory, and Prof. Cushing

the faculty address. The number of graduates was 64 ; matriculates 154. The honorary degree of D. D. S., was conferred upon James Atwood Swasey, who will be remembered by the Chicago Dental Society's February guests as the presiding genius of that most vigorous body. In honoring Dr. Swasey the college likewise honored itself. Congratulations on all sides.

NEW YORK ODONTOLOGICAL.

At a regular meeting of this Society Tuesday evening, March 19th, Prof. Horatio C. Meriam, D. M. D., of Harvard University, delivered an address entitled, "Professional Atmosphere and Morals." Prior to the meeting members and invited guests sat down to an informal dinner at the Hotel Brunswick.

MEDICAL CONGRESS PROCEEDINGS.

"Whom it may concern" is hereby informed that his subscription to the fund of the dental section (XVII) of the International Medical Congress, does not entitle him to a copy of the proceedings. There is no law, however, that will prevent him borrowing the work of his neighbor whose membership carries with it the right to a copy in full.

SEVENTH SOCIETY MEETING.

The Seventh District Dental Society of the State of N. Y., will hold its twenty-first annual convention in the city of Rochester, on Tuesday, April 30th, and Wednesday, May 1st. The special committee is arranging for clinics which will give the convention unusual interest. The papers to be read will be of great practical value. Members of the profession are cordially invited to be present. For further information address recording secretary, W. F. Arnold, D. D. S., 235 East Main street.

THE "ST. LOUIS" FOR 1889.

The program of the St. Louis Dental Society for 1889, includes the following: Antiseptics and Disinfectants, Chemistry, Dental Journals, Painless Dentistry, Dental Medicine, General Practice, Thorough versus Quick Operations, Cements—their Virtues and

Faults, Conditions affecting Practice, Filling Materials and their place in Practice, Calcarious Deposits on the Teeth, Planting Teeth, the Dental Pulp and the Peridental Membrane, Dental Literature, Dental Ethics. The Society meets twice a month.

PELLETS.

Some one says to clean the hands, rub with warm oil, wash in a solution of borax, then in soap and water.

Dr. John C. Dalton, known to dental students through his "Human Physiology," died February 12th, aged 64 years.

According to Dr. W. H. Rollinson, peroxide of hydrogen robs enamel of its lustre and renders the tooth so elastically soft that it may be sectioned at will.

THE OHIO JOURNAL for February, contains a most excellent likeness of the late Dr. G. W. Keely, also a biographical sketch by the senior editor, Dr. Watt.

DR. BIRDSALL'S "ETHICS," IN THE DENTAL COSMOS does the subject in new form. As usually discussed it is dry indeed, but here it is made both racy and rich.

At a meeting of the Students' society of the N. Y. College of Dentistry, held February 4th, C. G. Pease and S. P. Russell were elected president and secretary respectively.

Sulphate of copper may be had *in situ* for the treatment of pyorrhœa alveolaris by binding the neck of the tooth with fine copper wire and adding sulphuric acid. So says Dr. J. W. Whipple.

Patient (with fear and trembling) :—Good morning, doctor.
Doctor :—Good morning.
Patient :—Isaac is here, but I see no ram in the bushes.

THE SCIENTIFIC AMERICAN continues as of old, to supply its thousands of readers with the latest and best in the arts and sciences.

An M. D., of Wells Bridge, this State, advertises "Fill your own teeth with crystaline. Stops pain and decay. Lasts a lifetime. Circular free."

THE printer made up and "corrected" (save the mark), the January number while we were out. He has promised to never, never do it again.

The Massachusetts Dental Society will hold its Semi-Annual meeting at the Institute of Technology, Boston, June 5, 6 and 7. A large and enthusiastic meeting is looked forward to.

THE BUFFALO MEDICAL AND SURGICAL JOURNAL discusses editorially and in a most interesting and impartial manner the case of the late Emperor Frederick. Its equal has yet to appear.

In the very first number of the *Dominion Dental Journal* the editor shouts "Ahoy?" three times, and on one page too. Oh! Syracuse! Syracuse! What did he to thee that thou shouldst mark him thus?

IN THE BROOKLYN MEDICAL JOURNAL for February, Dr. Ottolengui discusses in all its details, the implantation of teeth. The article is fully illustrated, and is alike creditable to dentistry and to its talented author.

Madam Paine:—Don't you think Miss Grace is a *very* bright little body?

Dr. Paine:—Yes; altogether too bright. I sometimes wonder if her humor does not amount to a disease.

M. D., Jr.:—Perhaps she has Bright's disease, papa.—*Life.*

L. J. Mason & Co., of 194 E. Madison St., Chicago, manufacture dental instruments of the highest grade, and at fair figures. Their cutting instruments are unsurpassed, especially their hand cut hollow centre burs. These are a novelty, and are bound to displace all round-end burs whose seratations come to a common centre at the working extremities of the instrument.

Announcement is made that Drs. W. H. and C. B. Atkinson, have formed a partnership for the practice of dentistry and oral surgery. The senior partner may be consulted by appointment between the hours of 10 A. M. and 12 M.

"The taps of oxyhydrogen jets should be lacquered of different colours so as to be distinguishable in the dark." This from a recently issued book (third edition) may be all right, but for the life of us we cannot make it out that way. Perhaps it was made for the man who is color-blind.

"Bridget," said her mistress, "you'r ill; you had better see Mrs. Blank," naming a woman physician near by.

"Beggin' yer pardon, mam, but I'll do no such thing; do I look like a woman that'd consint to be threated by a shay docthur? Divil a bit."

Books Pamphlets, Etc.

History of the Developement of the Teeth. By Drs. Heitzman and Bodecker. Reprinted from the *Independent Practitioner*, P. 89.

The several chapters of the publication are devoted to the developement of enamel, of dentine, of cement, the epithelial cord of the enamel organ, teeth in embryos affected with rhachitis, and the literature of the subject. The book is fully illustrated.

Transactions of the American Dental Association. Twenty-eighth Annual Session at Louisville, Ky., August, 1888. Philadelphia; The S. S. White Dental Manufacturing Co. Pp. 286.

The largest and one of the most interesting volumes ever issued by the Association. The Southern Dental Association met in joint session and contributes its share of valuable matter to the book.

Dominion Dental Journal. Again Canada has a dental journal, and edited by the projector and financial backer of the old *Canada Journal of Dental Science*, Dr. W. Geo. Beers. Canada needed a good journal then, but failed entirely to support it; she needs one now, and in duty to herself ought not to withhold the most generous support at her command. For years past little has been heard on this side of doings in the Dominion, except as it has

come through a few representative men who have favored our meetings by their presence and speech, and our journals with an occasional letter or paper. In fact, we even doubt if our Canadian brethren have heard of each other any more often. Now, however, she again has a means of communication that merits the good will and financial aid of every dentist in Canada, and that will be welcomed on this side as a new and much needed medium of fact and opinion in matters pertaining to dentistry over the border. The first issue is filled with excellent matter, the greater proportion of it editorial, and of special interest to those practicing in the Dominion.

THE PRINCIPLES AND PRACTICE OF DENTISTRY. By Chapin A. Harris, M. D., D. D. S. Revised and edited by Ferdinand J. S. Gorgas, M. D., D. D. S., with 1086 illustrations. Pp. 1222, Philadelphia: P. Blackiston, Sons & Co.

For the twelfth time the publishers make it necessary to chronicle the issue of this work, the standard one-volume exponent of the principles and practice of dentistry. The demand for the work seems to be on the increase, the eleventh edition having been exhausted before this (the 12th) could be gotten ready for the press. The present edition contains additions to nearly every chapter, and notwithstanding the throwing out of old and now obsolete matter, it was found necessary to add 226 pages in order to bring it up to date. 382 new illustrations have been added, and a number of new systems appear for the first time in a work of this character. As an all-around text-book on this subject it stands alone.

A TEXT BOOK OF OPERATIVE DENTISTRY. By Thomas Fillebrowe, M. D., D. D. S., with three hundred and thirty illustrations. Philadelphia; P. Blackiston, Sons & Co. Pp. 273.

This is one of the several books undertaken by representative men of the profession, by invitation of the National Association of Dental Faculties, and designed to supply the dental student with that knowledge most essential to his preparation for practice. Prof. Fillebrown is one of the faculty of Harvard, and thoroughly qualified for the task involved in the getting out of a text book of operative dentistry, and in the present instance has done himself and his subject proud. In his preface he says: "History has not been attempted, and only enough of definitions, etiology and symptoms of diseases given to make clear the description of the operation to be performed." The most advanced nomenclature has been

adopted, cuspid for canine, calculus for tarter, hypercementosis for exostosis, phagedenic pericementitis for Riggs' disease. Crown and bridge work is "classed as operative dentistry, as it is all dependent upon the natural teeth, and may all be done at the operating chair, and almost all of it is much better done with the patient present." The declaration that "All operative dentistry is mechanical, and crown work is no more so than filling a cavity, applying a medicine or injecting an abcess," is likely to involve the distinguished author in explanations, inasmuch as there are some of the profession to whom the word "mechanical" has a very disagreeable sound. The style of the book is such that it will take with the student and practitioner—crisp, clear and without a superflous word, except, perhaps, in the quotations. The get up is excellent—clear type, good paper, well bound.

THE

Odontographic Journal.

VOLUME X.—*July 1889.*—*No. 2.*

THE DENTAL MANUFACTURER AS A CO-EDUCATOR WITH THE DENTIST.

BY L. E. A., NEW YORK.

The vocation of "manufacturer of dental goods" dates scarcely more than forty years back. Before that time a very few artificial teeth were made for sale, and a few instruments such as keys and lancets were roughly made by ordinary cutlers. But in the main, dentists made most of the teeth which they inserted and the most of the instruments that they used. The first manufacturers of dental goods, properly so called, confined their productions for a time to artificial teeth, which speedily put a stop, to a very large extent, to the work of the individual dentist in that line. By intimate association with dentists, and a growing familiarity with their needs, these manufacturers (some of whom had been in the practice of dentistry) undertook, by degrees, to supply those needs, and thus the range of their business was gradually extended. Their first productions in almost every line of instruments and appliances were, judged by the standard of to-day, exceedingly crude and clumsy, defective in adaptation, temper, etc. The commercial spirit, however (if there was no higher motive), stimulated those who were far-seeing, to constant efforts to make improvements. The needs of the dentists were studied; the advice and suggestions of practitioners were sought, and efforts were made to carry them out wherever and as far as practicable.

A large part of the improved instruments and appliances in current use to-day are the outgrowth of these suggestions from men in practice, but their fine quality, exquisite adaptation and finish, is to

be credited to the skill of the manufacturer and his ambition to excel in his chosen calling.

Another large part, however, of these improvements has come directly from the manufacturers, in their efforts to meet the growing wants of the dentists. Without this work of the manufacturer, the dental profession could not have advanced nearly so rapidly as it has done in this country, for it would have been impossible for the profession, aided by manufacturers in other directions than that of dental goods, to have been supplied with the variety and the quality of goods that are so indispensable to-day.

There was absolutely necessary a devotion to one idea—viz. : the supply of the dental profession, and an intimate knowledge and constant study of the needs of that profession to produce the results that have been accomplished. The dentist has now an infinitely greater variety of instruments and appliances than the surgeon, and of a quality and adaptability very much superior. American dental instruments take the lead all over the world, and are the synonym for excellence and superiority wherever there are educated dentists. This superiority is owing to the skill and care of the American manufacturers, and their eagerness to embody in an improved appliance every new suggestion of a skillful practitioner.

The two callings of dentist and manufacturer of denal goods have, in this country, moved on side by side. Very few dentists cared to, or could, manufacture and introduce their own inventions. The attempts to bring them out by the aid of manufacturers in other lines, have seldom been satisfactory or successful. But with the manufacturer specially allied to the dental profession, theory and practice have been intimately united and have rendered this great progress possible.

The commercial applications of science have in this case (as in that of electrical science, as stated by Sir Frederick Bramwell, President of the British Association for the Advancement of Science, in a recent address), reacted in the interest of pure science. The manufacturer has in many instances taken the lead, and has often been in no small degree an educator of the profession. This is particularly applicable to dentists living at a distance from the manufacturing centers.

The leading manufacturers are constantly importuned to attend society meetings, and annual gatherings of state and other societies,

and to send there a full display of everything that is new and interesting, "to add to the interest of the meetings and as an additional inducement to members from a distance to attend."

A prominent dentist once said of the *Dental Cosmos*, that its subscribers, in their eagerness to learn what was newly offered for their use, turned first, on receiving its numbers, invariably to the advertising pages, and he knew of no other magazine to which the statement would apply.

There is quite a diversity of opinion on the subject of patents in connection with the progress of dentistry, and some practitioners have been loud in condemning them; yet to the unprejudiced observer it would seem that a large number of the best appliances of the dentist to-day owe their success and perfection largely to the protection and stimulus of patents. The field for dental goods, as compared with that for general merchandise, is very limited, and the inducement to expend liberally in perfecting a chair, engine, mallet, or electrical appliance, is much less if there is no protection, and if every other manufacturer is free to copy it as soon as perfected.

Undoubtedly the protection of patents has been of much value as a stimulus and a reward to inventing dentists, and as an incentive to the manufacturer to produce the best goods. Where manufacturers are constantly met by lower prices of competitors, there will inevitably be a gradual depreciation of quality, and the standard of excellence is lost sight of in the race for cheapness. This is a condition that the dentist, of all men, should deprecate; an inferior quality of instruments and appliances, however low in price, is terribly expensive to them. Low-priced dentistry, as every practitioner knows, is likely to be of poor service to the patient. And it is just as true that low-priced dental goods are of little value to the conscientious practitioner.

PRESIDENT'S ANNUAL ADDRESS.

DENTAL SOCIETY OF THE STATE OF NEW YORK, ALBANY, MAY, 1889.

For the twenty-first time in the history of this Society it becomes the duty of the President to "give a concise statement of the condition of the State and district societies, with such suggestions for their improvement as he may think proper," a duty imposed upon him by the by-laws and not in itself difficult to perform. But Presidents have gone further than this. They have not only discussed

the affairs of this Society and its less pretentious but equally important associates, but have also discussed questions that concern the profession at large—of this State, and other, and all States—questions of theory, of practice, of politics, of legislation—and have suggested ways and means by which, in their judgment, these several questions in which we all have a general and associate interest, if properly studied by those who have assumed their consideration or had such consideration thrust upon them, may be made to contribute to the common good of all concerned in the practice of dentistry, and also that larger and inclusive body that makes such practice possible—the public. How well this duty has been performed heretofore, is shown in the recently completed publications of the Society, the official heads enumerated therein following lines of discussion, general or special, suggested by their surroundings, or their interpretation of them, or quite as often their affiliations or prejudices. It comes to pass, therefore, that so far at least as this Society is concerned, it grows more and more difficult to say anything new, or what is sometimes made to answer the same purpose, say the same thing in a new way.

Our immediate concern of course is with the business of this meeting, the one by the way at which we come of age. But before entering upon that, and to enable you the better to appreciate the feeling that came over the present incumbent of the principal office in your gift on being lifted from a position in which he had well-nigh become perennial, not to say soporific, it is desirable to revert to the meeting of a year ago and a phase or two of the work of that time. "Eyes hath he," saith the proverb, "in the back of his head, and his ear doth lengthen to a far-off sound." Caucussing began early, and the conclusion jumped at with an unaminity that betrayed the hand of the politician was that the next presiding officer should not come, like wise men the world over, from the East, but rather from those districts where simplicity and contentment are indigenous, and ambitious men are pleased to hold an inquest when denied the privilege of serving in the Senate. Diligent study of the map, careful scanning of the field, the buttonholing of members from districts not urban, resulted in directing all eyes to the Board of Censors, when lo, it was discovered, and not for the first time, that a principal of nature would suffer violence, if not nullification, in that two things cannot occupy one and the same place at one and the same time. In other words, that censorship and the presidency could not be made to lodge in one and the same man. Expediency

and the by-laws, said all, forbid. The Isaacs of the Board were safe in their censorship, but at the cost of a ram—a hornless one to be sure—but a ram nevertheless, and from the West. Whether he was thus honored because of fitness, or made the recipient of a reward on account of long service as keeper of the books, or served up as a peace offering on the altar of the Board or that of sectionalism, is still one of the mysteries. Let it suffice, however, that those most concerned seemed to be pleased with the result of the evening's work, the elect himself no less than his friends, and this he found to be the case with dental friends at home, who reminded him of the fact that in twenty-one years and a line of fifteen presidents the Seventh society had a name on the list for the first time. A lengthy digression, but the only one.

The condition of the Society is much the same that it was a year ago. By the rule that but five additions can be made annually to the permanent membership, with of course the filling of vacancies caused by death, resignation, change of residence and non-payment of dues, it is impossible that there should be any marked increase of members; in fact, it is to our credit, that there is no falling off. It has been thought by some that the mumber of possible additions annually should be increased, but it should be noted that the suggestion is made only when the number of applicants for permanent membership is over and above the number prescribed by the by-laws, plus vacancies from causes just enumerated. On the whole, the adjustment between places at the disposal of the Society and applicants for them is so delicate that like rainfall it will average to a fraction when taken for a term of years.

The finances of the Society are all that could be desired, the balance being, as at all times in the past, on our side of the ledger. It is a fact, too, worthy of remark, that dues as a rule are promptly paid by members, either personally at the annual meeting, or by mail when notified by the Treasurer, to whose business ability the Society is indebted for the regularity with which the figure three is offset by the same character. Most societies, other as well as dental, find themselves at the end of the year with just enough to their credit to warrant a continuance of the struggle for existance, a condition of things that may be often and justly charged to a misfitting segment in the official backbone. In this connection, too, it should be remembered that no salary attaches to the office of Treasurer of this Society, the incumbent doing the work for the fun of the

thing, for the love of the Society, or simply because when asked to do so is too good natured to refuse.

Our relations with other societies seem to have grown more intimate, and there is every prospect of a better understanding between ourselves and others than has prevailed in the past—a condition of things that seems to have grown out of a misapprehension of the functions of our examining board, its scope and powers. Gradually, however, the working of this peculiar institution is becoming known abroad, and where known is seen to be a power for good rather than, as had been supposed, a means of cheapening and consequently lowering the standard of professional attainment. Your Correspondent will present matter and opinion bearing on this feature of our standing and relations as a Society, and in a light complimentary to all concerned. His efforts, too, in other directions will reveal the possibilities of one who magnifies his office, or in the language of the day, works it for all it is worth.

Of the work of the standing committees, that of arrangements comes first. Year after year this committee, the personelle of which has undergone little or no change of late, has sought, but in vain, quarters better adapted to the needs of the Society than Geological hall, the few available rooms in the capitol, or that which we now occupy, but confession is made annually that Albany has yet to build for the suitable accommodation of this and kindred societies, a hall not too large, well-ventilated, well-lighted and of sound properties not too suggestive of a drum. The chairman lives in hope.

The committees of by-laws, ethics, and prize essays will report briefly the work in their hands, and the business committee such arrangements as will best facilitate the doings of the day. This last committee has done itself proud, whether viewed in the light of the fact that the chairman learned of his appointment late, or the quality and variety of the feast, or the energy and tact displayed in its preparation.

The committee on law has done more than can be fairly made to appear in its report to regulate the practic of dentistry in this State, and will incidentally or otherwise call attention to a weak attempt to smuggle into and through the legislature a measure calculated to rob our present law of several important features now in force.

The committee of publication has gotton out the transactions in excellent style, and as quickly as possible under circumstances very annoying. Information from various sources and a little personal

experience in such matters, point to the chief cause of delay as the too long retention of proof sent for correction. This is a matter made too much of a convenience, and when at last the corrected proof does come it often involves less delay and expense to throw in the type and reset than to rearrange a speech that was never made, all of which, or a large part of it, comes of the failure of men generally to say what they mean, and courage to mean in cold type what they have said. Few can stand the test of the former; fewer still the latter. Another contributing cause of delay was the heeded suggestion of the speaker, that the past experience of the printer of other years work would save the chairman a great deal of labor. This was unfortunate, as will appear in the report. To the future chairman of this committee our advice would be to have this work done at his own door, where its progress can be watched from beginning to end. We have suggested for the last time to any one a contrary course.

The committee on practice has steadily grown in popularity and importance until there is some fear lest the Society forget its time-honored custom of preparing and discussing regular papers, and be led to depend wholly on this committee for topics and the direction of the course of discussion. It is but a short time since a sheet of note paper was made to answer the purpose imposed by the Society on this committee, whereas now nothing more complete or suggestive, more comprehensive in its treatment comes before us. This is as it should be. The committee makes it its business to at least see all that appears in print, culling that that promises to interest and instruct, and discussing most intelligently for or against materials, appliances, methods and opinions. This year's report is an advance on all others, and the present worry of the business committee is where to place it and what time to give it. Like things that concern everybody it is democratic in its content, aim and object, and may be discussed in some of its features by every man in the room—just like constitutions and by-laws, in regard to which the unposted man has yet to live.

Of the routine workings of district societies little need be said in view of the reports about to be read by the Secretary. All seem to thrive—some after a fashion, others in a marked degree. One meets at least annually, several semi-annually, one quarterly, and one monthly, vacation term excepted. In the western part of the State union meeetings of the fifth and sixth, and of the seventh and eighth societies have been the fashion once a year since the

old Western New York association was superceded by, or in compliance with the State law, merged into the modern districts. These union meetings have kept alive the interests and associations grown and developed in the older body, but in two great sections, the counties comprising the fifth and sixth on the one hand, and the seventh and eighth on the other. For three years past all four have joined forces, and the largest and best meetings known to the membership are among the results. Like all good things these large gatherings carry within them the seeds of their own destruction, a statement just as true of large meetings of single societies as of those of the four societies mentioned. Their size is the first count against them. They are apt to become unwieldly, and because of the work involved in their management and the numerous details of business, the non-participating member—the one not on the programme for an active part in the play—is overlooked, his presence practically ignored, the sociability that he had looked forward to is denied him, and to that degree that he leaves greatly disappointed and perhaps fully resolved to avoid in the future meetings whose bigness is the only notion that he can take home with him. His desire to see is gratified by the manufacturers and dealers, and perhaps by a demonstration or two, if he succeeds in fighting his way to and holding a place at the chair. He hears a paper read and discussed, sees a model or two, and an instrument for some rare and, to the exhibitor, very important operation, but fails utterly in his attempts to meet men whom he has known for years by reputation and regarded as leaders in the profession; or if he meets them, it is only for a moment—all the time they and their busy managers can allow. The meeting has become a convention—what was intended as a social and business gathering of scientific and practical men, has become something akin to a gathering of the clans where many men have an ax to grind and are determined it shall be ground even at the cost of a good and true stone. Bigness, therefore, is a thing that should be kept under in the interests of other and more valuable features.

Another element of danger is the expense, which is necessarily great. The tendency is to outdo all past efforts. Some societies have in their membership men who feel an individual responsibility in society affairs, and who go down into their own pockets for whatever the treasury fails to supply. This is their business, to be sure, but far from just and cannot long continue. To illustrate: An active little society in a western city has held monthly meetings for

many years. At first there was simply a paper or two, discussion of these and miscellaneous topics, and perhaps a good cigar. Meeting followed meeting in rotation of members, the good cigar became a lunch—at first plain, then elaborate—the lunch grew until it reached the proportions of a supper. Right here the executive committee met with its first downright refusal to entertain. A was told that the next meeting would be held at his office, to which reply was made, "Sorry, gentlemen, but it is impossible—can't afford it." "But your not obliged to give a spread." "No, I'm not obliged to, but there'll be no meeting at my house until I can at least do as well as my neighbor." The committee's eyes were opened with a snap, and from that time to the present the dictum that the after part of the program should not go beyond simplicity itself, has made every member not only willing but anxious to entertain, even to the theft of a turn from his fellow-member. Therefore, to insure the permanency of these annual gatherings of district societies, it is necessary that the expenses should be kept well within the means of the poorest in pocket of the four. This is also true we are told of large meetings in the metropolis, where the expenses are necessarily great, and where both labor and expense fall to the lot of the few.

Another noticeable thing in the history of the district societies is the change in membership, the degree men growing in numbers from year to year, while those qualified by certificates issued by county clerks are becoming fewer and fewer. All this because first of the decrease of the possible supply which was at its topmost limit the last day of registration, and second, the losses by death, resignation, removal and other causes. The degree men have in some societies nearly if not quite a majority, which will augment from year to year through the operation of our law until the certificate becomes a mere relic in the history of dentistry in this State.

Now and then redistricting is sometimes mentioned. This is a desirable thing, for, based as our present system is on division of the State in the interests of the judiciary, it leaves some of our members—those of the fourth district—practically in the woods, where distances are great and means of transit slow and costly. The present arrangement was unfortunate both in conception and execution, those having the work in hand losing sight of the fact that division of territory and diversion in travel made by railways is of vastly more importance than any division possible to the map makers of the legislature. Centers of population, business, and lines of travel are of the first importance in fixing upon a place of meeting. While

a change is desirable, it would be inexpedient to attempt the further amending of the dental laws, since such attempts involve the risk of losing what we have. Other states may profit by our mistakes in the past, also by our experience present and prospective.

A phase or two of the workings of the law of a year ago remains to be noticed. We had asked for bread and got in return, not a stone, but bread, and of exceeding richness. This disturbed the dental stomach somewhat until the brilliant discovery was made that by making one's assistant a student both employer and employee could live within the letter if not the spirit of the law, the spipit being another and for the time a not easily definable thing.

A second discovery is not so easily disposed of. The aim and object of the law was the further regulation and improvement of the practice of dentistry in this State, and one of the ways, the chiefest perhaps, by which it was intended this should be accomplished was by forcing the prospective dentist through a dental or medical college, or by the State Board. It has worked to a charm. The Board has been no busier than at times in former years, but New York has been numerously represented in the colleges by students from this State, and students from other States who contemplate practice in this. And with what result—at what cost? Heretofore the D. D. S. has been sought because of the desire of the student to have at his command the information, both theoretical and practical, attainable only in a well equipped college, and in the case of the ambitious student, a college that will best and quickly fit him for legitimate practice. In the attainment of his degree he studies and works in the hope and expectation of thorough qualification, and takes his degree merely as evidence of it. On the other hand, many of the young men now in training for a place among the legally qualified in this State have no other object whatever in attending a dental college than the degree of D. D. S.. The advantages of study and practice offered by the school are of secondary importance—they would pay the fees and take the degree in twenty-four hours if that were a possible thing. It is nothing more nor less with such than a question of expediency and cost—a course or two in college or a series of contributions to the county poor fund. A few years since we sat next a medical student in a class of 550 listening to a lecture by the professor of physiology. We asked the student what work, if any in particular, had been recomended to the class. The student said he had approached the professor on that subject himself, in quest of a work that would serve as a coach between times, and had

been asked, "Young man, how much physiology do you want?" "Professor," said the student, "I want just enough to pass your chair." He got it, and to-day passes for a wise man in medicine. To "pass" to get his degree, was his only ambition—the course of study was simply in his way. The effect on dentistry, in this State at least, will be to cheapen the D. D. S. by making it common; its indiscriminate conferment cannot have other than a retarding effect on dentistry as a profession while at the same time it advances dentistry as a trade. There is no reason, however, in the expressed fear that this condition of things to likely to prevail—a leveling up must succeed the leveling down, but years must follow in which to regain lost ground.

The past year has been prolific of discussions of subjects both scientific and practical, among these questions in histology and histo-pathology. The bioplason theory has been ably presented, and in its best possible form by at least one of its chief exponents, and has been met by all the objections that could be mustered by those who hold to another and older theory of the structure, growth and development of tissues and organs. For a time it seemed as if dentistry was to know no other teaching than that fathered by Heitzman, and advocated by him and his ever alert and faithful lieutenants—Abbott and Bodecker. Until these views began to appear, in fact for a long time after their first publication, dental readers were regaled with quotations from and rehash of the contents of books the very names of which had grown musty. All reasoning as to the structure, growth and development of tissues and organs had as its starting point, with members generally of the dental profession, the timehonored and threadbare propositions of these ancient authors. Having been prepared by men whose interest centered in medicine, the chapters on dental matters were written merely to fill in—more for the sake of rounding out the subject than with the expectation of adding anything of value to the dental student and practitioner. But thanks to the gentlemen named and their followers, original investigation was stimulated, and has continued up to the present with the result that the dental profession is to-day in a position to decide for itself, through its practical workers in dental histology and histo-pathology, questions decisions upon which but a short time since were deferentially received from men without knowledge of the commonest affections of the teeth and contiguous parts. The published views previous to the advent of the bioplason

theory were in the main the work of compilers well read but non-practical in this particular field.. Several exceptions there were among the workers, but for reasons best known to themselves they worked quietly, for their own satisfaction, without publishing except in their own vicinity at meetings whose doings never or but rarely ever saw print. But when the views in question had all but captured the whole dental fraternity, Black, and Andrews, and Williams, and Allen, and Sudduth, and other qualified observers came to the front, and to-day we have two opposing factions—if they may be so characterized—each bent on the destruction of the other in the effort to get at the truth. It's a hard fight for the principals engaged in it, but a glorious spectacle to the looker on. It may be a case of perversion, but we are not alone in our delight at a quarrel, the conditions being that it shall be between the other fellows, and our position for the time being a safe one on the fence.

Except at the last meeting of the American Dental Association, dentistry as a profession, and dentistry as a specalty of medicine, have had a rest. Why, unless it be a reaction from former activity, or a stop to gather strength for a new attack, would be difficult to guess. It occurs to us, however, that the widespread introduction of comparatively new methods in the line of mechanics has had much to do with the decline of interest in this to some all-absorbing topic. With the introduction of crowning has come a simplification of methods of treating pathological conditions. Where not long since the tooth pulp was treated to arsenic, and one or more days later removed, the root put beyond the probability of further trouble by the use of antiseptics, and in a few days more carefully filled, now the pulp chamber is made accessible, and with one blow its contents effectively knocked out. This is radical, but the results are claimed to be at least as good as by the more roundabout way, plus the saving of valuable time. How extreme these transitions are is shown in the difference in methods of mechanically treating teeth large portions of which have been lost by fracture or decay. Contour fillings on a scale known in the past will never be repeated, and the appliances introduced to make such operations possible to the operator and tolerable to the patient have gone for all time. Better methods have come, and will continue to come, and with such rapidity that the practical man to keep up with the procession must relegate, for the time at least, the question of the status of dentistry to those who delight in the working out of such problems as the philosophy of the unconscious.

Dental education is receiving its share of attention, and the coming discussion will be as between that kind that informs a man as to what ought to be done and that which makes it possible for him to do. What do you know? is no longer the question in a pushing community, but—What can you do? The education of head and hand is rightly a feature of the technical school, but the former in some quarters seems to lead at the expense of the latter, and to the detriment of the individual. There can be no dentistry without finger-skill, and the time to acquire that is not after the student has passed the plastic stage. Judging from what one sees of men who first acquired mechanical training in other callings before taking to dentistry, one is almost persuaded into the belief that it would be better for them and dentistry if all were made to work before being permitted to study—if such distinction may be made.

The question of patents has filled a good many pages in our periodicals, and has resolved itself, as tersely put by a would-be patentee, into a difference between sentiment and sense. The dental profession has suffered from patent abuses as much as, if not more than, any other, but it has also benefited by the protection afforded inventors and manufacturers in the just application an enforcement of patent laws. That instruments and appliances that alleviate or lessen human suffering should not be patented we get from the medical profession, five per cent of whose members are inventors, and less than fifteen per cent inventive and suggestive. So said a noted surgeon of New York., himself an inventor, likewise a sufferer in mind and pocket because of this something-for-nothing feature of the medical code. A poor patient needed a yet to be invented appliance, and the surgeon in question set to work to devise a something to fit the case. The instrument maker put a skilled workman under his direction, and in time the poor patient got just what his case required, and other patients throughout the country are to day wearing duplicates of the appliance in question, but the work of other hands. The illustration and description of the appliance were followed in a few days, in one instance, by the appearance in another instrument maker's window of six instruments—deprived, however, of several of the very features that had made the original valuable—and cheapened to the figure of $25 each, where the first one cost in time and money $200, without a cent in return from the too-poor patient. Further modification of the appliance followed until it lost its identity, but retains to this day the name of the inventor, selling in some sections at $10. It not

only fails utterly of its object, but where applied does more harm than good. If patented every appliance bearing that particular name would do for every patient so afflicted just what the original had done for patient No. 1. What is true in this case is true of others—the modified appliance was a damage to the patient, likewise the man who prescribed it, and it cost the patient more than a perfect instrument made in quantity by a competent maker under the protection of a patent. The best instruments and appliances in dentistry to day, are patented, and their superior quality, style and finish, are appreciated when one invests in articles in the manufacture of which competition is free. As a rule the latter are cheap from whatever standpoint studied—they cost little and are worth less.

The future of dentistry comes in for a word. To day the relations existing between patient and dentist are largely personal, and in many instances intimate. This is likely to continue until competition among dentists is such that it will be for the interests of the patient, both as to teeth and pocket, to choose not merely between two, but many. With this comes a revising of personal and professional relations and the cementing of others on a purely business basis. The field is so closely crowded even now in some of the larger centers of population that a man in large practice can obtain in the market the very best of help in special departments and at reasonable cost. The difficulties in the way of obtaining a practice are such that the recent graduate would rather put in a year or two with his old preceptor than was formerly the case when the young man could hardly get out his sign too soon. Advantage of this condition of things has been taken by dentists without professional standing or ambition, but with great capacity for business, and under their ministrations the public is being slowly but surely led to look upon the professional man as poor but perhaps respectable, and his latter day competitor as a man of energy, vim, push, and in keeping with the spirit of the times. With the divisions of labor the individual becomes one of a firm, which in time is merged into a company, and this again into a syndicate, and finally a trust. The modern dental association that we see in every sizable city of the land is a step in this direction, and a long one considering the time. It merely adds another example of the sinking of the individual in the larger affairs of life, in which he is as effectually lost as the individual brick in a well. He is of value while in place, but can be thrown out without notice, and a better man put in without impairing the structure in the least, or interfering with its

progress or work. Looked at philosophically little else could be expected, for the socializing agencies, the leveling influences we see about us, are an integral part of modern civilization as we find it in the larger and more fully developed centers of population. Nor is dentistry alone among the professions that await this fate—law firms are larger and their specially qualified clerks more numerous than ever. Medicine, which some of us love to quote, is building its private hospitals everywhere, most of them small but on a plan closely imitating that at Washington owned and operated by a late surgeon-general of the army—a man whose standing as a citizen, and member of the medical profession, place him beyond the reach of other than favorable criticism. So too the rendering of much and good medical service at small cost, as in New Orleans, where hundreds of families are banded together to entertain and accept bids for medical attendance at so much per head per year. The older and more staid practitioners are against this thing tooth and nail, but service must be rendered and rendered largely in this way, and to go against it is like an attack on a stone wall with ones head as a means of demolition. Our profession has no substantial reason for thinking itself an exception—like other bodies it must move on or get out of the way. It has a great future before it, but all its ways are not likely to be ways of pleasantness, nor its paths wholly the paths of peace.

NOTE.–An organization called the Guarantee Medical Attendance Association has been perfected in New York city. Its object is to furnish medical attendance to its members whenever required, and drugs at a reasonable price. To accomplish this the city is divided into thirty-seven districts, corresponding with the police districts; in each of which there is stationed one the association's physicians, who is to respond to all cases of sickness among members. In each district contract has been made with a reputable drug store to fill all prescriptions at the uniform price of twenty cents each, To become a member necessitates the payment of $1 entrance fee and forty cents a month dues in advance, or $2 will be taken in advance for six months' dues. It is said that the association is already on a good paying footing, having done so well that it is talking of starting branches in the larger cities in the country.

The price is no bar to participation in the benefits of this association. For what would ordinarily be paid for one visit by a physician, medical attendance for a whole year can be had. But if people don't want the doctor but are themselves in the habit of buying many drugs, they can make membership in such an organization very profitable by the discount given on prescriptions. The main question will be as to the qualifications of the doctors. If the association shall be worthy of any patronage its physicians must be gentlemen skilled in the profession. For dangerous cases the association says it has a staff of specialists that may be called in consultation.—*Rochester Morning Herald, May 25th*, 1889.

REMARKS TO CANDIDATES RECOMMENDED FOR THE "M. D. S."

In accordance with one of the provisions of the dental law of this State, and a custom now time-honored, it is the duty of the President of this Society to confer upon those who have succeeded in passing the examination of the Board of Censors the degree of

"Master of Dental Surgery," and to this duty is added the privilege of such comments on what has transpired as may be suggested by the occasion. Others who have stood where you now stand have been told again and again, by our predecessors in office, of the difficulties of this examination, and of the yearly-decreasing possibility of any candidate passing it. The law says that all applicants shall be examined, but it does not say in what that examination shall consist, such matters having been wisely left by the law to the Board itself. The standard has been raised with each examination until the applicant is all but proscribed, and this in the interests of higher and better education. While the Board does not broadly publish the fact, it is determined that this honor shall be fairly earned, and if necessary, through disappointment, and trial, and tribulation. Some try but once and succeed, some twice, and yet a third time fail to grasp the much-coveted prize. The meaning of this is that the requirements of the Board are most exacting, and that the proper course for those who would not fail is to attend a school recognized as reputable by this Society, qualify themselves there for the school's degree, and be thus put in the way of the right to practice in this State. The time is not far distant when the last degree will have been conferred, and when the next step will be in the direction of a request to the Legislature to abolish the section creating the Board and defining its duties. When satisfied that its work is done, the members of the Board will be among the first to not only request but urge its own dissolution. This last act will have made the "M. D. S." of inestimable value, and it will be cherished by its happy possessor, and after him by those into whose possession it may pass, as the evidence of achievements of no mean kind. In conferring the "M. D. S.," I have the rare privilege of passing it into the keeping of the first lady ever before our Board for examination as to her qualifications to practice dentistry in this State; that it will be well kept by at least one member of this group goes without saying. Therefore, in compliance with the statute, and on the recommendation of our Board, I issue to each one of you the Diploma of this Society, and confer upon you, also each one, the "Degree of Master of Dental Surgery."

ACTINOMYCOSIS.

By the name actinomycosis is designated a contagious disease caused by the presence in the system of a vegetable parasite, of radiate form, actinomyces. This is a malady which has been

more especially studied in other countries than ours ; in Germany, Russia, and England, where it most frequently appears. Bollinger, of Munich, describes this parasite for the first time, and recognized in it a vegetable which produces, by its multiplications, tumors having their seat in the jaws of horned animals. These tumors have been known to veterinary surgeons under the name of osteosarcoma, cancer and scrofula of the bones. They are of a whitish color, of a firm consistence, and contain in spots small yellowish masses resembling little abscesses. Scraping these masses brings away small yellowish grains the size of a hemp seed, which are constituted, under the microscope, of filaments of variable form and grouping. Harz has recognized these parasites as belonging to the group of mucedines.

The affection does not seem very rare in Germany and Austria, for communications have been quite numerous upon the subject, and Rotter, of Berlin, has observed five cases in eight months.

The multifarious aspects under which the malady presents itself, have tended to confuse the diagnostic. For the time being, the cinical forms have been classed in three categories :

1. Those produced by the penetration of the parasite by way of the buccal cavity, carious teeth, dental fistulæ, tonsils, mucous coats of the palate, manifesting themselves by diseases of the jaw and neck.

2. Those taking their rise in the lungs ; the parasite introduces itself by way of the mucous membrane, wounded or not, of the respiratory passages, and develops accidents in the side of the lungs, the lips, the pericardium, and in the thoracic walls.

3. Finally those manifesting themselves in abdominal affections ; here the parasite penetrates, probably by the intestinal mucous membrane and invades next the abdominal organs, as well as the abdominal wall.

Under certain circumstances, each of these clinical forms may be complicated by accidents resembling those of chronic pyaemia ; as when the parasite has penetrated the blood vessels and lymphatics, infecting the whole organism and provoking lesions terminating habitually in suppuration.

In the first group of facts noted in the case of man, tumors of inflammatory appearance are observed to supervene in the region of the inferior maxillary, rarely in the superior. The tumors usually

develop very slowly, have the size and hardness of a cherry stone ; they occupy the sub-maxillary region, the angle of the jaw, the region of the zygomatic arch ; mobile and indolent sometimes for several years, they in the end become soft, adherent, painful ; if left to themselves they ulcerate and give issue to pus containing colonies of parasites. The tumors may multiply and invade successively the neck, the larynx, the clavicular region, and remain fistulous after having developed a phlegmon circumscribed about them. If the disease begins in the superior maxillary, the little tumors advance into the cheeks and temporal region, and, more deeply, into the vertebral column and the base of the skull, where they develop inflammatory accidents. Rotter has cited an instance of this kind of evolution. and it is understood that in these conditions, the malady presents the clinical aspect of vertebral caries. Esmarch has insisted upon the very pronounced induration which surrounds the abscess as being characteristic.

How does actinomycosis develop itself in man ? As the disease appears to be more frequent with cattle, it has been thought to be transmitted from animals in consequence of contagion or by alimentation from infected flesh. But the observation of cases becoming more numerous of late, has tested that opinion with the effect that many writers, with Israel, believe that man and beast are infected from common sources. Jansen thinks that the parasite lives upon certain gramineals in Denmark, and that barley, for example, being invested with a long beard, may occasion upon the buccal mucous membrane of animals slight wounds which serve as entrance doors to the radiate fungus. Johne, upon his side, has found grain beards upon the tonsils of hogs, especially those of barley, covered witn a fungus very similar to, if not identical with, the actinomyces. Soltman relates that a young man was infected with the disease after having swallowed an ear of wild barley, and had abscesses of the thoracic wall, in the pus of which were found parasitic colonies, and remains of the ear swallowed.

The prognostic of the disease naturally varies according as the infection is local or general. Death is the rule when the parasite has invaded the viscera, but so long as the disease remains local, that is to say accessible to surgical mediation, its cure can be counted upon. The treatment consists in ablation of the nodes, scraping and antiseptic dressing. Surgeons who have had occasion to treat actinomycosis of the inferior maxillary, have laid great stress

upon the good results obtained with silicious earth mixed with sublimate, two to a thousand. It is evident, after that, how important it is, in point of view of the treatment, to recognize the first stage of the disease.—L. JUMON (*France Medicale*), *L'Odontologie.*

THE ELASMOTHERIUM.*

TRANSLATED FOR THE ODONTOGRAPHIC JOURNAL.

[The Elasmotherium is, or was, one of those particularly graceful mammals which ambled and gambolled among the cenozoic marshes of a quaternary age, and is believed to have been still "tripping the light fantastic" when primeval man first awoke to a realizing sense of his painful situation in having been born into a world wholly unfurnished with "modern conveniences."

Owing to the nearly complete disappearance of such personal effects as were left behind by the last representatives of this ancient and aristocratic family, the genealogy of the elasmotherium is somewhat obscure, and it cannot now be satisfactorily determined how the patronymic was originally spelled or pronounced.

From time to time, such pieces of bric-a-brac and rococo as half a skull, (a yard in length) a metacarpian or ulnar fraction, a shinbone or shoulder-blade, carefully inscribed with its former owner's monogram or crest, has turned up in some unexpected spot among the debris of the centuries in the environs of Samara, in Russia.

The characteristics of these vagrant members of the several deceased, have been sufficiently diverse to cause them to be successively accredited with relationship to the elephant, the rhinoceros, the dinotherium, and the aquatic mammals, by a long list of experts having Cuvier at its head. If the elasmo knew his own cousins, he never told; perhaps this concealment, preying on his damask and extensive cheek, hastened his premature demise.

M. S. Hugard has drawn for us (upon his imagination), in "Le Naturaliste," the portraits of two now defunct scions of the extinguished house of Therium, standing in a paludic Samara landscape. Both wear their furs, though the summer season is indicated by the

*The introductory remarks consist partly of a very free (and) easy translation of the main points in the descriptive article in "Le Naturaliste," up to the paragraph where the account of the dentition begins, together with some comments and speculations which suggested themselves to the irrelevant and irreverent mind of the translator.

"accessories," but a cool glacier has probably just floe-ed by. One of them wags a semi-canine tail, sniffs the morning air, and gazes into the future with a far off expression in his near eye, as though he might be trying to solve some of the vexed problems which wrought such havoc in the Elsmere household. But he isn't; he is only waiting for his last mouthful of sedge to adapt itself comfortably to the new environment afforded by the walls of his stomach, prior to the pre-emption of another bunch of stalks.

History is quite silent as to which of these exquisite creatures was the entertainer, or, to use a vulgar expression, whose "treat" it was, on that halcyon day in the Samara "paysage;" but the evidence of uncivilization is incontrovertible, for with champaign lying about them on every hand, they are indifferently imbibing aqua pura, or impura, as the case may be. However, they seem to be having a sufficiently hilarious time of it, not to say malarious, in their post tertiary swamp, "out on a lark," I was about to say, but bethink me that the lark not having been yet, at that date, "naturally selected," perhaps it will be more synchronologically correct to put it "on a pterodactyl." But how could any animal drink spilled water with a Queen Anne gable on his upper lip, all the while being obliged to balance a leaning tower just above the bridge of his nose?

However absurd their order of architecture, it is impossible not to feel an absorbing interest in these esteemed contemporaries of our foremost fathers. The ephemeral product of to-day's "effete civilation" boasts, forsooth, of Norman blood! A paltry eight hundred years is but the merest twiglet on the family tree. Did not "all of our" ancestor come in with the elasmotherium?]

But to the translation:

The dentition is quite remarkable; in their number and disposition the teeth decidedly approach those of the Rhinoceros. But their form is different. The hight of the shaft, the almost complete absence of a neck, the numerous folds of the enamel, the abundance of the cement which fills all the interspaces, suggest the teeth of a horse or a Ruminant of enormous dimensions. But upon the molar is recognized the fundamental arrangement of the cusps and denticules which characterizes the Rhinoceros group; further, as we shall presently see, the Elasmotherium is a Rhinoceros, taking his skeleton as a whole. We have therefore conjectured that the differences of which I have just spoken, were acquired in consequence of a change of diet. While the present Rhinoceros has held to the same diet as

those of the tertiary period, and lives, for the most part, upon dry and coriaceous shrubs, the Elasmotherium, which inhabited regions where the glacial phenomena had just destroyed the forests, substituting therefor an herbaceous vegetation, was compelled to transform his cutting to grinding teeth. This change took place very slowly ; one can indeed follow it in different species of the genus Rhinoceros. Thus the Rhinoceros tichorinus, without being so herbiverous as the Elasmotherium, has, however, teeth more elevated, with enamel more contorted, cement more abundant, than in the case of his predecessor, the Rhinoceros Merckii, whose teeth in turn present a more elevated shaft than those of the tertiary Rhinoceros.

The same phenomenon of adaptation has taken place among the Proboscidians ; the Mastodons had teeth with thick cutting summits separated by deep clefts. They pass insensibly to the Elephants, whose teeth realize, little by little, the type of a perfect rasp. This arrangement is especially observable in the Mammoth, contemporaneous with the Elasmotherium and the Rhinoceros.

The ruminants of the most ancient geological beds have teeth equally little planned for grinding herbs. It is only little by little, and in proportion as the ascent is made through the series of rock formations, that the depth of the shaft is seen to increase, the colonnette takes more and more importance, the enamel folds itself, the cement fills the depressions, and by this alternation of hard and softer parts, the crown constitutes a surface eminently suited to the trituration of herbage.

Thus, while keeping to the morphological primitive plan which enables the retracing of the true origin, the adaptation to the same kind of life has brought about the same modifications in the organs of animals belonging to different orders.

The teeth of the Elasmotherium are modified for filling the same functions as those of the horse, the ox, the elephant ; the analogy of function has then induced a certain analogy of form ; but there is no homology of constitutive parts. The homology only exists with the teeth of the group Rhinoceros, and it is that homology, concealed by the adaptation to a physiological end, but not having disappeared, which makes it possible to reconnect the Elasmotherium with its true relatives.

Further, we see that adaptation to new conditions of existance can

really lead to the transformation of species and even of genera[1] paleontology furnishes here to the doctrine of evolution, arguments which seem to me to have great weight.—M. BOULE, "*Le Naturaliste.*"

ALVEOLAR ABSCESS—GOLD AND PLATINUM—GOLD AND AMALGAM—GOLD AND OXY-PHOSPHATE—GILDED AMALGAM FILLINGS—ROOT-FILLING—BRIDGE-WORK.

Extracts from the report of the Committee on Practice (Dr. Ottolengui, Chairman) read before the Dental Society of the State of New York, and published in full in the *Brooklyn Medical Journal.*

The advocates of immediate root filling have been so loud in their hurrahing and so convincing in their arguments that they have converted the majority of our profession to their method. This, however, leaves alveolar abscess to be considered from a new standpoint. If the root is to be filled at the first sitting, it is possible in many cases where the condition of the end of the root is obscure, that shortly after such treatment positive evidences of abscess may present. To those accustomed to treat such conditions through the root canal this is a point to be pondered over. In such instances your committee has to report that the most satisfactory result may be hoped for, if the sac be burred off the end of the root with a sharp bur, passed through the soft parts and the alveolar wall. Where such an operation seems likely to prduce pain, cocaine or gas may be administered, or ether spray may be used. Where pain may result and continues afterward, it may be abated with five grain doses of anti pyrine. In performing this burring operation on superior bicuspids or the buccal roots of superior molars, care should be taken not to enter the antrum, even though such an accident would not of necessity be attended by untoward consequences.

GOLD AND PLATINUM.

This is a combination which makes a very dense, durable filling, of light color. It is specially indicated for extensive contours in conspicuous positions, or where great strength is required, as in uniting teeth for pyorrhea. Those who have never used it should be very cautious at first, as this material is exceedingly difficult to manipulate. It tears readily under small points, and nevertheless too large foot pluggers should not be used. A long narrow foot

plugger with fine serations seems best. The main point, however, is annealing. It is necessary, to obtain best results, that this should be thoroughly done and yet there is danger of burning off the thin outer layer of gold, exposing the platinum and thus preventing cohesion. Therefore it will be wiser not to depend on skill, but to use the Johnson annealing apparatus, with which the material may be heated to a bright red without burning. This device may be had of S. S. White & Co. It is in appearance like a small nutmeg grater, set at an incline over the spirit lamp, the heat passing through the little holes to reach the gold which is laid on the upper side. It is safer to anneal a large piece and cut in strips afterward.

GOLD AND AMALGAM.

It has been demonstrated again during the year, though long ago discovered by Dr. Kingsley, that gold may be made to unite with amalgam at the same sitting, thus giving amalgam as a protection to the cervical border, where it has proven better than gold, and gold along all other edges where it is evidently better than most amalgams. In filling proximal cavities after this method a matrix is needed, securely placed. Amalgam is packed along the cervical border, and immediately upon it is packed plastic gold, preferably Steurer's, until the gold color persists, when the fillng may be finished as any other gold filling with any foil which the operator may prefer. Your committee was shown test fillings made in this manner, a tube of glass one inch long having been filled half with amalgam and half with gold. Removed from the tube the union between the two was so perfect that it was impossible to break them apart with the fingers. Your committee re ommend this method in cases where from extensive decay below the gum margin it would be difficult or impossible to fill with gold. When the depredation is so great that the cervical edge cannot be reached with the matrix, that portion may be filled before placing the dam in position, and the matrix adjusted afterward, when more amalgam must be put over that first inserted to insure a surface free from moisture, before adding the plastic gold.

GOLD AND OXY-PHOSPHATE.

Your committee wishes to attract special attention to a method devised by Dr. Reese of Brooklyn. In shallow cavities, the pulp being not exposed but nearly so, and where it would be dangerous to obtain sufficient retaining shape to the cavity, some "sticky" grade of oxy-phosphate may be placed over the bottom of the cavity, and before it is allowed to set a pellet of gold large enough to fill

the cavity, is pressed gently into the cement, and then left undisturbed. When the cement has set it will be found that the piece of gold is firmly held; it may then be condensed and forms the foundation on which the filling is built. In this way the filling is actually *cemented into position.* Your committee after trial of more than two years has no hesitation in saying that this is a thoroughly reliable method of starting a filling and of additionally securing it. Of course it is not meant that large contours may be made to depend on the cement alone; judgment must be used, but a trial will convince anyone that this is a most valuable idea. It also serves well with amalgam fillings, possibly better since such a filling may be completed without waiting for the cement to set.

GILDED AMALGAM FILLINGS.

An amalgam known to be reliable, especially as to color, is mixed rather dry and the tooth filled. Very thin gold foil, thinner than what is known as No. 4, is annealed and cut into small strips, which are laid unfolded on the filling, and with perfectly clean warm burnishers (which should be kept specially for this purpose) burnished into the filling until it has set hard. It must be done thoroughly and sufficient gold used; sometimes a sheet or even two sheets will be required. The result is an ideal filling which will keep its edge, its color, and its finish. Your present committee not only has tested this in practice during the year, but was allowed to inspect fillings made in this manner by the chairman of last year, where they had been in position two, three and four years. These fillings are so beautiful that those who see them for the first time involuntarily ask, "What amalgam is that?"

ROOT FILLING.

The immediate root filling advocates have covered themselves with glory and are masters of the field. So far as abscess after filling is concerned, that has been already touched on in this report. Your committee has but to outline what seems the best method of filling the root. Perhaps the most commonly used filling material is gutta percha, and next in order is oxy-phosphate. Neither of these materials is as reliable as the profession think. At a meeting in Philadelphia this winter a gentleman exhibited the results of some experiments in this direction which were both instructive and important. He filled roots out of the mouth with gutta percha, and others with oxy-phosphate. Twenty-four hours later they were placed in aniline ink and left for one day. A segment-shaped sec-

tion was removed and it was discovered that the ink had entered the dentine from the outside through the cementum, and from the inside by way of the canal, despite the fillings, which are generally thought to be water proof. A third specimen was where the root canal had been filled with cotton as a vehicle to carry carbolized cosmoline. The cosmoline had permeated the tubuli and thus prevented the ingress of the ink either from the outer surface or from within. Your committee does not think it advisable to use cotton as a root filling; nevertheless the above experiments teach the value of allowing a greasy filling to enter and carry with it a disinfectant. It therefore seems that the very best method is that introduced by Dr. Van Woert, which is to half fill the canal with a paste made of iodol, zinc oxide, and carbolized vaseline. By mixing these a paste can be formed stiff enough to render cotton unnecessary in its introduction. The upper half should be filled with oxy-phosphate, or better still, oxy-chloride of zinc. In practice this has proven as good as it looks theoretically considered. All manner of teeth have been treated in this way, and the percentage of success is most encouraging.

BRIDGE WORK.

This system of restoring lost teeth has come to stay. It, however, is still in its infancy, though a promising child and well worthy of being wedded to the dentist if he can only win her from her present parents, or rather "legal guardians." The weak point about bridge-work is its strength. This is a paradox, but it is explainable. If a bridge be united to several roots, it becomes a most difficult matter to remove it. Such removal often involves the total destruction of the bridge. And such removal becomes necessary with our present methods whenever an accident occurs and one tooth is broken. If one tooth is broken on a gold plate it may be repaired at a trifling cost to the patient. Not so the bridge. If codes of ethics mean anything, then it is our duty to devise promptly some reliable system whereby bridges may be so made that repairs may be made inexpensively. It is not just to exact a large fee for a contrivance so made that the patient is constantly in danger of losing its use or paying another large fee.

NEW APPLIANCES.

Those who have done much in the way of mounting gold crowns and bridge-work understand and appreciate the difficulty oftentimes experienced in removing the bands and crowns during the process of

fitting and adjusting. This part of the work has been rendered easy by the use of a little device of Dr. C. H. Rosenthall, of Cincinnati. It consists of a staple-form clutch, the points of which catch the edge of the crown or band at or under the gum margin; a screw shaft then passes through the crown part of the staple working through a screw-nut on the under side of the staple, and as the screw is operated its end comes in contact with the root or crown to which the substitute is being adjusted, the band or crown is removed from the root without the least jar or strain upon it. Only those who have used it can appreciate the great relief its use affords.

Another very convenient and useful appliance, especially useful in crown and bridge-work, is a Lilliputian rolling-mill, also obtained through Dr. Rosenthall; of this he does not claim to be the inventor, though it was made at his suggestion. The rollers are two inches long and an inch and a half in diameter, set in a strong frame; the whole weighing about twenty pounds. It is as efficient as a larger mill for working small quantities of metal, even to an ounce. An interesting point about it is that it is furnished ready for operation for $15.00.—*Dental Register.*

CASE OF PARALYSIS FOLLOWING THE EXTRACTION OF A TOOTH.

TRANSLATED FOR THE ODONTOGRAPHIC JOURNAL.

On the 9th of February, Madame G——, aged twenty-nine, anaemic, came me to complaining of the first lower left molar, attacked by gangrene of the pulp, followed by inflammation of the periosteum. Extraction was necessary. I warned Madame G., who is very timorous, of probable fracture, because it seemed to me inevitable.

At the first pressure of the forceps, the crown gave way, the root was partly luxated and emitted a jet of blood; I made a plug and took out that root with the elevator. The hemorrhage ceased at once, and all pain suddenly vanished. Madame G. fainted, and I gave up the extraction of the mesial root.

At the end of ten minutes Madame G. recovered and wished to go home, but at that moment her forearms became paralyzed, the hands were drawn in, the fingers rigid; articulation of the elbow joint was difficult.

After a quarter of an hour of friction, the elasticity of the fingers

seemed to return, but a new crisis threatened, and the paralysis seemed disposed to communicate itself to the lower extremities.

I supported Madame G., and forced her to walk, the lower extremities regaining their flexibility, but the paralysis of the forearms was as great as at first. The muscles of the head and neck had preserved their flexibility during the crisis. At 4 o'clock I made the extraction, at half past four Madame G. was able to return home with assistance.

At 7 o'clock, when I saw her, she was able to use her hands, though yet with great difficulty. Electricity, friction and warm baths had restored flexibility to the upper limbs. The forearms, hands and and fingers alone were insensible to pricking with a pin. —LEHR, *L'Odontologie.*

A TRUE STORY.

BY "SHE."

A cobbler was ambitious of practicing dentistry. He therefore hired a gilded saloon, hung out of his window a sofa made in the shape of a full set of artificial teeth, for the convenience of passers by, and placed upon his door the inscription—"Painless Dental Parlors and Odontological Drawing Rooms." He then obtained for publication in the daily papers the certificates of the butcher, the baker, and the candlestick maker, that they had employed him these many years, that he was the only dentist in the world who extracted and filled teeth without pains, and that they felt sure, in the matter of artificials, he was quite capable of giving his clients perfect fits. He also advertised as follows :

Teeth filled with gold hand-sewed, with silver, pegged and copper-toed.

Artificial sets, superior felt uppers, musical box attachment.

Inferior sets, tongue elastic.

Work guaranteed to last.

Whole-soled dealing with the public.

Kid work a specialty (welted and waxed).

Gum-boils tapped and heeled.

Teeth extracted by moonshine, etc., etc.

"Awl went well until one day," when an able-bodied patient actually appeared and took the chair. He objected to the use of bi-sulphuret of carbon as an anaesthetic ; he objected to the employment

of an old gum shoe as a rubber dam; he objected to having his teeth plugged with shoemakers' wax. In fine, of coarse, he kicked, not figuratively, but specifically and energetically. When the would-be dentist emerged from the cyclone that ensued, he was no longer "painless," though all his windows were.

DEFINITE THOUGHT.

Much mental labor is lost, or at least wasted, through a lack of definiteness. This is suggested by noticing the apparent lack of aim often manifested in considering decay of the teeth.

Toothache is a symptom, and as such may suggest any one of several morbid conditions. A brief conversation with a layman, intelligent in many lines, but certainly not in pathology, may make this thought clearer. "What is good for jaundice, doctor?" said he. "That depends on the cause," we replied. "This is a case of real yellow jaundice," said he. "Why can't you tell me what to do for it?" "Well," we replied, "jaundice is not a disease, but a symptom, and may be caused by different states." "Jaundice not a disease!" said he. "I tell you it is, and a h–l of a disease, too. I don't see how you ever cured so many cases, while you know so little." And thus we ended.

But may we not forget that dental decay, in any of its varieties, is a symptom of a morbid state, and not a state, itself? And while it is our duty to head off the decay by timely and appropriate filling, is it not also incumbent on us to remove, if practicable, the morbid condition that causes the decay? And in order to do this, each case of decay that comes under our care should be closely observed and definitely studied, as this is a necessary step in finding out the nature and character of the diseased condition causing it. We take for granted that all agree that no teeth are so badly formed and developed that they go into decay in or with a perfectly healthy environment.

And when we have thus closely and carefully studied one case of decay, and have succeeded in removing or neutralizing the morbid condition causing it, it does not follow that this study and its corresponding treatment will, as a matter of course, answer for the next case. For a few moments let us think of caries just as we find it in the mouths of our patients from day to day. Forget, if we can, for a little, how the books describe it, and how the societies talk about

it. No objection to books and societies at all; but, just now we want you and your patients.

Here is a case—look! the enamel is gone, and something is wrong with the subjacent tooth material. A cavity? Well, in a certain sense, yet *filled*, or nearly so. The filling is neither gold, tin nor amalgam. On careful examination we find it gives evidence of recent organization, and conclude that really it is the organic matter of dentine which lately formed a corresponding part of the tooth. We find the lime salts are gone, and we know they must have been in solution before leaving, or they could not have got away without displacing this organic matter. Nobody believes that a flock of little microbugs crawled in among these organic fibers and came out again each carrying a lump of lime salt, leaving the organic matter undisturbed because not fond of it. Nor does any one now believe that a grove of little micro-bushes grew there till their roots took up all the lime, leaving the organic matter as the residue of an exhausted soil. We are beyond all that. We are not discussing the germ theory. But germs, secretions, accidental contact, or what not, all agree that here is evidence of chemical action, and that in this case its force was mainly exerted on the lime salts. Possibly an acid, then? Yes, possibly, and if made by microbes, we care not; and if so, we care not if it is from their secretions, excretions, or putrefactions. Chemical action, though ? Yes, we think so.

But see this case. Almost the only points of its resemblance to the one just considered is that it is in the mouth of a patient, and a tooth is involved. Here you have a cavity not filled with organic matter, but partly filled with debris from dentine and, perhaps, accidental foreign matter from the oral cavity. The destruction of dentine is complete as far as it goes. The destroyed tissue may not be all removed, and this may be because it is not in perfect solution as then it would be carried out by the saliva and other liquids. There is, here too, definite proof of chemical action, but in the name of germs, microbes, acids, alkalies, secretions, excretions, and company, all must agree that the action is quite different from that shown in the first case considered here. And the science of chemistry will state positively that there must have been a different reagent, for "chemical action is different in its nature." And pathology demands that we find out the reagent in each case, while therapeutics demands our prevention of its ravages.

We are all more or less worried by the almost uniform expressions,

from pen and tongue, used as if dental decay were a unit. Nearly all refer to dental caries as if, when you have gained full knowledge of one case, you are master of the whole subject. But can any who carefully examine for themselves, believe that the two cases described above, are caused by the same reagent? that their immediate, or exciting causes are identical?

But here is a third case selected, of course, to make our office clinic the more instructive. It is not more like either of the preceding cases than is consumption like yellow fever or small pox. There is a cavity, perhaps, but not much of the enamel is gone. The semi-transparency of the enamel shows that the dentine beneath it is dark colored, sometimes black. Neither dentine nor enamel is much broken down. It is plain the condition is not normal. The prognosis has been slow. Chemical analysis may show no decrease in the weight of lime salts—possibly there may be a slight increase, which increase some claim is due to the fact that it takes forty parts of sulphuric acid to replace twenty-two of carbonic acid. In this case the organic matter seems to be carbonized—turned into charcoal, instead of having been carried away in solution, as in the first case here considered, or disintegrated, as in the second case. This variety is much more likely to be superficial than either of the others, and, progressing less rapidly, is not so likely to destroy a tooth. The pulp is not exposed by this variety as often, in proportion, as by the others, partly because of its slowness in penetration, and partly because of its color soon attracts the attention of the patient.

Now, no one will claim that the portion affected by this kind of caries is in the normal chemical condition of tooth substance. And if thus changed, there has been chemical action, and it matters not whether microbes caused the action or not, but it is important to know.

Now we appeal to all who have practiced operative dentistry with their eyes open, that we have described three cases with which they are familiar. And we do not claim that they will find the caries as distinctly marked in all cases as above described. Far more than one of these varieties may be found in the same mouth, at the same time. It is not uncommon to find a broken down cavity of black decay, of long standing, with a newly formed one of white decay in the bottom of it. But such things will not confuse or mislead a careful observer.

The difference in color does not suggest the most noted points of

difference in the varieties of decay. They are used for convenience.

The first variety here described is nearly colorless at first. It darkens by exposure, but never looks like "black" decay, and is never like it in other respects.

When we hear that some brother has artificially produced dental caries, we have a right to inquire which kind. And if answered, we may take courage that he may enlighten us on the others, but not forgetting to thank him for that already done. Let the research go on.—*Ohio Journal of Dental Science.*

Patients often break artificial teeth in the most unaccountable manner. Sometimes, however, they are honest enough to acknowledge that a tooth came off the plate while eating custard pie; or that, in sneezing, the plate dropt on a feather bed and broke in two pieces. We recently heard of a set of teeth being broken while the owner was reading a Sunday paper, he having, it is supposed, struck a chestnut. Volapuk is particularly injurious to artificial teeth.—*Dental Advertiser.*

NITROUS OXIDE NARCOSIS AND THE BLOOD.

Dr. A. Rothman writing in the *Vierteljahrsschrift fur Zahnheilkunde*, criticises the communication on the above subject of Dr. Ulbrieh, a translation of which we published in our last issue. He agrees that nitrous oxide cannot form a stable chemical combination with the hæmoglobin as does nitric oxide or carbonic oxide, for were this the case, the blood would not be able to absorb oxygen, and death would rapidly ensue. With reference to the spectral analysis of blood impregnated with nitrous oxide, he quotes Preyer, Buxton, and MacMunn, who assert that it is precisely the same as that of oxy-hæmoglobin, that is, there are two absorption stripes marked on the scale between D and E. Making numerous experiments on the human subject, Dr. Rothman found that he was unable to distinguish between the two spectra, but made this observation, that the blood of narcotized persons was more difficult to reduce than ordinary blood, the broad band between D and E, characteristic of reduced hæmoglobin, being longer in appearing after adding sulphate of ammonia in the case of nitrous oxide narcosis blood than when normal blood was used. The broader stripes and the dark aspect of the violet end of the spectrum, as shown in Dr. Ulbrieh's plate, as

characteristic of nitrous oxide hæmoglobin, Dr. Rothman believes to be simply a matter of the amount of dilution of the blood examined. The absorption bands of certain pigments will make their appearance in solutions of every possible variety of strength, and always at the same portion of the spectrum, but the breadth, their clearness, and the commencement of their shaded border depend only upon the concentration of the solution and the intensity of the light. Using a Bunsen-Kirchof spectroscope, which allows of the simultaneous examination of two spectra, he found that with one in a thirty-two solution of natural blood and a similar solution of blood drawn from a person narcotised to the full extent with nitrous oxide, that the spectra very nearly corresponded, and that with further dilution, the breadth of the bands decreased equally in both. He therefore concludes that in the inhalation of nitrous oxide there is no chemical combination with the hæmoglobin.—*Dental Record.*

SYPHILITIC TEETH.

Referring to syphilitic teeth, Mr. Hutchinson had nothing new to say, but thought that a review of the present state of opinions on the subject might be profitable. He believed that it might now be said that the value of the notches on the upper incisors is fully recognized all over the world as indications of inherited syphilis, and as time had gone on he thought that they had learned to concentrate their attention on the upper central incisors as being the test teeth; other teeth were often more decidedly marked but were less reliable. Respecting the test teeth, an experience of thirty years enabled him to say that, where their malformation had been well characterized he did not think that in a single case he had been misled. With reference to numerous cases of inherited taint in which in spite of it the characteristic teeth—using the word characteristic in its strongest sense—were not present, the best opportunities for observing the range within which syphilite malformations of the teeth might vary and occur, were those in which several members of the same family had suffered from inherited taint. The experience of recent years had confirmed, without in any way explaining, two items in clinical observation which he had made long ago. The first was, that those subjects of inherited taint who presented good examples of *interstitial keratitis* have almost invariably malformed teeth, and those who

have malformed teeth scarcely ever escape *interstitial keratitis*. The second was, that those who are liable to suffer in after-life from phagedenic affections of the mouth or throat, very often, perhaps usually, show nothing peculiar in their teeth.

THE BAND WAGON IN DENTISTRY—FRANCE ITS HOME.

As she passed across the market-place she saw a crowd surrounding a vehicle of a strange shape, on the box of which a man dressed in red was haranguing. He was a dentist going his rounds, who offered the public complete sets of teeth, opiates, powders and elixirs. Fantine joined the crowd and began laughing like the rest at this harangue, in which there was slang for the mob, and scientific jargon for respectable persons. The extractor of teeth saw the pretty girl laughing, and suddenly exclaimed,—

"You have fine teeth, my langhing beauty. If you like to sell me your two top front teeth, I will give you a Napoleon apiece for them."

"What a horrible idea!" Fantine exclaimed.

"Two Napoleons!" an old toothless woman by her side grumbled, "there's a lucky girl."

Fantine ran away and stopped her ears not to hear the hoarse voice of the man, who shouted—"Think it over, my dear: two Napoleons may be useful. If your heart says Yes, come to-night to the *Tillac d'Argent*, where you will find me."

Fantine, when she reached home, was furious, and told her good neighbor Marguerite what had happened. "Can you understand it? is he not an abominable man? How can people like that be allowed to go about the country? Pull out my two front teeth! why, I should look horrible; hair grows again, but teeth! oh, the monster! I would sooner throw myself head first out of a fifth-floor window on to the pavement."

"And what did he offer you?" Marguerite asked.

"Two Napoleons."

"That makes forty francs."

"Yes," said Fantine, "that makes forty francs."

She became thoughtful and sat down to her work. At the end of a quarter of an hour she left the room, and read Thenardier's letter again on the staircase. When she returned, she said to Marguerite:

"Do you know what a miliary fever is?"

"Yes," said the old woman, "it is an illness."

"Does it require much medicine?"

"Oh, an awful lot."

"Does it attack children?"

"More than anybody."

"Do they die of it?"

"Plenty," said Marguerite.

Fantine went out and read the letter once again on the staircase. At night she went out, and could be seen proceeding in the direction of the Rue de Paris, where the inns are. The next morning, when Marguerite entered Fantine's room before day-break, for they worked together, and they made one candle do for them both, she found her sitting on her bed, pale and chill. Her cap had fallen on her knees, and the candle had been burning all night, and was nearly consumed. Marguerite stopped in the door-way, horrified by this enormous extravagance, and exclaimed,—

"Oh! Lord! the candle nearly burnt out! something must have happened."

Then she looked at Fantine, who turned her close-shaven head towards her, and seemed to have grown ten years older since the previous day.

"Gracious Heavens!" said Marguerite, "what is the matter with you, Fantine?"

"Nothing," the girl answered, "I am all right. My child will not die of that frightful disease for want of assistance, and I am satisfied."

As she said this, she pointed to two Napoleons that glistened on the table.

"Oh! Lord!" said Marguerite; "why, 'tis a fortune; where ever did you get them from?"

"I had them by me," Fantine answered.

At the same time she smiled, the candle lit up her face, and it was a fearful smile. A reddish saliva stained the corner of her lips, and she had a black hole in her mouth—the two teeth were pulled out.—HUGO, *Les Miserables.*

PULMONARY CONSUMPTION.

This is more to be feared in every community than any other disease that affects mankind. Cholera, yellow-fever, and small-pox—diseases that paralyze with fright entire countries—are exceedingly limited in their results, in comparison with the slaughter of

consumption. Last year Florida was panic-stricken from the havoc of yellow-fever; but during the same year consumption destroyed more than twice as many lives in the little State of New Hampshire, and not a tremor ran through the body corporate. The average annual death-rate in this country, from cholera, yellow-fever, small-pox, typhoid-fever, diphtheria, and scarlet-fever, all combined, does not reach the enormous total of deaths from consumption. It is time that some determined and systematic effort be made to lessen this disease which is now regarded by so many as preventable. Among the general sources of infection there is one, at least, that should be removed, or, if not wholly removed, greatly lessened by legal action, and that is the sale of tuberculous food-products. Such foods, chiefly in the form of tuberculous meat and milk, particularly the latter, are undoubtedly extensively sold to unsuspecting consumers; and that the results are not infrequently lamentable, no sanitarian doubts. The general government has taken no measures to restrict this abuse, nor have the individual States. To illustrate: the New Hampshire State Board of Health says that very recently complaint was made to the Board of Cattle Commissioners that some disease existed in a herd of thirty cows in a certain town of the State; and, under the assumption that the disease might be pleuro-pneumonia, the government, upon notification, sent a competent veterinary surgeon to inspect the herd. The inspector immediately diagnosed tuberculosis, had an infected cow killed, and the post-mortem examination revealed tubercles in nearly every organ of the body, including the udder. The inspector reported that about seventy-five per cent of the herd was already infected. All, or nearly all, the cows were being milked, and the product being sold daily to a milk-dealer for distribution among his customers. The dairyman, ignorant of the character of the disease, was bringing up a baby upon the milk of a single cow in which the disease had advanced nearly to its fatal termination. Under the laws of New Hampshire, neither the Board of Cattle Commissioners nor the State Board of Health has any authority to deal with tuberculosis in cattle in a way necessary to restrict its spread among other herds, or to prevent the dangers to which it subjects the human family.—*Science.*

DENTAL SOCIETY OF THE STATE OF NEW YORK.

FIRST DAY—MORNING SESSION.

The twenty-first annual meeting was called to order by the President, Dr. Line, in the Common Council Chamber, May 8th, '89.

The Rev. Dr. Rudd invoked the blessing of Divine Providence upon the Society and its work.

Fifty-three permanent and delegate members answered to their names at roll call. Others reported later in the session.

The minutes of the last session of the twentieth annual meeting were read by the Secretary.

The Committee of Arrangements reported briefly through Dr. Baxter.

An opportunity was then given members to pay their annual dues.

The President, Dr. J. Edward Line, delivered the Annual Address. (See Page 69).

Dr. Mirick then presented his annual report as Treasurer, which showed the Society in excellent financial condition, as usual.

Dr. Curtis, the Correspondent, presented his report as correspondent.

Drs. Pinney and Eaton, of New Jersey, and Dr. Harrison, of England, were accorded the priviliges of the floor.

The Board of Censors reported through its Chairman, Dr. French, that seven candidates of the fourteen who had applied had passed the examination.

Dr. Hill moved that the recommendation in regard to the Pennsylvania College of Dental Surgeons be forwarded to the National Board of Dental Faculties, signed by the President and Secretary of the Society.

Dr. Ottolingui moved the thanks of the Society to those colleges named in the report (Baltimore and Maryland) for offering to receive beneficiaries of us.

The Secretary then read the report of the Committee on Ethics.

Dr. Starr read the first report of the Committee on Business.

Dr. Curtis presented the report of the Committee on the Prize Essays, awarding the Whitney memorial prize to Dr. Howard of Rochester ; title of paper, " The Facial Angle."

FUNDS FOR THE LAW COMMITTEE

The Committee on Dental Law reported through Dr. Carr.

Dr. Carr stated as proving the moral effect of the dental law in this State, that over 200 students had entered dental colleges.

Dr. Hill moved that the Chairman be authorized to draw on the Treasurer for $334.67 for expenses.

Dr. Hart did not know that the Society could do better than adopt the recommendation of the Committee that the Chairman be authorized to draw upon the Treasurer for $1,000, if necessary, for the

prosecution of dental law-suits. He made a motion to that effect.

Dr. Hill thought that too much to be put into the hands of any committee. The treasury might become depleted. Why could not they effect some arrangement whereby the members of the district societies might each contribute $5. He did not wish to oppose the committee, but wished to see the money obtained in another way.

Dr. Curtis said that the district societies were just about impoverished then. He did not know of any society with a surplus on hand.

Dr. Walker said that the treasury of the first district society was in just about the same condition as those of the Western societies ; nevertheless, each member had been assessed $5 for a certain purpose, which put into Dr. Carr's hands for the purpose in question $500. He thought it only just that each member should contribute something to this work. If the sum should fall short and the committee needed more money, the State Society could then direct that the money be taken out of its treasury ; but each individual member should give toward defraying the expenses of the committee.

Dr. Hill moved to amend by substituting $500 for $1,000.

The motion as amended was carried.

Dr. Hill then moved that this Society request each district society to assess its membership $5 each for the purpose of creating a special fund to be placed in the hands of the Treasurer of this Society, to be used for the purpose of enforcing the State law.

Dr. Rich said it was very evident that Dr. Hill did not live in the Fourth district. It was all very well to request members of that society to pay $5 each to enforce the State dental laws, but it was almost an impossibility for that same society to pay its dues to the State society.

Dr. Walker said if members could not pay $5 each let them contribute $2.50 ; if not that, what they could. Anything would be acceptable to the committee.

Dr. Hill had been to Albany probably twenty-five times in the last fifteen years, and had never received a cent from any one. He was as poor as Job's turkey. He hoped this thing would pass,—it was only a request. If we could get $500, all right ; if but $300, all right, too ; if $1,000, so much the better.

Dr. Curtis knew for a fact that if the Fifth district society was assessed, few would pay. The assessments of each year were usually met by a dozen men, except at some such meeting as a union meeting, when others contribute. There had been an

assessment made a short time before of $5. They had forty members and yet $30 was the sum total paid the Treasurer.

The motion was then carried.

Dr. Hill suggested that each district society solicit from practising dentists, not members, a contribution to this object, and in that way see if they could raise the money and forward it to our Treasurer. These men are interested and why not get some from them.

The Committee on Publication reported through Dr. Jewell.

There were no reports from dental colleges.

Dr. Hart moved the appointment of a committee on nominations for permanent membership.

The President appointed Drs. Walker, Hill, Rosa, Colgrove, C. C. Smith, Holmes, Elmendorf, and Birdsall.

LEGISLATION WANTED.

Dr. Wright moved that Dr. Stack's name be stricken from the roll of this society ; he had left the country under a cloud and was no longer a member of the Third district society. He thought one could not be a member of this society unless a member in good standing of a district society.

Dr. Mirick said that Dr. Stacks was all right on the books of the State society, and failed to see how he could be dropped.

Dr. Van Vleck could not see how a man could represent the Third society in the State society unless he remained a member of the Third.

Dr. Walker asked if Dr. S. was a permanent member of the State society.

Dr. Wright said he was.

Dr. Walker then said that the Third district society had no jurisdiction.

Dr. Mirick said the State society had a permanent member in Paris.

Dr. Wright wanted to know if a man could pass from a district society into the State society, and not have anything more to do with the district He called for legislation on the subject. It had been brought before the Third district society, and they were directed to bring it before the State society.

The President said this subject had been before the State society on another occasion. If a man severed his connection with his district society he necessarily cut himself off from the State society, because a man to be a member of the State society must be a member in good standing of a district society. But it was necessary

that the State society should be officially informed as to the fact. All the Third district society had to do was to officially notify the State society that the member in question had been dropped; that course was still open to the representative of the Third. Dr. Wright's motion was withdrawn for the time.

HONORED.

Dr. Brockway asked the attention of the Society to the case of Dr. L. W. Rogers, of Utica, whom a number of the older members would remember had been one of our most active members, and very energetic in the formation of this society, and whose increasing age and infirmities had compelled him to give up practice. He suggested that it would be a grateful act if this society would accept his resignation, which he had been authorized to tender, and make him an honorary member.

Instead of accepting Dr. Rogers' resignation it was moved by Dr. Jarvie that his name be transferred to the honorary list, he being no longer a practicing dentist. The motion was carried unanimously.

The secretary read the resignations of Drs. C. T. Wheeler and C. F. Rich.

Both were tabled for the time being.

The Secretary read a communication from the Massachusetts State Dental Society, inviting this society to send delegates to its annual meeting. The invitation was accepted and delegates authorized to be sent.

The Secretary read a letter from Dr. Crouse, of Chicago, in regard to the Protective Union.

The Secretary presented bills of Dr. Jarvie for $28 for engrossing resolutions, also a number of smaller bills, and bill of J. P. Smith for printing, $172.50.

The Committee on Business reported programme for the afternoon and evening sessions of May 8th, and the morning session of May 9th.

Adjourned to 3 o'clock P. M.

FIRST DAY—AFTERNOON SESSION.

The meeting was called to order by the President, after which he conferred the degree of M. D. S. upon the following successful candidates: J. Eben Almy, Chas. Korber, Henry P. Osborn, Richard W. Burrow, Frank E. Warden, Merrit H. Dailey, Miss Carrie Wolfsbruck. (See page 81).

Dr. C. T. Howard, then read the Whitney Memorial Prize essay, entitled, "The Facial Angle."

Dr. Jackson was appointed to a vacancy on the committee of By-Laws.

The Committee on Practice, Dr. Ottolingui, chairman, presented its report, a part of which appears on page 88.*

ONE SIDED.

Dr. Rhein thought the chairman had presented a very one-sided report. He admitted one failure, yet claimed he had had a remarkable success in another case, after five months. He did not think five months time sufficient to find absorption in a root, but that did not prove that absorption had ceased its ravages upon that tooth. He was rather surprised at the weakness of the report after the prediction of what it was going to be.

He thought the tendency of the profession in regard to pulp capping had been from one extreme to the other. Years before every man had pretended to save the pulp, while of late we had urged the other extreme, that was devitalize and remove. The most successful cappings had been made by removing a portion of the pulp. After exposure it made very little difference to the tooth whether one left in three-quarters of the pulp or three-sixteenths; but if one could leave a good portion of healthy pulp he could put that tooth in a condition that would be out of the question if the pulp had been extracted. While not always feasible, it was in many cases. Of course, the use of arsenous acid would not be in place, but they had in cocaine an agent which acted so well upon the pulp that one could remove as much as he pleased without seriously interfering with the health of other portions; six or seven years experience of that form of treatment had demonstrated to him this fact.

HAD LIVED TOO LONG.

Dr. Brockway had lived long enough to have observed a great many cases of this sort. The remarks of the gentleman who had just spoken, brought to his mind a visit by a celebrated dentist to New York, some twenty years before, when this idea of amputating a portion of the pulp and capping the remainder had been presented. This had been adopted by a great many men, and it had affected their practice to its subsequent detriment, and that of their patients. He knew that that same gentlemen had entirely repudiated the idea of amputating a portion of the pulp. He hoped no young man there would be lead away by the absurd idea that he could successfully amputate a portion of the pulp in most cases, and preserve the

*See also *Brooklyn Medical Journal* for July.

rest. If this could be done, which he denied, what was the use of it? He asserted, without fear of contradiction, that in 99 cases where it was considered necessary to remove the pulp, that under proper treatment the tooth was just as serviceable as though that had not been done. The pulp was, perhaps, a very necessary organ at the start, but the value of it was constantly diminishing with increasing age, so that in time the pulp was all but obliterated. He said that the proper practice, where the pulp was exposed, especially if it had been at all inflamed, was to remove that pulp, and with proper treatment one could have the tooth in such condition that it was practically as good as ever. Any other method was sure to result in trouble to one's self or some of one's fellow practitioners.

Dr. Edmonds had, in some four hundred cases of which he had a record, extracted the pulp with the use of cocaine. He had done this in all cases where they were so soft and flabby that he deemed them unfit to over-fill. The life of the cementum was maintained by nutrition supplied by the peridental membrane, therefore, it was useless to cap the pulp when such capital results could be obtained by complete extraction and the sealing of the cavity by gutta-percha.

NOT SO ONE SIDED.

Dr. Jarvie thought this Society had been pretty fortunate in its committee this year, and that they had listened to a most excellent report. It went over a great deal of ground and gave material for discusaion for the entire session. There were a few points that he wanted to speak upon; one in reference to root filling. The report speaks of cotton for this purpose. He had favored cotton for some years for root filling; had used it a great deal. One would think it as poor a material as could be used, but it condensed in the root, and would keep out moisture. Some two years before a patient had come into his office, the crown off a central incisor. This tooth had been filled by Dr. Atkinson some twenty years previous, at least. It was necessary to crown the tooth and he had to remove the filling from the root. He had found it to be cotton, and it was just as fresh and pure as the moment of its insertion. It was a beautiful operation, so far as the preservative qualities were concerned. He had been so much impressed with it that he called the attention of his associate to it.

A word now with regard to the absorption of roots after implantation. A year ago he had reported the condition of the gum around a certain tooth, as perfect as any gum could be. On the Monday preceeding, when he had examined the tooth, he found the entire

root absorbed. He knew this from the fact that previously the root had been rather prominent and one could see the outline of the root through the gum. That day it was perfectly black, and he could put an excavator to the end of the root. There seemed to be a great deal of absorption upon the labial aspect, and none upon the lingual. It was held in the mouth as a lateral incisor was held in the mouth of a child of eight years, when just ready to drop out. He spoke of this case because three months before it seemed like a case that would be permanent, and yet in three months there had been an entire absorption. There was no pain, and no sign of inflamation about the gum.

Dr. Hill accounted for the cotton in Dr. Jarvis' case being sweet and dry, that it was more on account of the closing of the opening, rather than any other fact. Let cotton remain in any time and it was almost impossible to remove it, if properly packed. He could remove a gold filling quicker than well packed cotton.

HAD BEEN MISUNDERSTOOD.

Dr. Rhein wanted it distinctly understood that what he had said about amputation of pulps was quite different from the plan of the gentleman of whom Dr. Brockway had spoken. That process was merely to remove that portion of the pulp in the crown of the tooth. He had tried to make it clear that that was not enough. A very small portion of the pulp is all that should be left, and that at the apex of the root. He had asked, why should that be lelf? He said, because one excluded ali moisture from the root. One must cut deep and leave just a little living matter at the apex of the root. It was not difficult to save that portion. He had yet to see the first case of any detrimental result of such treatment.

WANTED TO KNOW.

Dr. Starr asked Dr. Rhein in what manner he capped pulps, where large portions had been removed. He thought in those cases where amputation was necessary, and so much of the pulp had been amputated, that there was very little chance of the remaining portion continuing in health. He could hardly think it possible to keep this remaining portion in as good condition as at first. The success of this capping must depend on materials, non-irritating, and in a liquid form, and that will harden quickly. He would like to know how one could get that into the pulp canal and cap successfully.

NOT ADDRESSING THAT KIND.

Dr. Rhein was not supposed to be addressing his remarks to a

class of students, but to men of experience. He was talking of a case of pulp exposure where the pulp appeared to be healthy, and in which, under ordinary capping, the pulp would die. As to his manner of capping a pulp of that kind, he pursued the same method as in filling a root. All he wanted to see was a little red spot of living pulp way down in the apex. If one left that little portion he got all the benefit of a living pulp, because one had to cut off the pulp where it meets the periosteal tissue at the apex, a point of danger always. He covered that with chloro-percha, and put some gutta-percha over that, and filled up with oxy-phosphate. He removed the pulp with one of the various forms of Donaldson instruments, inserting it sufficiently far and giving it a side twist, which any one who had removed pulps would understand. He well knew that he was not going to remove the whole pulp, but leave a sharp cut edge.

Dr. Atkinson could not let this report pass without a few remarks, because it was meat all through. He had no greater joy than to know that his children understood the truth ; but that could be truth only so far as it was apprehended as such.

After further characterizing the report as "magnificent," he was pained, however, that so clean cut an intellect as Dr. Ottolingui's should slump into the mire in the way he had. The ancients had said that a tooth was held in the jaws by a process of compression, like the driving of a nail into a board—gomphosis. Every tooth was held in place by a most beautiful tissue that we call the peri-dental membrane. Ankylosis meant a stiffness, and was complete when there was intimate adhesion.

LAST SHOT.

Dr. Ottolingui said in reply to Dr. Rhein, that the tooth referred to in the report, had not been reported as treated more than five months. It was five months since the treatment had been stopped. He had not reported or admitted any failure of his own because he had not spoken of any case of his own. In regard to the term "gomphosis" he regreted very much that he had used the term; the more so because he had forgotten that Dr. Atkinson had very kindly explained the matter to him before. He had not used the word ankylosis—simply quoted from others' papers. So far from speaking of a new theory, he had not done so, and moreover, did not deem it wise to say to-day anything that might prevent him attending the next meeting. As to the fulfilling of the promises and predictions made a year before, he had promised nothing.. Failures in implantation must be failures from the materials used. He had

conceived the idea that a tooth as nearly healthy as possible should be used. It not being very easy for him to procure that, he had gone to a cat's mouth and taken out a tooth, and put it in his own, and he had had it there ever since last November. His intention was to have taken it out and sectioned it, but time would not permit. The chairman of last year had said he would not consider it perfect unless it had remained a year, so he had the cat's tooth in his mouth still.

LEGION OF HONOR.

Dr. Ottolingui here presented a supplemental report providing for the creation of a Legion of Honor, with power to name distinguished members of the profession, using medal or certificate for that purpose.

Dr. Walker moved that it be referred to a committee of three, to report at the next annual session.

Dr. Curtis thought this was a good time to discuss this report and learn what it was.

Dr. Walker said it was best to go slow. It was a matter of very great importance, and that was why he had suggested that the committee report at the next annual meeting. It was not only for the benefit of those present, but others who would come after and compete for the prizes.

Dr. Ottolingui was in accord with Dr. Walker. The idea was not to be carried out at once, but done well when it was done.

Dr. Rhein said this had already been considered by a committee, and a very competent committee too. He could not see why they could not consider the report right away, from the able manner in which it had been presented.

Dr. Atkinson said the qualifications of admission had not been stated. They need not be afraid however, of having ten thousand men apply for the Legion of Honor. Men are not built that way. Unfortunately for the community, dentists are not ambitious. So far as I understand the report my heart goes with it.

MORE BUSINESS.

Dr. Hart, of the Committee on By-Laws made a brief report.

Dr. Walker's motion was amended by Dr. Curtis calling upon the committee to report at the meeting. The president named as this committee Drs. Straw, Southwick and Ottolingui.

The secretary presented the bill of the Delevan House, for use of parlor $15; also bill of janitor, $15.

Dr. Southwick reported that he had settled with Matthews, Northrup & Co., for $30, for work done on the "lost transactions."

Dr. Van Woert said a resolution had been offered in his district society that he move here that the last clause of the section of the code in regard to examinations be stricken out—"The right of appeal shall cease after the third hearing." It was referred to the Committee on By-Laws.

Resignations were then taken from the table. First that of Dr. Wheeler.

Dr. Atkinson moved that Dr. Wheeler's resignation be accepted, which was carried.

Dr. Walker moved that the resignation of Dr. Rich lay upon the table until after election. Carried.

Adjourned until 8 o'clock P. M.

FIRST DAY—EVENING SESSION.

The meeting was called to order by the President, and the minutss of the morning and afternoon sessions were read and approved.

Dr. Atkinson read on

PYORRHEA ALVEOLARIS.

Dr. Curtis suggested that the essayist give his formula for the paste mentioned in the paper.

Dr. Atkinson said it was made first, by dissolving crystallized carbolic acid in water raised to the boiling point ; second, triturating caustic potassa at the boiling point, in a Wedgewood mortar raised to the boiling point ; and third, pouring them together, about bulk for bulk, and rubbing until they form a perfect paste.

Dr. Curtis asked if this was not the Robinson remedy ?

Dr. Atkinson said it was not. It had not the water of Robinson's.

As to ligating or fixing loose teeth Dr. Atkinson said he had left silk on a year ; it was simply a matter of dexterity. There was no way of ligating with wire without having it cumbrous. The point was to get the tooth into position and hold it there ; have the ligatures above, and have them stay where you put them—on the crown of the tooth and not below.

Dr. Gilson had used Japanese grass line ; Dr. Atkinson had not.

Dr. Palmer of Syracuse then read a paper on "Regulating Teeth," illustrating by colored charts.

MORE BUSINESS.

The election of officers was then declared the next order of business and was proceeded with.

While members were preparing their ballotts, the President presented the request of the Brooklyn *Medical Journal*, for permission to print Dr. Ottolingui's report from the Committee on Practice; as there was no objection the journal in question was accorded the privilege.

The result of the ballot was as follows: President, Dr. Line; vice-president, Dr. Walker; recording secretary, Dr. Van Woert; correspondent, Dr. Curtis; censors, in the First and Third districts, Drs. Carr and French respectively.

LEGION OF HONOR AGAIN.

The committee on Legion of Honor recommended the appointment of a committee of five, three from the First, and two from the Second districts, to report at the next annual meeting in such shape that the society could take action, the present committee to be discharged.

Dr. Ottolingui said in explanation why those two districts had been named was because they could be most easily got together.

Dr. Starr moved the reception of the report, the discharge of the committee and the adoption of the recommendations.

The President appointed as such committee Drs. Kingsley, Carr, Ottolingui, of N. Y., and Drs. Brockway and Jarvie of Brooklyn.

PERMANENTS.

Ths committee on nomination of permanent members reported through Dr. Walker the names of Drs. Hart, Jackson, Royce, Saunders and Birdsall as nominees for permanent membership.

THAT "V."

Dr. Hill said in regard to the raising of the five dollars per head that had been carried in the afternoon, it had been suggested by Dr. Holmes, that perhaps it might be well for the president and secretary to issue a circular to all the district societies, that they could use in urging nonsociety men to assist in raising money to carry on prosecutions under the law. He would make that a motion. Carried.

SECOND DAY—MORNING SESSION.

The time from nine to ten was occupied by members and others in exhibits and demonstrations, Drs. Jackson, Ottolingui, Edmonds and others filling in the time. Dr. Jackson's exhibit of models of irregularities and appliances used in their reduction, was one of the largest, most varied and interesting on record.

The meeting was called to order by the President, and the minutes of the previous evening's session were read and approved.

The secretary presented the bill of the stenographer, $68.50.

Dr. Lang then read a paper on

"MESMERISM AND ITS THERAPEUTICAL APPLICATIONS."

A member said that while a student with his brother, some thirty years ago, a gentleman brought a lady to the office to have the four inscisors excised and new teeth put on. She sat in the chair, and after the gentleman had made a few passes, he said to the speaker's brother, go on He had struck these incisors off, filled each one of the nerve canals and inserted four wood pegged teeth, and the girl sat in the chair as motionless as if dead. She informed us afterwards that she had felt no pain whatever.

Dr. Starr read a telegram from the other essayist who was to have been there that morning—Rev. Dr. Brown—saying that sickness deprived him of the honor of addressing the Society, and asking them them to accept his regrets. Dr. Starr suggested that the paper be read by title, and he would see Dr. Brown meantime and get the manuscript from him so that the paper could appear in the transactions.

The secretary then read the paper by title, "Talmudic Medicine and Dentistry."

The secretary read a communication from the Third district society, stating that they had erased the name of E. C. Stacks from their roll, for conduct unbecoming a gentleman, and requesting the State society to take the same action.

The communication was received and placed on file.

Dr. Hill moved that the name of Dr. Stacks be dropped from the roll in accordance with the provisions of section 8. Carried.

PROTECTIVE UNION.

Dr. Walker presented a communication from Dr. Crouse of Chicago, stating that he had sent blanks for membership in the Protective Union which he would like to have the dentists throughout the State of New York sign. The fee was ten dollars. He also said Mr. Offeld, the attorney they had engaged to look after the interests of the dentists, was connected with one of the largest patent law offices in Chicago. He was the attorney for the Pullman Car Co. and the Singer Sewing Machine Co. He would be at the First district society the following Tuesday evening. He hoped every person present who had not already done so, would forward his application.

Dr. Palmer said he had received a notice some weeks since and immediately responded with pleasure. He thought they should stand by it, that they must be protected; it seemed to have a national standing, so we would be protected in the future.

Dr. Carr said it had been his honor to belong to the company having charge of the defence of those who had been arrested for violating the patent in New York. Their great difficulty was lack of organization. This Chicago affair seemed to meet the requirements. He thought it was a good thing.

AGAIN THE L. OF H.

Dr. Carr moved that the resolutions, authorizing the appointment of a committee on Legion of Honor, be reconsidered.

The secretary then read the original report of the committee of three.

Dr. Ottolingui said, as being identified with the idea of a Legion of Honor, he would like to make a statement. The original idea was that something might be done by this Society, whereby it would advance the interests of dentists as a body, and would be an advantage to this Society. The matter had been discussed and put in as a supplementary report by the committee on practice. That was referred to another committee of which he had been made a member. Although it might be well from an outside standpoint to confer honors, in the Society itself it would not. They had so many members who might be anxious to have that honor, that there would be, rom time to time more or less desire for it, which would make it a source of trouble in the future. He was entirely in accord with a reconsideration, and moved that the whole matter be indefinitely postponed. Carried.

NOT YET.

Dr. Curtis' resolution, "Resolved, that only graduates of recognized dental colleges and the dental society of the State of New York, be admitted to permanent membership in this society," was briefly discussed and lost.

Dr. Starr moved that the usual warrant be drawn upon the treasurer in favor of the secretary for $100, in consideration of his services during the year.

The resignation of Dr. Rich was accepted.

Dr. Jarvie said we should have some other place to meet than this hall. It was one of the worst rooms we had ever been in. It was impossible to hear a speaker ten feet. He moved it as the sense of the meeting that the proper committee endeavor to secure

some other room, better adapted in its acoustic properties than this.

Dr. Curtis suggested that proof be sent the gentlemen who had read papers or discussed them, for revision, and to limit the time to five days within which they should be returned or published as per proof.

The President then appointed the committees.

Arrangement—Drs. Wright, Candady, Mills; Business—Drs. Starr, Jackson, Jewell; Publication—Van Woert, Jarvie, Howard (C. T.); Practice—Ottolingui, Gross, Rosa; Law—Carr, Baxter, Elmendorf; Ethics—VanVleck, Jones, Lamb; Prize Essays—Straw, Geran, White.

"THE DENTAL SOCIETY OF THE STATE OF NEW YORK."

BEING SOME TOAST AT THE 25TH ANNIVERSARY OF THE BUFFALO DENTAL ASSOCIATION, MAY 27, 1889.

In attempting to respond to this toast, Mr. Chairman, I shall avail myself of the privilege usually accorded the man who has little to say and knows not how to say it—that of telling my story from notes. And I tell it in this way because I can tell it better, with greater speed, and make it much less of a tax on your patience than were I to essay the method of the man who takes to his feet easily and whose tongue wags at either end, and that without apparent cause or provocation. Would that I could, but I cannot. And while I have nothing of value to present even in this form, a little noise may be made to answer the purpose. Not, however, that I have any ambition in that direction, but simply because "mine host" has imposed the condition, and told me that I must.

According to the records, the State Society has attained its majority—has been in existence twenty-one years. To those of us who have made the Society's acquaintance since '68, that period includes its span of life to date, a truthful statement as far as powers and privileges conferred by the State are concerned, but very far from truthful if we study the matter from the time the scheme, of which it forms but one of many features, was first proposed—a time that antedates the State Society, and I suspect, the formation of the association the close of whose first quarter century we celebrate this evening. Of the months and years of preparatory and preliminary work done

by its originators, history has saved us little or nothing; but no doubt need exist that it was hard work, long continued, through trials and disappointments, but to which there was no let up until the governor had affixed his signature to the document since looked up to as our charter.

Central New York was represented by Wescott and Rogers, and Western New York by Whitney, ably seconded by Snow, and Hayes, and Harvey, and these in turn by the founders and early members of this Association. The most active and vigorous in this matter were Whitney and Westcott, and it was to their consumate ability and unflagging energy that the State organization owed its birth.

But what of this Society? What is it? What has it done? What must it do to keep up with the procession? What of the future?

Before the Dental Society of the State of New York became a fact much and efficient work had been done in sections of the State by societies without legal recognition, and whose working methods were similar to those prevalent elsewhere to-day. Work of the same kind was in progress in other States then as now, and movements were on foot having for their object that already attained in this State. Pennsylvania and Ohio both led us in time, but the men who attempted to lead to success ignored, and proposed to trample under foot, the rights of others, and set themselves up as sole judges of the qualifications of others, and if needs be, deny them the rights that the State said belonged to all, and equally, until forfeited for other reasons than earning their bread and butter by following the same occupation. These reformers wanted it made a penal offense to practice without a permit from their own exclusive body, which amounted practically to the robbing of a mass of otherwise good citizens of the means of a livelihood. New York men, on the contrary, early appreciated the fact that every man then in practice—with a most liberal meaning attached to the word—must be recognized in the proposed law as fully qualified to follow dentistry as his legitimate occupation. And it was this frank recognition on their part that made its passage possible at that time, and under the circumstances then prevailing. Pennsylvania and Ohio asked everything and got nothing; New York asked little and got all that it was safe for her to have in that day.

It was thus set down for all time that our State Society was the first to be legally recognized, and through the law made the instrument by means of which every then practitioner could be reached, and at the same time inducing, if not compelling, the coming man to

take advantage of educational facilities whereby he might become qualified for intelligent and skillful practice.

What was done here for the profession made it possible for other States to at least talk of similar enactments, and since then to accomplish them. Up to '68 it made little difference to other States so far as relations between them and us were concerned whether they had dental laws or not, as there was about an even exchange of dentists of moving tendencies ; but the moment our act went into effect, they discovered that New York was like a well filled sponge, the squeezing of which gave them what they did not want and of which they already had a surplus, and this fact was used with such effect on their legislators that State dental societies duly incorporated became the fashion, the end of which is not yet.

This movement in our State also made possible the system of Societies, several of which are well represented here to-night—the only system of dental societies in the world. It may be said that the district societies made the State society possible ; but it must not be lost sight of that the men engaged in the formation of these societies had the State society as its objective body, and the districts as a means to that end, trusting to the law and the yet to be established relations to cement these nine bodies into one smoothly working whole.

To-day the State society is what it has been, perhaps by force of circumstances, since its first inception, except that from a law-suggesting and law-procuring institution it has become law-watching and law-enforcing. Its former function is gone—there is nothing more to do in that direction, and it would seem to some of us that little of the time of its annual meeting need be given to work that by custom and law is delegated to its law committee. Some, however, persistently cry that law, more law is needed and should be had, forgetting that other than general laws come under the head of special legislation, one of the growing curses of this enlightened commonwealth, and which we fight against with all our might when the object is not purely dental and of course in our sole interest. These men are of the by-law breed—their notion of the function of the State society is that it discuss laws and by-laws, and the wisdom and power in debate displayed by the parties in question passes all understanding and trespasses on endurance. But we must get beyond this, and soon. Such discussions are not only incapable of keeping the membership of this body together, but are certain to result in dissaffection and disgust. Other and more important mat-

ters than how to behave should engage the society—it must devote its time and energies to the discussion of questions of scientific and practical value to the profession at large; and do so not merely for its own good, but for its very salvation.

It is suggested that the State Society utilize the work and talent of the district societies, wherein the familiar or conversational—in many instances elementary—style of preparation and presentation of subjects prevails, and that this be done by elaborating those papers that bear evidences of incompleteness, but at the same time have upon them the stamp of originality; and further, reducing to abstracts such papers whose matter is valuable but whose treatment leads to the too detailed consideration of non-essentials. This would make a volume a year that would be a credit to New York, and lead perhaps to the founding of a journal of the Society that all would read instead of the motheaten "Transaction" that is rarely seen outside its wrapper.

As things now go—and this is just as true of other State societies as of New York, just as true of the American Dental Association—papers are read on every conceivable subject, no relation whatever in or between them, and this from year to year without the suggestion of change or improvement. Something should be done—must be done—and I know of no better season than the present, no better place than Buffalo, no better qualified body to initiate such a movement than the Buffalo Dental Association.

THE TEETH AND THE GENERAL PRACTITIONER.

Affections of the teeth are not so often considered in our columns but that the general practitioner may congratulate himself on the appearance, in this issue, of an instructive, though cursory, paper and discussion on this subject before a recent meeting of the Practitioners' Society of New York. There is doubtless a strongly rooted reluctance on the part of the profession (and this was brought out in the discussion to some extent) to agree with the writer in respect to the importance he attaches to the dental reflex. But the candid observer can but feel that much careless dental work may be the outcome of referring dental neuroses due to caries of the teeth for treatment to persons unfamiliar, as most dentists are, with the important relations of the teeth with other organs. And where the physician is unable himself to offer any suggestions to the dentist in

this regard, the patient is liable to be made worse rather than better, especially from the practice of saving so-called dead teeth. We trust the interest excited by thus bringing this subject before the profession may continue until the surgical importance of diseases of the teeth is recognized by medical men. Every surgeon now fully recognizes the importance of drainage and antisepsis in the treatment of necrotic processes, especially of the osseous tissues ; and unless better means than now generally prevail—since the above well-known surgical principles are ignored in treating "dead" teeth so as to retain them in the jaws—are adopted, more or less danger is imminent in every case where the attempt is made.—*Medical Record.*

DYSPEPSIA.

Dyspepsia is a thankless malady. No matter how wretchedly the victim feels, he gets no sympathy whatsoever. The hand of the world is against him, as if, instead of being a worthy sufferer, he were a veritable Ishmaelite. Even his doctor laughs him to scorn. "Well, what have you been doing *now?*" the doctor asks. "What have you been eating?"

The callous scoffer knows very well, perhaps, that his miserable patient has not eaten a blessed thing in ten days—nothing but oatmeal cakes moistened with water. Yet the doctors have fallen in with the popular heresy that the best way to sympathize with a dyspeptic is to rail at him.

When you have dyspepsia every man you meet asks you to go to lunch with him ; every house you pass is a restaurant; every gale that blows wafts to your nostrils the odor of ham and eggs ; every newspaper is full of domestic recipes ; every woman in the street is loaded with spring chickens, or dressed hogs (ough !), or fresh berries ; the only sign you can see is "Dinner Now Ready" or "Supper Only 15 Cents ;" why, even the beggars who waylay you, importune you for pennies with which to buy "something to eat !" It would be a pleasure to do an act of charity once in a while, but why do the beggars never importune for money with which to buy pepsine, or lactopeptine, or a seidlitz powder ?

Dyspepsia never kills, they say ; yes, that's the sneaking villainy of the malady—it thwarts every high purpose and honorable ambition and compels its prey to dodder and mope through life in a condition of perennial consciousness of his weakness and helpless-

ness. We do not agree with those who say that it necessarily sours its victim—that may be its diabolical purpose, but we do not think it always succeeds. On the contrary, we think that it very often serves to soften the temper, to broaden and to deepen the sympathies, and to instill into the heart a nobler and sweeter charity. Physical discipline, however rigorous, serves the grand purpose of chastening the soul ; it is one kind of sorrow, and sorrow is good for humanity. A very interesting essay upon this subject was written many years ago by Bulwer Lytton ; it would repay invalids, we think, to read that essay occasionally—we regard it as one of that great man's best bits of work.

Dyspepsia, if humored properly by long and circumspect fastings, occasionally gives its victim a season of rest, and during these seasons, whensoever they occur, it behooves the dyspeptic to improve his opportunity. Hot mince pie with melted cheese ! ah, there is a dish that will compensate you for weeks of torture ! Another glorious viand is Nesselrode pudding ; this is a cross between ice cream and the Spanish inquisition ; it is of a decomposed hue and it is full of candied fruits, nightmares, Arabian perfumes, pungent flavors, ecstatic sapidities, etc. Then again there is nothing the matter (if we may be pardoned the slang phrase) with a Welsh rarebit, yet the banqueter should insist upon having a nice, overdone, indigestible poached egg served with the rarebit.

But we shall—we can go no further ; it makes the mouth water, the palate yearn and the heart throb to think of these precious boons, and even in the midst of stomachic paroxysms we feel constrained, like old Louis XI., to plead indulgence not noly for the sins we have committed, but also for the sins which we hope to have the pleasure of committing by and by—we regret that we cannot fix the exact date.—*Chicago News.*

MODERN ASPECTS OF THE LIFE-QUESTION.

Thus far, when we have spoken of a living being, we have had reference to the organism as a whole, and this of a rather complex kind. In this view of the case, however, we find that biological microscopists do not agree with us. "The cell alone," says Kuss, "is the essentially vital element." Says Beale : "There is in living matter nothing which can be called a mechanism, nothing in which structure can be discerned. A little transparent, colorless material

is the seat of these marvelous powers or properties by which the form, structure, and function of the tissues and organs of all living things are determined." And again, "However much organisms and their tissues in their fully formed state may vary as regards the character, properties, and composition of the formed material, all were first in the condition of clear, transparent, structureless, formless living matter." So Ranvier: "Cellular elements possess all the essential vital properties of the complete organism." And Allman, in his address as President of the British Association last year, is still more explicit. "Every living being," he says, "has protoplasm as the essential matter of every living element of its structure. . . . No one who contemplates this spontaneously moving matter can deny that it is alive. Liquid as it is, it is a living liquid; organless and structureless as it is, it manifests the essential phenomena of life. . . . Coextensive with the whole of organic nature—every vital act being referable to some mode or property of protoplasm—it becomes to the biologist what the ether is to the physicist." From these quotations it would seem that even in the highest animal there is nothing living but protoplasm or germinal matter, "transparent, colorless, and, as far as can be ascertained by examination with the highest powers of the microscope, perfectly structureless. It exhibits these same characters at every period of its existence." Neither the contractile tissue of the muscle, the axis-cylinder of the nerve, nor the secreting cell of the gland, is living, according to Beale. Hence it would be fair to draw the inference that no vital force should be required to explain the phenomena of the non-living matter of the body, such as the contraction of the muscle or the function of the nerve. If this be conceded, it is a great point gained; since the phenomenon of life becomes vastly simplified when we have to account for it only as exhibited in this one single form of living matter, protoplasm. In describing its properties, Allman includes this remarkable mobility, these spontaneous movements, and says: "They result from its proper irritability, its essential constitution as living matter. From the facts there is but one legitimate conclusion, that life is a property of protoplasm." Beale, however, will not allow that life is "a property" of protoplasm. "It can not be a property of matter," he says, "because it is in all respects essentially different in its actions from all acknowledged properties of matter." But the properties of bodies are only the characters by which we differentiate them. Two bodies having the same properties would only be two portions of the

same substance. Because life, therefore, is unlike other properties of matter, it by no means follows that it is not a property of matter. No dictum is more absolute in science than the one which predicates properties upon constitution. To say that this property exhibited by protoplasm, marvelous and even unique though it be, is not a natural result of the constitution of the matter itself, but is due to an unknown entity, a *tertium quid*, which inhabits and controls it, is opposed to all scientific analogy and experience. To the statement of the vitalist that there is no evidence that life is a property of matter, we may reply with emphasis that there is not the slightest proof that it is not.—BARKER, GEO. F., *Popular Science Monthly.*

DENTITION AS AFFECTED BY RICKETS.

If rickets prevail to any extent in American communities, it must exercise a very important influence in all diseases of childhood, and must play an exceedingly important role in infant-mortality. As dentition is almost always retarded and irregular in rickets, I may be permitted to dwell at some length upon its pathology. It is a stormy epoch with children. Although a physiological process, which should be regular in its course and without danger to life, nevertheless all authors agree that any illness occurring during teething is aggravated in type and dangerous and protracted in course. Convulsions, diarrhæa, bonchitis are common in these critical months, and the mortality among children from six to twenty-four months of age, in Buffalo, is 1,500 yearly. I even find dentition ranked as a cause of death, sixteen deaths from dentition being returned. Yet teething goes smoothly on in healthy children, the central incisors appearing at the seventh month, the lateral at the ninth, the first molars at the twelfth, the canine at the eighteenth and the second molars at the twenty-fourth month. Any essential deviation form this order is a variation from the standard of health, and its cause should be sought for and explained. Delayed dentition is not due to all causes which enfeeble a child, for in infants suffering from diarrhœa or tuberculosis the eruption of the teeth is regular, and the teeth are often well formed and strong. Among the laity, many maladies of childhood are referred to the malignant influence of teething, and mothers ask their physicians why their children are so fretful and sickly, and why the teeth do not appear

at the appointed time. The maternal anxieties are usually quieted with soothing assurances that all will be well in time, but the most common cause of delayed dentition is rickets. A rickety child may have no teeth even as late as the second year, or the eruption of teeth may progress regularly until the incisor teeth are through, and the child becoming rickety, dentition may be arrested for months. These rachitic teeth are very prone to decay, and physicians have observed how very bad the teeth are among the children of the city poor. No physical examination of a sick child is complete without a careful inquiry into the condition of the teeth. If dentition be late or irregular, and if the child be harassed by digestive troubles, or obstinate pulmonary catarrh, the underlying cause will almost invariably be found to be rickets. I will quote again from Sir William Jenner upon this subject :

" If a child pass over the ninth month without teeth, you should carefully inquire for the cause. It may be that an acute illness has retarded dentition. It may be, but this is very rare, that there is some condition of the jaw which interferes with the advance of the teeth; it may be, and this is infinitely the more common cause of late dentition, that the child is rickety. Fail not, then, when called to a child in whom the teeth are late in appearing, to look if it be rickety, for if you fail to look for rickets you will most likely attribute to the irritation of teething symptoms which are the consequence of the rickety diathesis, the late dentition of rickets being in itself a symptom of the general disorder. The rickety deformities may be very trifling, and yet the teeth be considerably retarded in their development."—*Medical Record.*

ROOT FILLING—A NEW METHOD—COSMOLINE.

It was said by Dr. Truman that gutta-percha, when used as a canal dressing, in his opinion, did not leak. My experiment with glass tube tests, which I admit are very crude tests, was criticized on the ground that the glass expanded. It was not denied that oxy-chloride of zinc would absorb moisture. One gentleman, a visitor, advised me to take a glass tube drawn down at the end to the size of the apical foramen of a tooth. This, when filled with gutta-perca, he said, would exclude moisture for months. I did not carry out his experiment, as the unequal expansion of the glass and gutta-percha again could have been brought forward. I concluded to set aside all unnecessary complication by taking natural teeth—three, and opened into the canals and filled them much more thoroughly

than it could be possible to do when situated in the mouth. After cleansing the canals by careful drilling into one of the teeth, warm gutta-percha was inserted until it streamed from the apical foramen. The other two teeth were respectively filled with oxy-chloride of zinc and cotton soaked in carbolized cosmoline. The holes in the crowns of these teeth were then filled with gold. Having operated on these teeth January 7th, I dipped them in a solution of analine ink. They were removed on the 1st of February, having been submerged just twenty-four days. I then laid bare the canals, and here they are, gentleman, for your inspection. I think you will all perceive that the gutta-percha has not only leaked, but even its surface, to a slight degree, has absorbed the ink. The oxy-chloride of zinc is permeated with ink, while the canal guarded by cotton and carbolized cosmoline is absolutely intact.

The cosmoline has also permeated the structure of the dentine, making it water-tight and antiseptic. But the chief merit of this filling lies in the fact that it can be readly removed. It has been said by my friends that I do not fill teeth with cotton, but fill them with cosmoline. And yet, in the same breath, they assert that I sometimes fill teeth with cotton and carbolic acid, objecting to this practice on the ground, that the carbolic acid evaporating, leaves the cotton unguarded.

Why do not they say that I fill teeth with carbolic acid only? It would be just as logical. They must know that the cotton acts as a vehicle for holding an antiseptic. No one, at the present day, thinks of using it unguarded. Cotton when saturated in cosmoline, renders venting of the canal much more easy of accomplishment than when cosmoline alone is used.

The great advantage cosmoline has over all other medicaments, lies in the fact that it readily permeates the entire structure of the tooth, thus rendering the tooth water-tight.—HEAD, *International Journal.*

THE AMERICAN POSTURE.

These are the days when even the most ordinary and apparently inconsequential items in human conduct or social custom must be submitted to the prying gaze of science. Everything, from the kiss that first actuates the dawn of love to the painful struggles of parturiency, has to have its analysis and physiological explanation. It seems somewhat strange therefore that, in this alert and eager search for cause and effect, no one has yet attempted to analyze and place on a solid scientific basis the practice of sitting with one leg crossed over the other. This is a custom which, we venture to assert, is distinctly American, and one that has been observed and

transmitted with pious care by the average American male for the past two hundred years. Its prevalence may have become somewhat modified by the incursions, during late years, of foreigners with large waists and weak abductors; but the true American still preserves this detail of his birthright with a constancy and obtrusiveness born of a deep sense of its eternal and inherited fitness.

There are certain inferior races of men who also sit cross-legged. But their case is quite different. They abduct the thighs and cross the legs, assuming a more or less fœtal posture, and one evidently connected with a lower degree of ethnical evolution. The monkey sits somewhat in the same style. In the higher and tenser civilization, however, which has unfolded between the stars and stripes, and the ennobling influences of the spoils system in politics, there is nothing fœtal in the posture, but directly the reverse. The abductors of the thighs are brought into play, a nobler group of muscles and one whose superactivity must, we take it, mean a higher physical development of man.

The conditions of life in America made of Brother Jonathan a man with a short trunk, small waist, and long legs, anatomical proportions exactly suited to a comfortable sedation with the thighs crossed. This type of man still prevails in New England, the South, and parts of the Middle States and the West. With these a posture in which the thighs cross is instinctive. The observations of physiologists and physicists would undoubtedly show that in this position the centre of gravity is thrown forward so that it corresponds more nearly with the tubera ischiorum, thus enabling the sitter to gain a firmer hold upon the seat. Besides this, the weight of the crossing leg doubles the pressure of the foot upon the floor, and this again helps to prevent slipping forward. Whether there is anything in the posture which arouses a particular sense of ease, comfort, and feeling of well-being and contentment, despite a frowning environment, we cannot say. For the American leg-crosser does sometimes carry his habits to extremes. It may require another century of evolution to inoculate those given to the habit with altruism, and teach them that a deeper and truer joy may flow from not wiping their shoes on passing strangers than comes even from the highly evolved muscular adjustments of sitting with superimposed knees.—*Medical Record.*

CONDUCTOR'S DEPARTMENT.

JOHNSTOWN MEMBERS OF THE PROFESSOIN.

A committee consisting of Drs. Fundenburg, Templeton, Arthur, Goshorn, and Smith, of Pittsburg, has issued a circular to the dental

profession, dental manufacturers and dealers in dental goods, in the course of which is cited the facts that in the ruin of Johnstown one member of the profession lost his life, others members of their families, a majority of them their property, and every man of them—ten in all—his practice. These gentlemen have taken upon themselves the task of aiding our unfortunate brethren to tide over their present hardship, and ask their fellow members to contribute promptly and as liberally as possible to this most worthy object. Send direct to Dr. Lee S. Smith, 52 Sixth Street, Pittsburgh, Pa.

BUFFALO ASSOCIATION—25TH ANNIVERSARY.

The 25th anniversary of this "ancient and honorable" body was fitly celebrated at "The Niagara" on the evening of the 27th of May, when fifty members and guests sat down to several hours of solid enjoyment, physical and mental. As to the spread, it was evident on all sides that the committee in charge had worked on the principle that "the best was none too good," and with the help of "mine host" of "The Niagara," made the guest to feel that he had been bidden to a seat at the King's very own table. The address of welcome was made by the President, Dr. Eshelman, and Dr. Snow officiated in a happy manner as toast master. "The Buffalo Dental Association" was responded to by Dr. Freeman, whose remarks will appear in full in the *Dental Advertiser*. "The Dental Society of the State of New York" was next on the list. Then came "The State Board of Censors," which was responded to by Dr. French, of Rochester. Then followed "The Medical Profession," by Dr. Potter; "Dental Literature," by Dr. Barrett; "The Legal Profession," by Mr. Bushnell, and "Our Guests," by Dr. Darby, of Elmira. Others spoke briefly, among them the venerable Dr. Bristol, of Lockport, whose contributions to dental history are always intensely interesting. Of the speeches that by Mr. Bushnell should have been taken down word for word as a truthfully and beautifully worded and eloquently delivered effort. That by Dr. Darby suggests the possibility of his soon being in as great demand as Horace Porter or Whitelaw Reid.

NEW JERSEY STATE DENTAL SOCIETY.

The nineteenth annual session of this Society will be held at the West End Hotel, Asbury Park, (commencing Wednesday) July 17th,

18th and 19th. Prominent dentists from throughout the country will read interesting papers, and the clinics will be more than usually instructive. Everything new and useful in operative and mechanical dentistry will be exhibited by inventors and dental supply houses, for whom space will be reserved. Low hotel rates will prevail. The national reputation of the New Jersey Society is sufficient of itself to call out a large and representative attendance.

NOTES.

Dr. Southwick, of Buffalo, is making a rush through Europe.

The *Dental Record* jumps on "bony ankylosis" with both feet.

To remove chloro-percha from instruments, dip them in hot water, wiping hard with cloth.

A patient about to go abroad wanted a "very strong" set of artificial teeth—one that would enable him to talk German with safety.

Charles Fasoldt, whose services to micrometry will always command the admiration of microscopists, died at Albany, N. Y., May 13th, aged 70.

The American Medical Association held its fortieth annual meeting at Newport, June 25th to 28th. Dentistry was well and ably represented.

Dr. Bogue presents his compliments and states that he will be pleased to receive his patients from this time on, at 73 Boulevard Haussmann, Paris.

The twentieth annual session of the California State Dental Association will be held in San Francisco, the 3d Tuesday in July, continuing four days.

Her teeth contained as many cavities as there are holes in an old fashioned collender. She couldn't account for it unless the moths had got into them.

The Rochester Dental Society held its midsummer meeting this year with Dr. Cowan, at Geneseo. The "Big Tree Inn" is still the place where the righteous cease from troubling and the weary are put to rest.

For thorough want of knowledge and appreciation of Dr. W. D. Miller and his work, the effort in the June *Microscope* by Dr. F. O. Jacobs, is the most remarkable in our whole experience. It will be surprising indeed if some one is not hoist by his own petard.

The *Medical Record* says editorially, likewise truthfully: "The choice of President for the coming year was a most happy one, and we extend our congratulations to both the Association and its new President upon the honor which has come to both in this fortunate selection."

Members of the American Dental Association as well as others interested in the progress of the profession are cordially requested to forward contributions pertaining to dental education, literature and nomenclature either in the form of papers or suggestions. Contributions should be in the hands of the officers of Section II (Dr. Atkinson, New York, and Dr. Ottofy, Chicago), on or before August 1, 1889.

The science of dentistry is one of the most progressive of what may be called the special departments of human skill and learning. It does not carry so heavy a weight of conservatism as the medical profession, and new inventions in its field are eagerly embraced and adopted. Dentistry is ably represented among the periodicals of the country, and one of the handsomest publications of this class is the "Odontographic Journal."—*Mechanical News.*

"Doctor, I see by this periodical on your table that a man was prosecuted for simply advertising himself as a dentist, his competency, except from a legal standpoint, being admitted."

"Yes."

"I thought the dental profession boasted of its liberality—made unprecedented claims in that direction."

"Yes."

"Then isn't this pretty small business for a liberal profession to be engaged in."

Those dentists who take an interest in medical matters should subscribe to the Brooklyn *Medical Journal* which is the official organ of all the Brooklyn societies, medical, surgical, dental, microscopical, and pharmaceutical. The July number contains in full the report of the Committee on Practice, read at the annual meeting of the Dental Society of the State of New York. Numerous extracts from the report may be found on another page of this JOURNAL.

At the recent anniversary of the Buffalo Dental Association, our old friend, Dr. S. A. Freeman, so far forgot himself as to break the charm of a long and hitherto honorable career by perpetrating his first and (let us hope) only pun ; and straightway fourteen of the fifty gentlemen present fell each on another's neck, while the remainder of the company retired to the conservatory and wept bitterly.

Great as a microscope is, and varied and important its applications, there are some things vouched for by clinical experience as much beyond the reach of the microscope as the mountains in the moon. Clinical experience has its limitation, it is true ; so too has microscopical research in the practical affairs of every day life. Chemistry enables one to identify sulphuretted hydrogen, but all the chemistry in Christendom cannot disabuse the mind of the fact that sulphuretted hydrogen stinks.

Books, Phamphlets, Etc.

Dental Medicine: A Manual of Dental Materia Medica and Therapeutics. By Ferdinand J. S. Gorgas, A. M., M. D., D. D. S. Third edition, revised and enlarged. Philadelphia: P. Blackiston, Sons & Co. Pp. 446.

This standard work comes to us this time with nearly one hundred pages of new matter, every one of which enhances the value of the book to the busy practitioner. Much of the subject matter has been rearranged, and considerable additions made to the list of subjects, among which may be specially mentioned—Diagnosis of affections of the mouth, general and local anaesthesia, action of arsenious acid as a devitalizing agent, etc. Antiseptics are considered at length, their action also their proper use in dentistry ; germicides and disinfectants, a discussion of their value ; digestibility of foods, incompatability, etc. The additons to the dental materia medica and therapeutics are numerous, and in the light of recent experimentation and discussion, important. New formulae occur throughout the work, and there is a noticeable enlargement of the index to dental diseases and remedies. Taken all in all the third edition is so much in advance of its predecessors that it looks and reads like a new book. The publishers have done their part well as a matter of course.

DENTAL SCIENCE: QUESTIONS AND ANSWERS IN MATERIA MEDICA, DENTAL PHYSIOLOGY, DENTAL PATHOLOGY AND THERAPEUTICS. By Lumen C. Ingersoll, A. M., D. D. S. Philadelphia: Wilmington Dental Mfg. Co. Pp. 140.

Dr. Ingersoll's little book has been with the profession for several years, especially the student element, and is justly appreciated for its general reliability and suggestiveness. It is the work of a teacher, one familiar with the needs of the student and fully capable of meeting the demand. We can say of this what we had occasion to say of one of Prof. Flagg's books some time since: It should be in the hands of chairmen of business committees the land over, if only for the purpose of meeting the steryotyped reply to requests to prepare papers for prospective meetings—"Don't know what to write about." Every page is alive with suggestions that would do anyone good to work out.

MERCK'S INDEX OF FINE CHEMICALS AND DRUGS FOR THE MATERIA MEDICA AND THE ARTS. New York: E. Merck. Pp. 156.

The "Index" comprises a summary of whatever chemical products are to-day adjudged as being useful in either medicine or technology, with average values, also synonyms affixed.

MERCK'S BULLETIN, by the same house, is a monthly record of new discoveries, introductions, or application of medicinal chemicals. It makes a note of everything of value whether of Merck's manufacture or not. The "Index" is worth one dollar, the "Bulletin" one dollar per year.

HISTORICAL SKETCH OF THE SIXTH DISTRICT DENTAL SOCIETY. By Frank B. Darby, D. D. S. Pp. 13.

This little pamphlet tell a most interesting story, and in the author's own style. Sketches of men and things are usually pretty dry reading, but the man who can get through this without a broad and numerous smile stands in need of medical attendance. A sketch like this of each of the other district societies would prove equally valuable and interesting, and save the future compiler of the history of dentistry in this State much trouble and expense.

THE

Odontographic Journal.

VOLUME X.—*October, 1889.*—*No. 3.*

PHYSIOLOGY OF DIGESTION—THE NUTRITIVE ORGANIZATION.

The body anatomic is made up of a number of completely organized systems, osseous, nervous, muscular, etc., of which three distinctly contribute to the foremost and decidedly important function of nutrition.

Let us give the three a hasty glance. Turn to an anatomical plate of the alimentary canal, the intestinal system. Though rudest and coarsest it is not the least interesting. A mouth cavity set with teeth, a long gullet, the stomach or chymepouch, the liver with its bitter bile, the large coils of intestines, small and large, all these form the vegative, earthly portion of man. All this mechanism receives, masticates, digests, liquefies, and unifies crude matters, animal, vegetable, mineral, solid, viscid, liquid, reducing everything to an even paste. This is the system of crude chyme, the system of alimentation, the feeding system.

Take next the plate of lymphatics; that is to say, the absorbent system. The black ground represents the flesh, upon this ground throughout head, neck, trunk, and limbs are seen a million white rootlets. These rootlets which thus are implanted on the flesh are perpetually sucking up juices, drinking, absorbing. They are thickest and attain the maximum upon this intestinal tract. Upon the intestinal system this absorbent system seems to be implanted or to form a continuation. All the rootlets are filled with milky chyle or lymph. The main trunk of this root system is the thoracic duct.

Turn to a third plate, the circulation, the vascular system. By its strange branching it reminds one more than any other part of the anatomy, of the branches of a tree. We see main trunks, lesser

trunks ; large branches, small branches, shoots, and capillary twigs. From the heart goes the aorta, large arteries, small arteries, capillaries, then small veins, large veins, and so on up to the ascending and descending venæ cavæ.

Into this majestic vital stream the thoracic duct pours its prepared milky fluid. We see plainly how the three are connected together ; the lymph or chyle system is implanted on the alimentary or chyme system and empties itself into the blood system. In the intestinal system is crude chyme or soluble food. In the absorbent system milky chyle, liquid or vitalized food. In the circulating system blood, which is organized, vitalized, or plasmic. The first is the crude digestive section, the second is the absorbing section, the third is the plasmic section, with its double process of assimilation and disassimilation.

Poetically, the first is the earthly part of man ; a reservoir system. The second is the vital root, and the third the vital trunk of man. Such a simile is convenient for the time as a mnemonic aid in grasping the whole of this vast and complicated mechanism.

It will be seen that the field and contents of this organization are immense. Three complete systems, alimentary, absorbent, assimilative, each of which covers or comprises, in a way, the whole man. They involve many interesting and complicated apparatuses and nearly five hundred distinct organs.

To see the origin of the mechanism of nutrition, and trace its development, we must look to comparative anatomy. Here we find that the intestinal system, or alimentary canal, in the higher animals consists in its entirety of two sections, eight cavities, and thirty-nine organs. Its two main sections are the "respiratory intestine" and the "digestive intestine," the chief center of the one being the lungs and that of the other the stomach.

The intestinal system, at its simplest, in a fresh water polyp, is a simple pouch with a mouth opening. In the lower worms it consists of a stomach with a mouth and an anus. In ascidians this intestinal tube is differentiated into two sections, the respiratory, or gill, intestine before, and the digestive, or stomach, intestine behind. In the lowest fishes gill arches appearing behind the gill openings in the gill intestine form lip cartilages and a jaw skeleton, and the swimming bladder grows out from the larynx, whilst a liver blind-sac grows from the stomach pouch of the digestive intestine, developing into a compound liver gland.

In the intestinal system of dipneusta, amphibia, etc., the swimming bladder is modified into lungs, the larynx originates from the upper end of the trachea, the urinary bladder grows from the last section of the intestine. In marsupials the primitive mouth and nasal cavity is separated by the horizontal palate roof into food passage and air passage, and the anal urinary cavity, cloaca, is separated by a partition into a uro-genital aperture and a posterior anal aperture. Finally, we arrive at man, where the system reaches its perfection.

In man the eight cavities with their organs are as follows:

1. The mouth cavity, cavum oris, with its mouth opening, lips, jaws, teeth, tongue, bone, salivary glands, palate, and uvula.

2. The nose cavity, cavum nasi, comprising the nose canal, maxillary, frontal, and ethmoidal sinus.

3. The throat cavity, with isthmus, tonsils, pharynx, Eustachian tube.

4. The lung cavity, comprising larynx, trachea, and lungs.

5. The anterior intestine, œsophagus, cardia, stomachus, pylorus.

6. The central intestine, that is, the gall intestine, duodenum; empty intestine, jejunum; and crooked intestine, ilium, together with liver and pancreas.

7. The posterior intestine, colon, cæcum, rectum, anus.

8. The urinary intestine, comprising urinary tube and urinary bladder.

It cannot fail to be remarked that this vast aggregate, the coarsest and most primitive organization in the body, the oldest, according to some anatomists, has little about it that is fine or spiritual, but much that is gross, earthy, and material. These eight yawning cavities, mouth, nose, throat, lungs, stomach, intestine, rectum, bladder, are so many canals and reservoirs of earth, air, and water, sac or pouch reservoirs of pabulum, nourishment, and drainage. They are the foundation and cellar of the human edifice.

The lymphatic and lacteal organs, vasa absorbentia, the absorbent system, consist of countless myriads of little villi, rootlets or suckers, fastened upon the intestines and strewn, at intervals, with certain nodosities or glands. These rootlets unite in a root-like tube, the thoracic duct, which leads up into the circulation. These vasa absorbentia are not limited to the digestive tract, but send their rootlets in the form of lymphatic capillaries and lymphatic lucunæ,

through nearly all tissues except brain and bone ; and this absorbent system is like a root implanted on the intestines and overgrowing all the rest of the body. The remainder of the system comprises jugular trunk, or root, the subclavian trunk, the bronchial trunk, all emptying into the right lymphatic duct. The lumbar trunk joins with the thoracic.

Lymph and chyle, the white blood, are of the same composition ; serum, white corpuscle, fibrine, fatty globules. When entering the great trunks of the system this white blood passes from a soluble food, or pasty chyme, to liquid food, chyle or milk, which by passing through the nodosities or lymphatic glands becomes vitalized milk, or lymph ; that is to say, it acquires the white-blood corpuscles which are formed and living elements. If the blood of the sanguine system is called liquid flesh, the fluid of the lymphatic system might be called white blood or liquid white flesh, plasma not yet brought up to the standard. Its clot is thin and pale ; it must pass on into the veins and through the lungs and liver and be further purified, further refined and further elaborated, and further built up before it becomes true plasma.

By studying the lymphatic system as a whole we see where the chyle or white blood originates. In normal states the grand supply is from the intestines through the villi, or rootlets, and so through the thoracic duct. In case the normal supply fails, the intestinal reservoirs being empty, then the lucanæ and reticular vessels begin a more serious work, as it were, sucking and drinking up the tissues of the body. Emaciation ensues, noted especially in such diseases as phthisis, severe dyspepsia, etc. In all cases of inanition a man, by his absorbent system, absorbs or drinks his own flesh, literally sucking the life out of himself, the lymphatic system becoming an immense leech, covering the whole surface of the body. Science, as well as observed fact, shows us that starvation is a fearful and terrible process.

To sum up at a glance the whole of this curious white blood or lymph tract : First, its rootlets, the sucker-like villi of the intestines, capillary or thread-like and lacunar or web-like upon the other tissues. Second, the nodosities, lymphatic glands, lymphatic ganglia in which the blood is united, elaborated or vitalized, being given the white blood corpuscles. Third, the five root trunks, jugular, subclavian, bronchial, intestinal, lumbar. Fourth, the two grand trunks emptying into the circulation, on the left the thoracic duct ; right, the right lymphatic duct.

The circulatory or assimilative system consists of veins, small and large, with the two main trunks leading to a propelling organ, the heart ; then through the trunk arteries, large arteries and small arteries to the capillaries, where the work of building and repairing is constantly going on.

This highly ramified tree, whether we study it from embryology or comparative anatomy, has a history. It is not one of the earliest tissues, for the skin, stomach, kidneys, nerves and muscles have all preceded it. Only the skeletal and the genital systems were formed later. Comparative anatomy shows the vascular system in various stages of completion. For instance, in the lower worms Bryozoa, appearing between the skin covering and the intestinal wall a simple body cavity. In the scolicida appears a long, dorsal vessel above the intestinal tube, a long ventral vessel behind it, the two connected by rings encircling the intestine. In ascidians a portion of the ventral vessel is enlarged to a simple heart pouch. In fishes the heart divides into two chambers, the lymph system appears side by side with the blood system. In the selachii five artery stalks rise from the main chambers of the heart. In amphibians only the right and left aortal arches are developed, whilst in mammalia the heart has four chambers and the left aortal arch alone is developed. We see here a law of decrease in a number of grand trunks and increase in the number of heart chambers.

Turn now to the elaboration of the material, up through this three-fold labyrinth, the vital reservoir system, vital root system, and vital trunk system to reach its final destination in the flesh. The bolus as it leaves the mouth is wetted and masticated ; it is still crude food. As it leaves the stomach peptonized, it is soluble food. As it is absorbed by the villi having been emulsified by mixture of bile and pancreatic juice, it is liquid food. After passing the lymphatic glands it is vitalized food. After passing into the veins and through the portal system, it is crude blood plasma, and after passing the lungs it is purified blood plasma.

By the natural miracle of transubstantiation the bread is made flesh. The eggs, bacon or biscuit eaten in the morning before the day is over will be living, walking, talking, writing letters. The change is fearful and wonderful if we simply contemplate it. Natural and admirable, scientific and not less wonderful, if we observe, test, measure, weigh and experiment. This humble mouthful of bread to fulfill the order of its being, to carry out the veritable purpose for

which it was created and complete the great metabolic cycle must pass through fifteen processes. The mediæval miracle of transubstantiation was performed "presto" at a blow, the modern scientific miracle of metabolism develops by stages, elaborates little by little, inch by inch, increment by increment. Prehension, mastication, insalivation, deglutition, peptonization, emulsification, fermentation, absorption, vitalization, elaboration, purification, circulation, assimilation, disassimilation, such are the fourteen processes of the foremost of all vital functions.

How may bread become flesh? Follow out this *bouchee de pain* as it plunges down into this vital mælstrom and seek to follow it through all its windings in the thirty feet of intestinal canal, through the absorbent system, through the miles of veins, and through miles of arteries.

Food is licked or sucked by the lips, lapped with the tongue, bitten by the teeth, finds itself cut, torn, and ground by incisors, canines, and molars, held fast and mashed up by masseter and buccinator muscles, made moist and slippery by the saliva, moulded and rolled up into a bolus by that extraordinary muscle, the tongue, with its nine complicated movements, and thrown backward, it leaves its first cavity to pass to the second. Deglutition is a complicated and difficult performance involving many muscles, many nerves, and consisting of six distinct acts. Peristaltic action brings the bolus to the stomach, it is deluged with pepsin and hydrochloric acid and churned by a peristaltic and rotary motion through the combined action of longitudinal circular and oblique muscles. Only one portion of the food is dissolved. The nitrogenous or motor portion, fats and starches; the more vegative portions wait for the next solvent in the duodenum, the bile intestine. The pasty mass of chyme is now again deluged, this time with bile and pancreatine mixed together. The pancreatic juice attacks the starch, exerts a hydrolytic influence, and emulsifies 40 per cent. of the fat, probably the simpler fats. The bile exerts an antiseptic influence, emulsifies nearly 60 per cent. of the fats, probably the more difficult ones. The pancreatic principle, apparently like the salivary principle, operates primarily on the starch or carbohydrates and proteids, and secondarily upon the fat, while the bile attacks directly and strongly the fats or hydrocarbons. Through the two we have a complete sugar transformation and saponification, and the whole is now chyle, a sugary, soapy, egg-white, milky mass, in taste not unlike mother's milk. Four million lacteal rootlets or villi drink this up. The

number of human rootlets has been carefully estimated by Kraus. They begin in the duodenum, decline in the jejunum and disappear in the ileum. In the lower intestine, striking fermentative processes go on and strange substances are produced, phenol, skatol, etc., but we will follow the milky fluid into the lymphatic system. Chyle passes into lymphatic glands by the vasa afferentia, and when it comes out by the fewer vasa efferentia, *it is alive* with amœbæ or white blood corpuscles. In the spleen and portal circulation it is further elaborated, reddened, and strengthened by the red blood corpuscles, iron corpuscles, sent to the lungs it throws off its dark impurities and is vivified with oxygen, and we might find here a fifteenth process vivification, and finally with a hot rush from the propelling left ventricle, all sparkling and quivering and alive it bounds through the narrowing passages to meet the myriad capillaries that are waiting for it. Living brick and mortar it is piled up in unstable molecules in the columns of muscles. As vital cell units these live their little lives, do their little work. Their function ended, they are dissimilated, disintegrated, pass into the torrent as effete matter and are expelled from the organism, the carboniferous portion through the lungs, the nitrogenous portion through the kidneys. Their two natures as it were divorced, one going to the air, the other to earth. Is not man himself and every animal compounded chemically of this double substance? By carbon the organism lives and grows, by nitrogen it moves.

The three systems, reservoir system, absorption system, and assimilation system, with their fifteen or sixteen processes, form an immense chemical apparatus, and the iatro-chemists were not far wrong when with the iatro-mechanicians they divided the empire of man. The surgeon's field is the exterior or mechanical part of man, the physician's field is the interior, the chemical part of man.

You may say literally that the nutritive or chemical organization comprises the whole of the inside of the organism. We refer to it daily when in popular phase we speak of a man's inside. The man who has big lungs and a big stomach, and a powerful circulation may be said to have a powerful nutritive organization.

To the stomach the organism looks for its food, to the lungs for its fire. The nutritive organization is of all the four most costly to support, yet it must be supported. Nine-tenths of all one's expenses go for the supply of stomach and lungs. Hunger, thirst, suffocation and cold ensue when the wants of the nutritive organization are not

attended to. It is the system of vital importance, the veritably vital organization, and to supply its wants all the agriculturists, three-fourths of the manufacturers and half the traders of this world are at work. Food and drink and fuel cost something, houses and clothes supply wants, and from these vital wants or necessities men work to accumulate food, drink, fuel, clothes and shelter. Comforts and luxuries are delightful, pictures and books are edifying, but the necessities of this world are what rule it. From the decrees of hunger and cold there is no appeal, and the general belief is that property, if not the highest thing, is at least before all else a good thing. Lands and houses, much cattle, and heaps of gold and silver, what are they? Necessities, tissue formers and heat producers, nothing else. They all go first and foremost to the support of that tyrant inside of a man, the nutritive organization.—WOOD, *Dietetic Gazette.*

PHYSIOLOGICAL ACTION IN THE MOVEMENT OF A TOOTH.

When force is exerted upon a tooth for the purpose of moving it, the first effect produced is the compression of the pericementum between the tooth and alveolar wall on the advancing side and the stretching of the same membrane on the opposite side. In the compression of the membrane the blood supply is partly cut off, and the nerves, by their irritation, create a sensation of pain which is soon obliterated by the semi-paralysis brought about by continued pressure. At the same time, this irritation stimulates and hastens the development of the osteoclasts, which at once begin the work of breaking down and absorbing that portion of the aveolus pressed upon,

Bony tissue thus being removed, accommodation is made for the advancement of the tooth, which at once takes place. Under continued pressure this action is renewed again and again until the tooth has reached its desired position. While this is taking place on the advancing side quite an opposite condition prevails on the side from which advancement has taken place. There the fibrous tissue of the pericementum has been subjected to extreme tension ; greater room has been provided for the accommodation of the nutrient vessels, and osteoblasts have been developed for the formation of bony material to add to the alveolar wall, and thus close the space caused by the movement of the tooth. While these processes of absorption and reproduction on opposite sides of the tooth have been

going on coincidentally, their results have been very unequal, for the absorption of bone is a far more rapid process than its formation.

During the entire time of moving, and for a long time afterwards, the tension of the pericementum on the free side of the tooth is kept up to such an extent that, were the force of pressure or of retention renewed, the tooth would at once be drawn partly back into the space created by its movement.

The tendency is only finally overcome after the deposit of ossific matter in the alveolar socket has been sufficient to allow the pericementum to resume its normal thickness on that side of the tooth, when, by virtue of the removal of the tension and support of the new bony tissue, the backward movement of the tooth is no longer possible.

While this process of reparative construction has been going on, the structures obout the opposite side of the tooth have been adjusting themselves to the new condition. The pressure upon the tooth having ceased, no more bone is absorbed ; any injury inflicted upon the pericementum by its continuous compression is repaired ; the nerves and blood-vessels resume their normal functions ; and the tooth in its new position becomes a far more useful member of the dental organism than it had been.—GUILFORD, *International Dental Journal.*

THE MACCOY PNEUMATIC TOOL.

It consists of a cylindrical case bored out internally so as to receive a piston. The actuating portion of the piston is uppermost as the sectional illustrations stand, and is prolonged downward of reduced diameter, as if forming a piston rod, which again expands so as to form a second piston-like collar or hammer head. The actuating portion, as we have termed it, which is really the piston proper, is contained in its own chamber, within which it can reciprocate like the piston of a steam engine. At the end of each stroke it is air cushioned. From the lower part of the tool a stem projects adapted to carry any desired chisel. This stem is free to move up and down. In the lighter class of tools it is normally pressed upward by a spiral spring. When the piston is driven downward, it strikes the head of this loose stem. At the upper end of the case is a nozzle to which a hose connected to an air or steam supply can be connected. The piston is drilled transversely, and in this aperture a

valve travels back and forth. It is turned out of a single piece of steel, and cylindrical, with three collars. Four passages for air go through the piston. As the valve travels back and forth, it opens and shuts the valve openings, so as to admit compressed air to one end or the other of the piston, and to bring each end of the air chamber or cylinder alternately in communication with the atmosphere. The compressed air itself causes the valve to travel back and forth. The effect is simple. When air at high pressure is admitted, it actuates the valve, and in consequence the piston, which at once starts into action with lightning-like rapidity. It beats back and forth, air-cushioned at the end of each stroke, on each downward movement striking the upper end of the stem. As many blows per minute as 15,000 are spoken of by the inventors. Whether this rate has been attained is doubtful, but with its air-driven valve and exceedingly limited number of parts, it has the capacity for velocity, and certainly attains a wonderfully high rate of action.

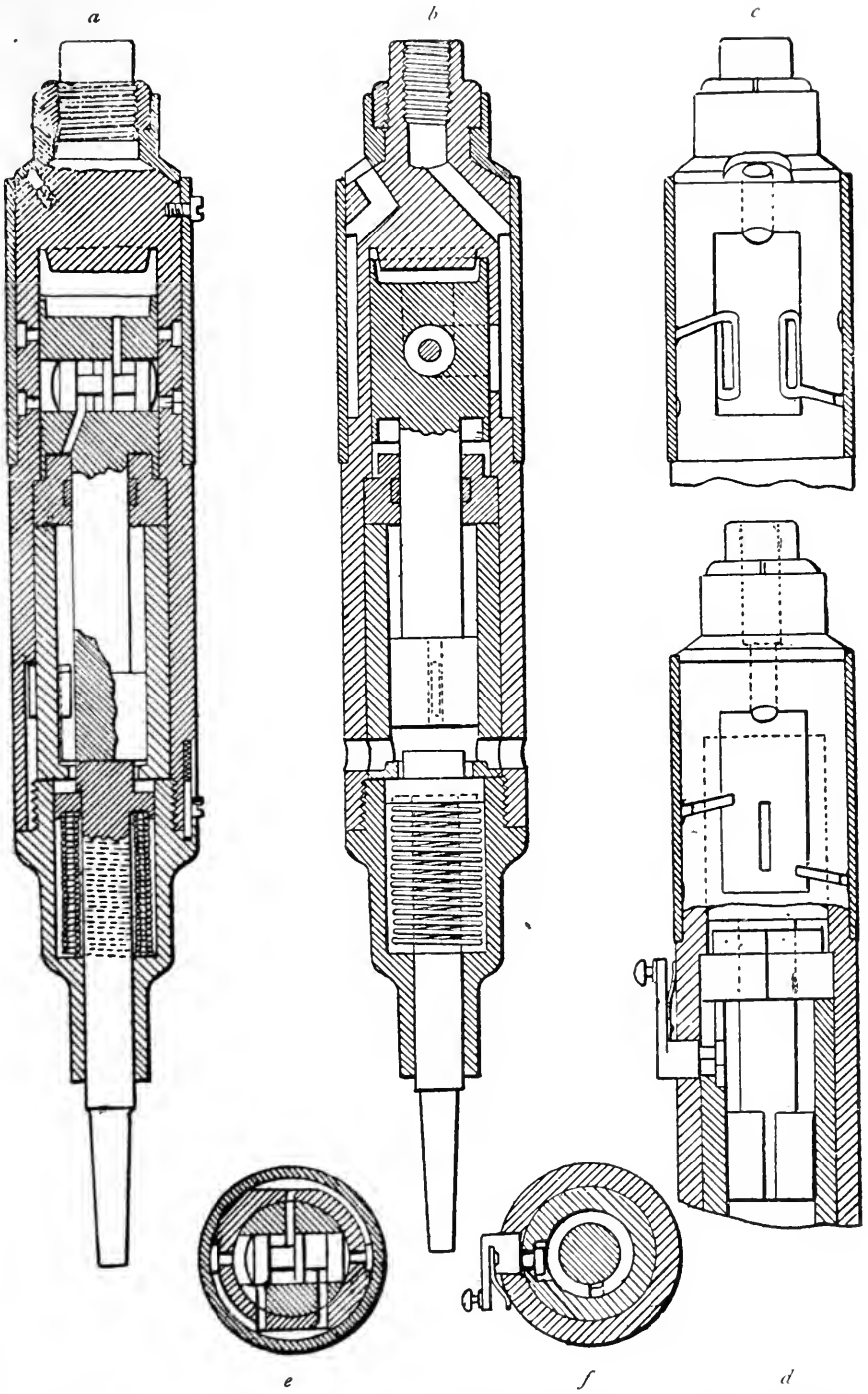
The tool is provided with its own throttle or cut-off valve for stopping or starting it. This, as now adopted, acts by closing the air outlet. It has no projecting parts, and is casehardened throughout, so that it is not susceptible of injury. It will stand the most severe usage and even abuse.

To the stem the cutting tool or chisel is attached, the lever end of the stem entering into a hole drilled and reamed in the end of the chisel. From the description it will be seen that the construction is simple to the last degree, a piston, valve, and loose stem being the moving parts. In some of the larger sizes the spring for pressing back the stem is not used. The stem drops forward out of reach of the striking end of the piston head. In this class the chisel receives no blows until pressed upward within reach of the piston head by contact with the work.

To drive it, air at a pressure of about 40 pounds to the inch is used. A number of sizes are constructed for a large range of work. As a cutting instrument, it may be used on every material—wood, stone, or metal. As a tamping machine, it can be employed for everything, from filling teeth to calking steam boilers. It has also received an extensive application for repousse silver and sheet metal work and engraving.

To acquire an idea of its power, the action of the large size upon a block of brown sandstone may be cited. A heavy chisel, two or three inches wide, is inserted in place, the air is turned on, and at

once the tool begins to hum like a top, and vibrates, or rather trembles, in the hand. The cutting tool is now pressed against the



a. Front sectional elevation. *b*. Side sectional elevation. *c*. Showing eduction chamber. *d*. Induction chamber and side-stop motion. *e*. Valve chamber plan. *f*. Throttle plan.

stone by the operator. The multiplicity of light blows begin to show their force. The stone at the point of the chisel is converted at once

into dust, the edge enters the stone, and begins to wedge off chips half as large as the hand. Almost as fast as the tool could be conveniently moved forward, even without obstruction, it plows its way through the material, absolutely planing the solid stone as a carpenter would treat a block of soft wood, but deeper and more rapidly. A more remarkable exhibition of power cannot well be thought of. A tool weighing, perhaps, fifteen or twenty pounds, held without any bracing by the workman, cuts stone as if it were cheese.

To show its delicacy a smaller one may be used. A tool not much larger than a pen holder, designed for filling cavities in teeth, is fitted with a chisel. With this marble can be carved with the greatest delicacy, the shaping reminding one of modeling in clay. The marble yields to the rapid percussion as if it were a plastic material.

Its action on iron comes next. A cut can be carried right across a smooth face, with slight pressure from the person holding it, a smooth chip or shaving curling away sidewise from the cut, such as might have been turned out by a sharp chisel driven by a skilled workman. In wood the action is the same. With a gouge as cutter, chip after chip is cut away, the wood yielding with curious and almost plastic facility. The cut can be carried up to the very edge of the block without danger of splitting. When the gouge is forced in too deeply, the work is checked, but by keeping one or the other corner free, the chips come away as fast as the tool can be moved around so as to cut them away from the body of the wood.

The above describes the experiences of the writer. It is safe to say in each minute the instrument strikes more blows than a good workman would in a day of ten hours. Owing to the small range of action of the piston, the blows are individually of slight force, the remarkable power being derived from their multiplicity. These trials disclosed the more characteristic action of the tool where cutting is involved. It is also used to actuate a striking tool for doing repousse work in metal. The metal yields to the blows, swelling up into shapes that by the skillful operator can be given any shape, such as birds, fruits, or other objects. Separate strikers are provided for different inside and outside work, and the striking bits can be changed at will according to the class or stage of the design.

Owing to the extreme rapidity of the succession of blows, no recoil, or a very slight and easily controlled one only, is felt. To this peculiarity, much of the efficiency of the instrument is due. It

can, without trouble, be held to its work, and the finest lines of a design can be followed with precision. Marble can be cut away to a pencil mark ; across a smooth surface of iron a cut can be carried with the utmost accuracy. On some materials it accomplishes a new result in its planing action. Thus, stone can be worked off to a surface just as a carpenter would plane wood. All these are possible on account of the absence of recoil.

We illustrate several of its applications : In the mine it can be used to cut away the mineral. This use illustrates the lowest stage of stone cutting. In the marble factory and sculptor's atelier it is used for the most delicate carvings. Work of the most artistic type can be executed by it with a rare combination of freedom and precision. The iron worker uses it for chipping and calking. We illustrate its use on steam boilers. Finally, its use by the jeweler on repousse work is shown. The worker in precious metals, and in art work generally, can employ it with great effect, also, as an engraving tool, and can produce beautiful effects by combining engraving with repousse designs, all performed by it.—*Scientific American.*

NEGLECTED ADVANTAGES.

No fact seems to be more generally admitted than that the present is an age of imyrovement. The triumphs of steam and electricity, whereby our ready communication and exchange are so vastly promoted, are fitly supplemented by the growth of more enlightened and liberal views in science, ethics, and religion, softening and broadening in their influence, and steadily tending to bring in peace and good-will among men. The laws of sanitary science are inquired into with a zeal born of enthusiasm, that the "pestilence that walketh in darkness and wasteth at noon-day" may be stayed. The reform of political methods is undertaken and carried forward by earnest and unselfish men to the end that good government and wise policy be promoted, and justice and prosperity prevail.

But no observant person can fail to be struck with the fact that, after all, the acceptance of new ideas and new methods is of really slow growth, limited at first to a few receptive minds ; that the mass of mankind are not easily changed from the habits and methods to which they have become accustomed. To them appears as the highest wisdom the snug and satisfied philosophy embodied in the couplet :

> "Be not the first by whom the new is tried,
> Nor yet the last to lay the old aside,"

forgetful that were it adopted by *all* there would be an end of progress.

Reflection upon this phase of the subject has led me to better understand what I confess has sometimes surprised me in the attitude held by so many in our own chosen profession, which is but an epitome and microcosm of the larger world.

That the improvements made within the past few years in the practice of dentistry—especially in the appliances used—have been very great, all will admit. We are, indeed, apt to speak of our progress as phenomenal and exceeding that in most other branches of human activity, which is perhaps in consequence of our nearer view. Be that as it may, the fact remains that we have at our command in the present day many advantages in the conduct of our beneficent work not possessed or scarcely even dreamed of by our fathers,—advantages which, if not neglected, but rightly employed, are capable of increasing our capacity and consequent usefulness to those under our care to a most marked degree. The statement does not readily admit of illustration by statistics, so much of the purely personal element is to be taken into the account, or I should be tempted to undertake it. I can only say, in passing, that in my individual experience as demonstrated by my recorded operations the benefit derived has been sufficient to more than double my capacity for work.

That many of these advantages are neglected by not a few among us, to their own and their patient's detriment, is to me therefore a matter of regret, and I shall endeavor in the short time at my disposal to designate a few of the more prominent improvements, and comment briefly upon their value, in the hope that thereby they may be more generally appreciated and made use of.

Not undertaking to indicate the order of importance, I shall speak of the assistant, the burring-engine, the matrix, and the separator.

And first of the assistant at the chair. There is, I am aware, in the minds of many dentists, a prejudice against the employment or presence even of another person at the operating chair,—a prejudice which I confess I myself once shared, but which experience has shown to be unfounded and absurd to the last degree. They fancy that the presence of another will in a measure interfere with the somewhat personal and confidential relation which the dentist should hold toward his patient, and that fastidious patients might object to their employment. Granting the objection its full weight, I am convinced that it should not be for a moment considered in view of the advantages which can be set against it. To the operator aided by a trained and intelligent assistant is given another pair of hands,—and sometimes we fancy that Briareus with his hundred

arms would have too few for the emergency !—another pair of eyes to look for the elusive and particular instrument required, two willing feet to fetch the needed article just out of reach, and another brain to take thought of the order and care of the surroundings. To the patient is given the service of one less preoccupied than the principal, to see to his needs, look after his comfort, and help in a hundred nameless ways to shorten the tedium and fatigue of the dreaded sitting.

Objection is sometimes made to the employing of an assistant on the ground of expense, many declaring that they cannot afford to, seeming to regard it in the nature of a needless luxury ; and I have, in advocating this advantage, not unfrequently been asked what use I could find for an assistant aside from malleting.

The objection of expense can be urged against the employment of any means of improvement ; but expense is relative, and what seems needless extravagance may in fact be the wisest economy. No one, however limited his practice, can afford to forego the advantage of an assistant ; on the contrary, the increased efficiency and celerity which he thereby secures—to say nothing of the added comfort which is insured to his patient—will repay tenfold the probable expense incurred.

A word as to what kind of assistant. Having tried them of both kinds, I give the preference to those of the gentler sex, as being, all things considered, better adapted by nature to fill the office ; and to illustrate, I will mention some of the services rendered me by the young lady who has for some time past been associated with me in this capacity.

In the first place, she looks to the general condition of the fixtures of the office after the servants have properly swept and dusted, to see that everything is in proper order for the reception of patients ; she keeps in condition the instruments and appliances used, bringing them to me as wanted and returning them to place when done with ; she prepares in advance all articles that may be needed, such as absorbent paper, pellets, waxed ligatures for adjusting the rubber-dam, swabs for dressing root-canals ; she assists in putting on the rubber-dam, or in using the separator or matrix ; she holds away the lips or the tongue of the patient when needed, to avoid abrasion or secure a better view ; prepares ready to my hand the materials for filling and assists in packing them into the cavity, and renders a thousand and one little services to the saving of my time and strength and the preservation of my good temper that time would fail me to enumerate.

The number among us who fail to make use of the burring-engine in some measure is perhaps too small to be seriously considered, yet I am of opinion that not a few fail to get from it all the advantage which they might. The operator who wastes his strength and sacrifices in some degree his steadiness of touch by driving his own engine, standing on one leg, stands no less in his own light. This matter should be delegated to an assistant, or, better still, some motor power should be employed for the purpose. There can be little excuse at the present day for not doing so. I have in my own practice for several years made use of a water motor, put in at an expense of about one hundred dollars, and costing me in taxes some eight dollars yearly, which I am confident has been a most profitable investment. The steadiness of the bur when driven by a uniform power makes its use less painful than when driven in the usual way by the treadle, besides the operator and assistant are left free to give their attention to other matters. But great as is the advantage secured by the burring-engine in the preparation of ordinary and accessible cavities, in reaching those upon the posterior surfaces of teeth far back in the mouth it is *indispensable*, if time and the feelings of the patient are to be taken into account. By the aid of the corundum-stone and the back-action hand-piece, such cavities can be readily exposed and prepared with nearly as much facility as any ; while with the help of a suitable *matrix* the introduction of a proper filling is rendered far less difficult and uncertain than would otherwise be possible.

It is in such cases as these, and in those more accessible teeth where considerable loss of substance has taken place, that I find most use for the matrix in some form ; and while I do not myself make use of it in filling many approximal cavities in the molars and bicuspids, I have been surprised to hear, within a short time past, two deservedly prominent dentists admit that they had never even *tried* such an appliance. However, I am satisfied that the matrix is too useful to be wholly discarded, though less a necessity than some other things.

The separator, as introduced in its crude form by the late Dr. Jarvis and modified by Dr. Perry and Dr. Bogue, also the forms devised by Dr. Parr, Dr. Elliott, and others, has met with a less universal acceptance than its great merit demands. It is one of the most useful devices for saving time, both to the operator and patient, that has been introduced. Nor is time alone saved, but pain and discomfort as well. By its employment not only are the teeth separated quickly without serious discomfort, but being also thereby held firmly

in the changed position their sensibility is greatly reduced, as every one familiar with the use of this instrument has doubtless observed. I am aware that many quite progressive dentists have not yet availed themselves of the manifest advantage of the separator from fear that injury might be done by its use, or that it would provoke protests from their patients. This objection might be urged against almost any instrument we have, and with about as much force. I have never known of harm done by its use, while we are all familiar with cases where serious mischief has been wrought through the careless separation of teeth by the ordinary methods with wedges of rubber, wood, or cotton.

It is true that the sensation caused by the application of the separator is at the first somewhat unpleasant, possibly painful ; but it is only momentary, and patients after experience with it almost universally express their preference for it over other means. The time saved by its use is no small item.

To apply it will take, let us say, at a liberal estimate, perhaps five minutes in the most difficult cases, and of course much less usually. By the ordinary method of separation nearly as much time will be consumed in getting the patient into the chair and introducing a wedge of cotton or rubber, which not unfrequently will require one or more renewals before sufficient space is gained, each renewal taking a few moments of the dentist's time and involving another visit on the part of the patient. In a full practice the aggregate waste of time is a serious loss.

But as I did not set out to cover the whole field of neglected advantages, I will not further continue. In what has been said, my desire has been to impress upon such of my professional brethren as have for any reason failed to fully appreciate the benefits of the appliances mentioned my own belief in their value, and to ask them seriously to consider whether they can afford to forego any advantages of this nature which are within their reach. If any shall be aided in this by what has been said, I shall feel that I have not spoken in vain.—Brockway, *Dental Cosmos.*

CELLULOID.

Now there seems to be every probability of glass being, at least partially, superseded by celluloid in negative work, especially out of doors, we may expect soon to find a new subject for discussion in

the question as to whether the substance referred to is altogether free from faults in its new application. It may be said, indeed, that the question has already been raised.

If it should be proved that these doubts are well founded, the question suggests itself as to whether the beautiful substance cannot in some way be freed from its baneful ingredients. In other words, whether it cannot be *decamphorated* and *denitrated* without destroying its advantageous features, especially its transparency and flexibility.

With a view of testing the possibility of this we have made a few rough experiments, but not with any very decisive result, at any rate so far as success is concerned, but rather the opposite. With a view of removing, if possible, the camphor, a sheet of celluloid was digested with ordinary methylated alcohol, which, though at first producing no apparent result, was found in the course of a few hours to have *completely* dissolved it. Here, then, there is no possibility of dissolving out the camphor, since the latter lends its aid to the alcohol in dissolving the pyroxyline.

Another sheet accurately weighed (like the last) was submitted to the heat of about 180° Fahr. in a gas oven for a period of twelve hours; at the end of that time it was physically changed to the extent of being badly curled and crumpled by the heat, though that might possibly be remedied by proper precautions. But the loss in weight after twelve hours "stoving" did not amount to *one tenth of one per cent* on the total weight. So here, again, there does not appear much hope of driving off the camphor in vapor without hopelessly spoiling the material.

Of a number of experiments in denitrating, one may be specially mentioned. If the celluloid be immersed in strong concentrated sulphuric acid, no apparent action takes place; but if an equal volume of water be added, the sudden and intense heat evolved causes a deep yellow coloration of both celluloid and liquid, and the evolution of a powerful empyreumatic, mixed up with which camphor is plainly recognizable. After a very short time the action ceases and the color leaves the solution.

If the celluloid be now taken out, washed, and dried, it will be found to have lost considerably in weight and to have had its surface eaten away irregularly, or corroded in much the same way as glass when treated with dilute hydrofluoric acid. Returned to the dilute sulphuric acid and boiled, no further action takes place until ebullition has gone on for some time, when the liquid commences to turn

yellow, but the color at first quickly disappears on stirring. Gradually, however, it becomes stronger and more persistent, and at the same time strong nitrous fumes are given off, these being apparently the cause of the yellowing. Finally, the color becomes brown, and the celluloid dissolves entirely, forming a deep brown solution.

Now this seems to prove that *as celluloid* the substance for a long time resists even boiling sulphuric acid, but gradually it is denitrated, and then *as cellulose* is carbonized and destroyed by the acid. Thus the possibility of denitration is proved, but whether it can be done practically without destruction is a question.

If this can be accomplished, one at least of the possible weak points in celluloid will be removed.—*British Journal.*

DEATH OF THE MAN WHO KNEW HOW TO MAKE ALUMINUM FROM CLAY.

The manager of the American Aluminum Company, Fred. J. Seymour, died at Findlay, Ohio, last week, and the secret of making aluminum is said to have died with him. He was the inventor of processes by which this valuable metal could be profitably extracted from common clay, and had put his inventions into practical use. About four years ago, as the result of years of experiments, F. J. Seymour, then a citizen of Detroit, secured patents covering processes for the manufacturing of aluminum. He had little difficulty in inducing capital to take hold of the enterprise, and the American Aluminum Company was organized, with Gen. Russell A. Alger as president and Senator Palmer, of Michigan, as vice-president. The discovery of natural gas in Findlay caused the location of the laboratories there. Expensive retorts and valuable machinery were constructed, and the manufacture was begun on a large scale, and proved so successful that large quantities of the metal were placed upon the market at a large profit on the investment.

The process, although patented in nearly all of its points, has been kept a religious secret, says a correspondent, and no one has ever been permitted to penetrate the mysteries surrounding it. A 15-foot picket fence surrounds the buildings, with its gates doubly padlocked. From remarks made by the chemists and other employes at different times, it is gathered that the clay, after being ground in water and treated with various chemicals, is treated to a heat of 1,500° in large retorts, until it has become thoroughly fused. When

it has reached the crowning temparature, the precious metal is separated from the mass by the addition of a certain chemical in specific quantities, but the name and nature of this chemical is not disclosed in the latters patent, nor has any one employed about the works ever discovered it. It is this secret that has gone down into the grave with F. J. Seymour. It had been his invariable custom to await the critical moment when the fluid mass had reached the right stage, and then all the employes were excluded from the room, the doors were locked, and all alone he went through the mysterious processes of the laboratory, adding a chemical that no one knows the name of, has never seen, and in quantities that cannot be even guessed at. His death came as the result of a paralytic stroke, from which he never recovered consciousness, so that on his deathbed he had no opportunity of revealing the all-important secret. The stockholders of the company are undetermined what to do under the peculiar circumstances in which they are placed, but will probably give some of their chemists full scope to endeavor to rediscover the lost secret.—*Electrical Review.*

CARE IN DENTAL OPERATIONS.

The treatment of abscesses, roots, and teeth, when carried to a successful termination, also requires the greatest care. I am not among those who advocate an immediate root-filling, under any and all circumstances; in fact, would rarely advocate the practice, and certainly not where the root or tooth had been bathed in and permeated with the products of decomposition for a length of time. While we are better able to judge of the conditions at present than before the introduction of the peroxide of hydrogen into our list of remedies, still, for all that, I am of the opinion that great care should be exercised in determining the facts as to the proper time to fill such roots, believing the permanent results to be greatly influenced by the condition of the root when filled, whether septic or aseptic, throughout its whole extent. In the removal of pulps of teeth after devitalization, great care should be exercised to avoid giving pain to the patient (or more than is absolutely necessary), as well as to successfully accomplishing that which we have undertaken. By resorting to remedies which we should always have on hand, cocaine, carbolic acid, etc, and by the use of broaches, barbed and smooth, and the Donaldson nerve-canal reamers, we can arrive at results that but a few years since were beyond the possibilities, and

of course our successes will be in a like manner increased. The filling of root-canals also has, from the introduction of the practice to the present time, been one of the operations that have stood as witnesses in evidence of the fact that care and thoroughness have all to do with success in dental practice. The theory of the preservation of pulpless teeth is based upon the perfect accomplishment of this operation. The means resorted to in carrying out the intentions of the operation are various, and outline in a manner the amount of skill possessed by the practitioner. With the knowledge which we have at present of the conditions absolutely necessary to success, to my mind one who would use cotton as a root-filling, as we often see advocated, would certainly show a want of care for the patient, his profession, and himself. While I am an earnest advocate of the use of gutta-percha in some form, I recognize that other materials may answer as well in other hands.

The important uses to which abscessed roots and teeth are frequently put in our present modes of practice will, I think, justify me in insisting upon the exercise in all cases of the greatest care, both in the thorough treatment and filling of such roots, being, as they frequently are, the foundation upon which the whole structure of a useful denture is based.—FULLER, *Western Dental Journal.*

A NOBLE METAL.—PLATINUM.

Charles Wood, an assayer, in 1741 found in Jamaica some platina which had been brought from Carthagena and which he forwarded to London for inspection as a curiosity.

The first to mention platina by its present name, however, which means "little silver," was Don Antonio Ulloa, a Spanish mathematician, who, in 1735, accompanied the French academicians who were sent to Peru by their sovereign to measure a degree of the meridian in order to determine the figure of the earth.

After his return he publisned at Madrid, in 1748, a history of his voyage, and mentioned the abandonment of the gold mines in the territory of Choco on account of the presence of platina, which, being too hard to easily break or calcinate, the gold could not be extracted without much expense and great difficulty.

It is reported in the *Chemical Annals* for July, 1792, that the miners of Choco, discovering platina was a metal, began to use it in adulterating gold, in consequence of which the Court of Spain,

fearing disastrous results therefrom, attempted not only to prevent its export, but to conceal the discovery of the metal from the world.

To effect this all gold brought from Choco to be coined at the two mints of Santa Fe was carefully inspected, and all platina separated and given to the king's specially appointed officers, and when a sufficient quantity had accumulated, it was taken to the river Bogota, about two leagues from Santa Fe, or to the river Cauca, about one league from Papayan, and in the presence of witnesses thrown into the river.

From the great specific gravity of this metal, it being the heaviest known, together with its malleability and ductility, and the fact of its great resistance to the action of acids, alkalies and sulphurs, it has become known as the "metal of the chemists."

Some of the most important discoveries of modern chemistry would have been impossible without the aid of platina. It is so soft it may be readily cut with the scissors, and when formed into a mirror, reflects but one image.

Platina has been found in various parts of the world—Peru, New Granada, Brazil, St. Domingo, and in the gold washings of California, Australia and Borneo—but the principal source of supply is in the Ural Mountains of Russia and the auriferous sand of Kuschwa, in the Auralian Mountains of Siberia.

Platina is rarely found in pieces larger than a few grains in weight.

The chief uses of platina are for the various apparatus used in chemical laboratories, such as crucibles (first crucible was produced in 1784), spoons, blow-pipe points, tongs, forceps, and boilers or stills for concentrating sulphuric acid. A still of this kind, valued at 95,000 francs, was exhibited at Vienna in 1873, capacity 20,000 pounds of sulphuric acid daily.

An ingot valued at $20,000 was exhibited at the London Exhibition in 1862.

On account of the high degree of heat requisite to fuse or melt platina—melting point 1,460° to 1,480°—it is the only metal used for making the pins of porcelain teeth, and on account of its value and lack of any known substitute, has become the greatest item of expense in their manufacture.

It is also utilized for making fine jewelery, and a great and growing demand has been but recently created by the development of electricity.

The Russian Government began coining platina for general circulation in 1826 and continued until 1845, when by an imperial ukase the coinage was discontinued and the $2,500,000 issued called in because of the great fluctuation in the price of the metal.

The average production of platina metal from 1828 to 1845 amounted to 2,623.8 kilos or 5,784.48 lbs. per anum; from 1875 to 1884 inclusive, the average yield of the Russian mines was *3,483.3 lbs. per annum, showing a decrease since 1882, the maximum year of 45 per cent. in the yield. The Russian mines yield 80 per cent. of the total product of the world.

The price of platina, which has always ruled very high in consequence of the continually increasing demand, the limited source of supply, without any new discoveries of moment sufficient to relieve the market, is constantly advancing, so rapidly indeed as to cause serious apprehension for the future.

Those industries whose manufacturers depend largely on platina as their chief element of cost (and with no known substitute in sight), such as stills, crucibles, porcelain teeth, electrical and chemical apparatus, etc., are suffering more or less seriously from this increase in price, and for self-protection it would seem will be obliged to advance prices porportionately.—*Electrical Review.*

TAKING LOWER IMPRESSIONS.

Dr. F. C. Green, in experimenting in taking lower impressions, believes he has succeeded in finding a means by which a perfect impression may always be obtained in those difficult cases where the absorption has been great and where the attachment of the muscles is very close to the alveolar border, rendering it difficult to construct a plate that will not impinge upon the muscles and rise whenever the patient opens his mouth or raises the tongue. This method is as follows: Use a very narrow impression cup, one not much wider than the alveolar ridge; fill the cup with plaster, very soft, adding a little sulphate of potash to make it set rapidly. When hard, remove from the mouth, and with a small scraper, remove a thin layer over tne entire surface of the impression; trim the edges, and especially the tongue. Place the impression in water for a few moments and when thoroughly wet fill it with very thin plaster, not thicker than

*Above figures are from the latest statistics obtainable, up to May, 1888. Russian officials are said to be very dilatory with their reports.

cream; place it in position in the mouth with gentle pressure; observe that the buccinitor muscle is not impinged upon and request the patient to raise the tongue, letting the point rest upon the cup. When hard, remove, and if each step of the process has been carefully taken, the result will be an impression from which a plate can be constructed that will not rise or rattle while speaking. He never uses anything but plaster for taking impressions of the mouth, believing it to be the only reliable material for this purpose. —*Dental Office and Laboratory.*

HOW TO STAIN AND TO AVOID DISCOLORIZING THE TUBERCLE BACILLUS.

For an expert there is not much difficulty in finding these microbes, even if they should be present in very small numbers. For the less experienced, however, there is considerable difficulty in their discovery on account of the great facility with which they are decolorized by the nitric acid if the prepared cover-glass should be in only a few seconds too long contact with the acid. Especially when the bacilli are very few in number this decolorization readily takes place, and they consequently become invisible.

The patient is then, on account of the negative result, pronounced free from tuberculosis, when he is in reality suffering from this disease.

Therefore, to be able to discover the bacilli, we must know of some acid or other agent that does not decolorize these microbes even after having been a long time in contact with them.

Such an agent we possess in oxalic acid.

The staining is done in the following way: One part of aniline oil is thoroughly shaken for a few minutes with ten parts of distilled water, and then filtered through a filter previously moistened with water. To the perfectly clear solution is then added four or five drops of a saturated alcoholic solution of fuchsin. In this solution (fuchsin aniline water) is immersed the prepared cover-glass. The solution is slowly heated a few minutes until vapor appears, then the cover-glass is taken out and washed in distilled water, and afterward immersed in a saturated solution of oxalic acid. It must remain here until it is completely decolorized, when it is taken out, dried, and immersed in a weak solution of methylin blue, until it has received a light-blue color (about one-half to two minutes). After this it is

dried again, and examined in Canada balsam with a homogeneous immersion-lens. All is now colored blue except the bacilli, which have a beautiful red color.

I have tried several methods of staining, but in none of them are the bacilli seen so plainly and brilliantly as when the above method is used.—NORDERLING, *Medical Record.*

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.*

The association held its eight annual session at Saratoga Springs, N. Y., commencing August 6, 1889.

The following boards were represented: Illinois by C. R. E. Koch; Ohio, J. Taft, H. A. Smith; New Jersey, F. A. Levy, J. G. Palmer; Indiana, S. T. Kirk; Maryland, T. S. Waters; Massachusetts, L. D. Shepard, J. S. Hurlbut; Vermont, Geo. H. Swift, James Lewis; Delaware, C. R. Jefferis, T. H. Gilpin; Colorado, B. T. Smith; Georgia, A. G. Bouton.

Delaware and California were admitted.

Drs. Jefferis, Shepard, and Koch were appointed to consider correspondence with reference to the standing of a college whose name had been omitted from the list of colleges whose diplomas were recommended to be received by the State Boards. This committee was afterwards constituted the Committee on Colleges.

The committee later reported that the secretary be instructed to inform the Dental Department of St. Louis College of Physicians and Surgeons that owing to insufficient information the association is unable to take final action on its application for recognition; and sustaining the action of the officers in omitting the name of the University of Maryland from the printed list of recognized colleges last year. The report was received and adopted unanimously.

The committee reported the following as reputable:

American College of Dental Surgery, Chicago, Ill.
Baltimore College of Dental Surgery, Baltimore, Md.
Boston Dental College, Boston, Mass.
Chicago College of Dental Surgery, Chicago, Ill.
College of Dentistry, Department of Medicine, University of Minnesota, Minneapolis, Minn.
Dental Department, Columbia University, Washington, D. C.
Dental Department of Northwestern University, Chicago, Ill.
Dental Department of Southern Medical College, Atlanta, Ga.

*From report furnished by the publishers of the *Dental Cosmos.*

Dental Department of University of Tennessee, Nashville, Tenn.
Harvard University, Dental Department, Cambridge, Mass.
Indiana Dental College, Indianapolis, Ind.
Kansas City Dental College, Kansas City, Mo.
Louisville College of Dentistry, Louisville, Ky.
Minnesota Hospital College, Dental Department, Minneapolis, Minn. (Defunct.)
Missouri Dental College, St. Louis, Mo.
New York College of Dentistry, New York City.
Ohio College of Dental Surgery, Cincinnati, O.
Pennsylvania College of Dental Surgery, Philadelphia, Pa.
Philadelphia Dental College, Philadelphia, Pa.
School of Dentistry of Meharry Medical Department of Central Tennessee College, Nashville, Tenn.
St. Paul Medical College, Dental Department, St. Paul, Minn. (Defunct.)
University of California, Dental Department, San Francisco, Cal.
Northwestern College of Dental Surgery, Chicago, Ill. (Defunct.)
University of Iowa, Dental Department, Iowa City, Ia.
University of Maryland, Dental Department, Baltimore, Md.
University of Michigan, Dental Department, Ann Arbor, Mich.
University of Pennsylvania, Dental Department, Philadelphia, Pa.
Vanderbilt University, Dental Department, Nashville, Tenn.

The committee recommended also that the standing Committee on Colleges be instructed hereafter to take cognizance of and investigate all charges against any college, that they give the accused an opportunity for defense, and that they report a revised list of colleges at each annual meeting after having investigated all complaints; and that this same committee also have authority to inquire into the proper equipment and organization of colleges not now on our list, so that they may be able to report as to the capability of such institutions to give acceptable instruction, both as to the quality and quantity of its teaching.

After hearing the representative of the University of Denver, Dr. P. T. Smith, that institution was added to the list, and the report adopted.

Dr. Koch offered resolutions that it is the sense of this association that no one should be permitted to assume the responsibilities of a dental practitioner until he shall have had at least three year's previous study and instruction, inclusive of three full terms of not less than five months each, in a properly organized and equipped dental college, provided that time spent in the study of medicine or graduation from a medical college may be credited on this requirement not to exceed the period of two years or two full terms of collegiate instruction; and recommending to such State boards of dental

examiners as are by the laws of their respective States required to issue licenses to practice dentistry to all holders of diplomas from reputable dental colleges that they make such rules as shall require all colleges to make three full calendar years of study and the attendance upon three full college terms of not less than five months each a prerequisite to graduation; and that only such colleges as shall comply with this rule on or before the beginning of their scholastic year of 1890–91 should thereafter be considered as reputable; and that all State boards should, when their State laws permit the same, decline to grant a license to practice to any one who cannot produce evidence showing that he has spent at least three full years in study and preparation before attempting to resume the responsibilities of a dental practitioner.

Referred to Drs. Kirk, Palmer, and Bouton, with the information that the National Association of Dental Faculties had adopted a rule to go into effect at the session of 1891–92 requiring attendance upon three full regular courses before examination for graduation. The committee reported recommending that the portion "relating to States where an examination is held and license granted be approved." Adopted.

Dr. Koch moved that the secretary be instructed to publish a notice in the dental journals informing all dental colleges not now recognized as reputable by this association that in order to be enrolled upon the list of recognized colleges it will be necessary for such colleges to apply for recognition and show that their workings are such as to entitle them thereto. So ordered.

Dr. Shepard moved to make the standing Committee on Colleges consist of five members, whose duty it shall be to report annually upon the colleges entitled to recognition. So ordered.

The following officers were elected: T. S. Walters, Baltimore, president; C. R. E. Koch, Chicago, vice-president; F. A. Levy, Orange, N. J., secretary–treasurer. The president appointed as the Committee on List of Reputable Dental Colleges Drs. L. D. Shepard, C. R. E. Koch, C. R. Jefferis, F. A. Levy, and S. T. Kirk.

Adjourned to meet at the time and place of the next meeting of the American Dental Association.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.*

The sixth annual session was held at Saratoga Springs, N. Y., commencing August 5, 1889.

*From report furnished by the publishers of the *Dental Cosmos*.

The Executive Committee reported credentials as follows :

Chicago College of Dental Surgery, Truman V. Brophy.
Indiana Dental College, J. E. Cravens.
State University of Iowa, Dental Department, A. O. Hunt.
New York College of Dentistry, Frank Abbott.
Boston Dental College, J. A. Follett.
Harvard University, Dental Department, T. H. Chandler.
Ohio College of Dental Surgery, H. A. Smith.
University of Pennsylvania, Dental Department, James Truman.
Baltimore College of Dental Surgery, R. B. Winder.
Dental Department of Southern Medical College, L. D. Carpenter.
Vanderbilt University, Dental Department, W. H. Morgan.
University Dental College, J. S. Marshall.
Missouri Dental College, W. H. Eames.
Kansas City Dental College, J. D. Patterson.
Dental College of University of Michigan, J. Taft.

Credentials were also received from Pennsylvania, represented by C. N. Pierce ; Harvard, Thos. Fillebrown ; and Louisville, J. Lewis Howe.

Columbian, represented by J. Hall Lewis, and Maryland, F. J. S. Gorgas, were elected members. The application of Royal College of Dental Surgeons of Ontario was reported favorably, but doubt was expressed as to the propriety of admitting it owing to the title of the association, which would seem to confine membership to colleges in the United States.

Applications from American College (Chicago), University of Denver, and University of Minnesota, were laid over one year.

The association adopted a rule requiring attendance upon three full regular courses in separate years before examination for graduation. The regular courses were made "not less than five months each."

The time when the new rules shall go into effect was fixed at the beginning of the session of 1891–92. It was also ordered that the resolutions requiring attendance on three terms be published in the announcements for the session of 1890–91.

Drs. Truman, Taft, Cravens, Brophy, and Howe, were appointed to take into consideration the equalization of college fees. The committee subsequently reported a partial tabulation of fees, with a recommendation that the minimum fees be fixed at $100 a year. The report was laid over and the committee continued.

Drs. Cravens, Marshall, and Patterson were appointed to codify the rules.

Dr. Fillebrown, from the committee appointed to consider the request of the Baltimore College of Dental Surgery with reference to the granting of the D. D. S. to a prominent practitioner without attendance upon lectures, reported in favor of declining the request. The report was accepted.

Ordered that the colleges print the list of their matriculates at the previous session, with the States or countries from which they come, in their annual announcement, with an asterisk (*) opposite the names of those not in attendance and a foot-note stating the fact.

Ordered that colleges making application for membership be notified by the secretary that it will be necessary for them to appear by representative before the executive committee.

The following was adopted :

Resolved, That all applications for membership reported upon favorably by the executive committee shall lie over one year before final action may be taken thereon.

Dr. Abbott offered a resolution requiring colleges of this association desiring to confer the honorary degree, to submit the names of the persons so to be honored to this association for approval. Adopted.

The Committee on Text-Books reported that the work recently published by Dr. Fillebrown had not been submitted to the committee for approval. The report was accepted.

The committee also reported that they had examined the work on "Orthodontia" compiled by Dr. S. H. Guilford, and they recommended that it be adopted as a text-book. The report was accepted.

On motion of Dr. Truman, the work on "Dental Chemistry," by Dr. Clifford Mitchell, was accepted formally as a text-book.

The follwing resolutions were laid over :

By Dr. Brophy :

Resolved, That graduates in medicine who have not had at least two year's practice in operative and prosthetic dentistry shall be required to attend the lectures and engage in the practice-work in these departments during two annual sessions previous to admission to the examinations for the dental degree.

By Dr. Patterson :

Resolved, That after the session of 1891–92 a diploma from a reputable medical college shall entitle its holder to enter the second course in dental colleges of this association, but shall not entitle him to an entrance into the senior class.

The following officers were elected :

James Truman, president ; L. D. Carpenter, vice-president ; J. E. Cravens, secretary ; A. W. Harlan, treasurer ; Frank Abbott, J. Taft, and F. S. Gorgas, executive committee.

The following committees were appointed : *Ad interim* committee, Drs. T. W. Brophy, R. B. Winder, and J. A. Follett ; Committee on Schools, Drs. H. A. Smith, J. D. Patterson, J. Lewis Howe, W. H. Morgan, W. H. Eames.

Adjourned to meet at the call of the executive committee.

THE AMERICAN DENTAL ASSOCIATION.

A Monument of Unselfish Work—Disintegrating Forces—Iron-Clad Law—A Scene—The Paper of its Meeting—The Syndicate—"Excelsior"—Faculties and Examiners—"Partial Culture"—Looking Up.

Philadelphia, Sept. 12, 1889.

Editor of the Odontographic Journal:

Dear Sir :—The Dental Conventions have had their Annual reunions, and for a series of months we will digest their proceedings in the journals and then prepare for a similar round of vacation exercises another year.

It requires no argument at this day to prove the value of these conventions. They are absolutely essential to the growth of the individual members, as well as for the advancement of the profession at large. Hence, no one can in justice to himself or to his calling neglect them without a personal and general injury. It is, therefore, of vital importance that they should be kept up to the highest attainable standard and be held subject to the closest criticism. It has seemed to your correspondent that editors of dental journals have been negligent in this respect, possibly through an amiable desire to avoid offence. Conventions of all kinds have their cyclical periods from birth to death, and it is sometimes a question whether this apparent law can be contravened by any effort of individuals.

The last meeting of the American Dental Association, held at Saratoga, led to some serious reflections on the mutability of organizations, and the possibility, near or remote, of this body having

passed its perihelion of usefulness, and tending as the two previous organizations, to decay and final extinction. No one can contemplate the decline and fall of any organization with equanimity, especially one such as this that has received the talent and effort of the best men in this country for more than a generation, and yet remains a monument to their unselfish work. The thoughts that naturally arise in this connection lead me beyond the limits of a letter; but I must be permitted to give my views on the necessity of a change of proceedure to avoid destruction in the near future.

There are two prominent disintegrating forces at work and have been seriously undermining the foundations for a long period. They are briefly:—(1st). The stringency of constitutional enactments and the combined determination of a few "learned in the law," to enforce these to the bitter end; and, (2nd). the annual effort to make this convention a political machine in which the legitimate work of such a body is subordinated to the struggle of rival factions for the control of the presidency.

The first of these is by far the most serious. A certain class of men, in all bodies, assume that without parliamentary law, society in general and their societies in particular would go down in a general wreck. Their whole ambition seems to be concentrated in an effort to make the letter of the law perfect, and to bid defiance to its spirit. This kind of talent does not seem to be commingled or inter-changeable with scientific ability. Your modern Jefferson, Mathias, or Cushing, sits serenely under party discussions silent and unmoved by any scientific scintillations, waiting for the supreme moment when there may be an infraction of the law. This, at times, has its serious as well as its humorous side; but the first concerns us the more. Men do not leave their homes and travel great distances to be regaled with questions of order that may be decided with more or less luminosity after prolonged discussion. They do not care to have some one of the "learned gentlemen" sit down unceremoniously on one desirous of giving his thoughts and experiences, but who may not have fulfilled all the requirements of the law to entitle him to the floor. They desire to have something added to acquired knowledge, and return home refreshed with the social life that surrounds, and should be an essential part of these gatherings. Your "rise to a point of order" man is a thorn in the flesh, a disturber of the peace, an obstruction to all scientific progress, and should be relegated to ward meetings, where his peculiar talent ought to make him a shining light. Law, in scientific bodies, should

be simple and elastic ; but for some years it has been of the iron-clad variety in this association, until now it has become dangerous for one to even ask the privilege of giving his views unless he is sure that he stands correct on the treasurer's books. The disgraceful scene enacted during an evening session, in which one of the fathers of the profession and one whose voice is never heard but with profound respect, was called to order as not being a member in good standing—those who saw this humiliating sight and witnessed this venerated man trembling with agitation at this unlooked for call to order, will, probably, never forget it, and if we could hope that it would be a lesson to the "law and order man," it would be worth all it cost ; but that is not to be expected, for in the face of venerated age insulted in the house of its friends, these men were busy trying to prove that age or service had no rights that an association was bound to respect. Instead of welcoming every word of intellectual light, these blatent defenders of a law would stamp enlightenment to death and with it the prosperity and usefulness of the body. This insidious influence has been at work now for years and its deadly effect is beginning to be apparent in loss of interest, meetings of little value, absence of men who could alone make these occasions worthy of the loss of time, money and strength to attend them.

This condition of things reminds me of an incident illustrative of the point I wish to elucidate. Once upon a time, in the far away, I owned a favorite tree. It was beautiful to look upon. It spread its broad branches to the summer heat and was a rest to the weary eye. I loved to watch it. It was old and I venerated it. In the morning light I would watch the young shoots on the old branches, and it seemed to me it was an ever present inspiration to work. One day my tree was dotted all over with little white flocky spots. I anxiously drew in a branch. The white cotton, in appearance, was more than cotton; it contained the eggs of a parasite, beautiful to behold under my microscope, but, I knew my tree was doomed. It died, and the blasts of heaven blew it away. An entomological friend cultivated the parasite. It was new and he wrote a monograph upon it ; but this new thing found a resting place on my tree and killed it. Now this is to my view the condition of this association. The parasites are there, and it will gradually trend to certain death unless an effort be made to infuse new life into its circulatory system.

The political question at this session was not as annoying as at some previous meetings. The opposition to one of the nominees

was quite marked and seemed to be controlled by local influence. On the first ballot, however, he had the highest number of votes. Both the prominent candidates were good men and were sustained to the last by their friends, and when defeat came they gracefully bowed to the inevitable. It is one of the mysteries of the human mind that men will aspire to the anxieties of this position, and it is also one of the singular things that it should occupy more than a minimum amount of the time of the convention.

Your correspondent was not very much edified by the proceedings in general. The one paper fully worthy of the occasion he was unfortunate enough not to have heard. It was presented by Dr. Talbot, and fully and beautifully illustrated by models and drawings. It was generally considered to be the principal paper of the meeting. Dr. Talbot has spent years on this and analagous work, and he was extremely anxious to have it properly discussed, and seemed disappointed at the paucity of ideas brought out as a result. The way these things are managed nothing better could have been anticipated. The subject is a profound one, and there should have been a synopsis made in advance and furnished to members, and this should be done with all papers when possible. By the adoption of this plan the discussions will be worthy of the name. It is idle to expect a man can do himself or the subject justice with no time for reflection, much less study. Dr. Talbot may feel, however, paid for his effort in the reflection that his work will not be of an ephemeral character, but must remain as an authority on that subject, and a monument to his intelligence and industry.

The syndicate of New York gave us the annual interesting paper. The division of labor was well marked out, and the drawings, as usual, excellent as pictures. This elaborate paper will be forthcoming in the proper journal.

The commission that sits at Washington and conducts the railroad system, must have had a serious and deterring effect on the travel disposed members, for the convention was but slimly attended in comparison to former years. It certainly could not have been the place, for a more healthful and beautiful spot could hardly have been selected. It has, however, this disadvantage that the high price of living at the hotels sends the majority to small boarding houses, thus breaking up all social life. The difficulty in my view is not to be ascribed to high charges anywhere, but a state of mind thoroughly in opposition to the present management of this association. Are we on the eve of the formation of a new convention? I sincerely

hope not. Let us work together to save the old for it has much that is good in it, and if we are true to ourselves and to our profession this can be easily done. Be ye ready, therefore, to go up to "Excelsior" and renew the life forces of the American Dental Association, August 1890.

The "Association of Dental Faculties" as well as the "National Board of Examiners," met at the same time and interfered somewhat with the interest, as they drew many away from the meetings. This can be readily remedied another year by making but two sessions a day for the association, and this, probably, will be done.

The work of these two bodies is of vital importance, and cannot be neglected. That of the Association of Faculties had been looked forward to as possibly the most important meeting of this powerful organization. It was generally understood that the question of adopting three years would come up for decision. The matter was debated for several days and elicited a good deal of feeling, so much so that the final result was held in doubt by the most sanguine. It was with a good deal of anxiety that the final vote was cast, and when it was found that more than two-thirds of the colleges had voted in favor, there was a feeling of relief, for had it been by a bare majority the success of the movement might have been endangered. Now in 1891–92, the dental colleges will present a united front on this subject, and they can look with complacency upon their medical brethern practicing under the two year rule existing in many of the medical schools. Perhaps we may hear less talk of "partial culture" when that time rolls round.

The active and consistent work of the "National Board of Examiners," has made the labors of the "Faculties" less burdensome; indeed, without the co-operation of this body the great reforms already inaugurated would have been impossible.

So are we growing, and in the advancement all true lovers of progress must rejoice. T. J.

OUR DUTIES TO CHILDREN.

BY DR. W. W. SMITH, PENN YAN, N. Y.

[Read before the Seventh District Dental Society.]

The placing of children in our hands makes us trustees of interests far beyond the comprehension of those imposing such trusts, and the feeling that *we* fail often to realize our responsible position is my excuse for presenting this paper.

Surely the pathological and deformed condition of the teeth of adults, due to neglect and maltreatment in childhood, should arouse all sincere members of our profession to a faithful performance of their duties.

I do not hope in the following general treatment of the subject to advance any scientific theories that are not known to all present, but will be satisfied if it awakens new resolves on the part of some who, I assume, treat the subject with too much indifference.

Much credit is due members of the profession who are making such great progress in restoring and replacing diseased and lost dental organs, and who are remunerated with glory and cash ; but can the conscientious dentist do this to the neglect of careful, honest teaching and practice which will in a measure prevent the necessity for so much restoring and replacing? The satisfaction derived from having done our duty should be an incentive. If we care only for the pecuniary benefits derived from our labor, we disgrace the profession, and should seek other employment where the *health*, *comfort*, and *beauty* of human beings are not involved.

Let us bear in mind we can never inspire in others a greater interest in the cause we represent than we have in it curselves; the best we can hope to do is to transfer *our* enthusiasm to them, and instead of saying it is not in our nature to gain and hold the confidence of children, we should be willing to be at the cost of acquiring such ability, remembering that all good work is costly work, and "nothing in life slips by more stealthily than an opportunity."

Our duties to children begin with their prenatal existence, and as opportunity presents, we should be prepared to instruct the prospective mothers, who I believe are often eager for instruction, when their attention is directed to the subject ; impress her with the fact that *its* teeth are then being formed, which makes an extra demand that if not supplied through *her* diet, will result in her teeth becoming decalcified, and those of the child lacking in solidity. We should not be too specific, but do the best we can. Advise with and through her physician. She should be equally careful of her diet during lactation.

While the theory of abstaining from this character of food may have its commendable features, yet I believe such practice will result in irreparable harm to the teeth of both mother and child. I am aware that this is a threadbare subject, but are we doing our duty in this regard ?

The next but not less important period is from the time they are supplied with organs of mastication until they come into our hands direct.

The diet and habits of children. What a subject! "A little learning is a dangerous thing," etc., especially applies here. Let us be cautious and not lose our influence by positive statements in regard to articles of food, etc., that are questionable, but teach the mothers the importance of attention to the child's diet, get her interested, and methods for profitable teaching will suggest themselves. In a general way teach her that systematic habits of feeding, as well as a plain, varied diet consisting of food favorable to the development of tooth structure are important, a few articles of which I will mention. Stale bread from unbolted flour which is not ground too coarse, a portion of bolted flour being admissible if desired, to render more palatable, and that our dogs (for whose health we seem to have more consideration than our children) may have their "canail bread;" oatmeal if of good quality and thoroughly cooked, cornmeal in bread, puddings, etc., fish, a variety of nuts, (taken as part of the regular meal and not as so much extra) soup, from bones well broken and boiled for several hours (four at least), and a liberal quantity of milk from well fed and healthy cows. These and other articles which might be mentioned will form a sufficient variety if prepared properly. We should insist that a large portion of the food be served dry to give the teeth exercise and promote insalivation. I catechise children very closely and find that most of them eat their food soft. Very much of the so-called indigestible and unassimilating food can be used with impunity if taken moderately and masticated thoroughly. I cannot find language to properly condemn the prevailing and excessive use of pastries and confectionary indulged in by so many, not only at meal time, but semi-occasionally from morning till night; the wonder is they have any teeth at all.

I can best illustrate my ideas by presenting personal experience, and take the liberty of doing so. A Scotchman aged about twenty-one came to me four years ago, after having been in this country about two years, with two approximal cavities which I filled; the following year I filled four, and a little later six cavities, the teeth becoming soft and he discouraged. By close questioning the following facts were brought out. In Scotland, he—being of the poorer class—subsisted entirely on oat cakes and milk, the cakes being baked a long time before the fire, rendering them dry and hard. They had a certain allowance each day, and ate nothing with

it—not even butter. (What a blessing such poverty.) Never heard of artificial in his part of the country. His diet in this country has been such as four-fifths of our people subsist on, *slops*. His occupation is that of vineyardist.

Twelve years ago a girl of fifteen come to me for advice; her teeth were badly decayed and soft in structure. I told her their loss would be a serious one, and advised the saving of them, if she would consent to take proper care of them, observe hygienic laws and have them examined at least twice a year, which advice and instruction she accepted, and resulted in the saving of her teeth. On her semi-annual visit one year ago I found them in good condition ; had not required much attention since the first very extended treatment and filling, but, on her next visit, six months ago, the depraved condition in which I found them led me to inquire its cause. "Well," she said, "I think I can tell you. I have been in a confectionary store several months and have been almost unconsciously *nibbling*." Which habit she promised me to overcome. Have not seen her since.

The next case I shall present is that of a teacher (which suggests another avenue through which we can educate the children). My general treatment of a case of pulpitis suggested to her the fact that her teeth were as much a part of herself as were her fingers, and were nourished by her blood through the circulation. I found her eager for instruction which was imparted as best I could, and resulted in the perceptible hardening of her teeth, and she afterward told me she had induced most of her pupils who brought their dinners (she taught a county school) to reverse their former custom, and throw away the "pie and cake" and eat the the "bread and butter," thus giving them a lesson in dentistry which was of great benefit.

While operating for one of our teachers I took the opportunity of enforcing upon her mind the importance of caring for the teeth, and smiled when three weeks later two little girls (her pupils) came to me to have their teeth cleaned, saying their teacher had been talking to them about it, and that they would thereafter take proper care of them.

When children are brought to us what is our first duty? I answer, gain their confidence, which in most cases is lacking, often because of the stories of others about their experience in our hands, and because of the too prevailing custom of deceiving them, in many cases by the mothers themselves. We should be gentle, be *honest*,

be *reasonable*, and in nine-tenths of the cases we can control them. We do a child a lasting wrong if, by our treatment, we cause them to dread the dentist and his office, and lose interest in caring for their teeth. I say treat them as rational beings. Do you say this is sentiment? Consult your older patients, listen to the bewailings of some and the expressions of gratitude and satisfaction of others because of the treatment they received when experiencing their first dental operations. If by our tact and kind treatment we win their confidence, let us not by lack of *thoroughness* in our operations cause them to lose that confidence. I repeat, they are rational beings.

The scope of this paper forbids a treatise on the several subjects connected with the treatment of children's teeth, but I cannot refrain from doing so in part.

We should teach them that each individual tooth has its peculiar mission and should be preserved.

We should not extract any because asked to do so, but because after having thought seriously of the possible consequences *we* find it advisable.

Do not extract the inferior central incisors because the permanent ones erupt at their lingual aspect unless there is room for them in the arch without taking a diagonal position, but leave them till the jaw develops, and in most cases they will loosen and the child be spared a surgical operation.

Never extract a second temporary molar without considering that it will permit the first permanent molar to incline forward and thus prevent the second bicuspid from taking its proper position in the arch.

Let the extraction of the six year molar be a last resort, and consider that in doing it you remove nature's prop intended to give support to the jaws during the shedding of the temporary teeth and until the articulation of the permanent ones has been accomplished

Never yield to the temptation of crowning a child's tooth that has been fractured (I refer of course to the permanent teeth), but if possible preserve its pulp that its development may not be interfered with. I consider this very important. Still another important duty is to teach children to properly care for their teeth. I find by careful inquiry that very few of them are provided with *suitable* brushes, nor do they have any idea of using them as they should. We should first direct them to procure one. I favor the "prophylactic"—and inform them where such may be obtained, then, with a mirror show

the neglected points and how they may be reached with the brush and floss silk—tell them they can do more to preserve their teeth than we, and that our efforts will be in vain unless aided by their co-operation. Teach them to have stated times for cleaning them, one of which should be at night—giving your reasons for it, and not allow trifles to interfere with its performance, and that it should be considered of as much importance as any part of the toilet, and, as we see them from time to time commend or reprove them as the case may require.

Now, are we remunerated for all this? Perhaps not, as we should be, but we gain the confidence of those we serve and elevate the profession, which I trust we all love, and in a measure counteract the influence of those who care *only* for the money they receive for their services, and thus degrade it.

Let us remember that,

> "Small however, the true endeavor,
> Great may its outcome be."

AN OPEN LETTER.

Picked up on the steamer "Vide" "going down the Bay," and said to have been dropped by one of the trade syndicate, a traveler from Kansaw. (See current *Dental Advertiser*):

REVERED SIR:—Please do not leave open any space for me in your columns, as I don't see how I could possibly furnish any copy very soon. I do not, these days, have time to think who I am (tho' I doubt if the most abundant leisure would afford answer to that conundrum.) I am doing extra work at the office, and a relative of our maid of all work having been so inconsiderate as to die at this juncture, I have been sufficiently weak-minded to allow the latter to go home, so that, for some days past, present and future,

> "I'm the cook, and the captain's mate,"
> "And the crew of the Nancy Jane."

Good time to invite my *enemies* to dine——?

Lastest and bestest of reasons, an acknowledgement which I hate to make, and therefore write it in a whisper: "I can't—begin—to do—anything good enough—for the *Blankety-Blank*." Not that I have ever had the pleasure of seeing it, but I have been making a tolerably observant, though not very consecutive study of its editor.

Now, addressing you in your other professional capacity, let me remind you of a few particulars which I fear you might not otherwise include in your bill—following the idea you furnished the other day :

To time lost in waiting	$100.00
" explaining apparatus	10.00
" general information imparted	5.00
" furnishing interesting psychological study	5.00
" hunting for nerve	5.00
" finding nerve	10 00
" auricular damage sustained from a war whoop which "split the ears of the groundlings"	25.00
" not discussing the tariff	2.00
" furnishing moral support during operations	
" item, encouraging smiles	10.00
" reassuring smiles	10.00
" agreeable expressions	10.00
" entertaining anecdotes	10.00
" refraining from expression of real feelings	20.00

I hope you will accept note for part payment.

Don't you think this continued pluviosity is likely to develop webbed feet in the human species? For my part, I should prefer them to so much caoutchouc.

Assuring you that it pains me much to seem disobliging, I am

Regretfully, but can't-help-it-ly, yours,

"She."

ALBUMEN AND BICHLORIDE OF MERCURY.

The relation of albumen to antiseptic work is of very considerable importance for the reason that its presence contra-indicates one of the most powerful of the antiseptics in use—bichloride of mercury. It has long been known that albumen is an antidote for bichloride of mercury. Yet, on account of its great potency in the absence of albumen, the drug has grown into very extended use in the utmost disregard of the antagonism of the two substances. Experimental tests indicating this have been published by several experimenters, but seem to have been heeded by very few medical men. In order to estimate the degree of antagonism that exists between these two substances, and to see if this applied to other drugs as well, I began a series of comparative experiments, but have not found the time to carry them through with any considerable number of medicaments

I have, however, made fairly thorough work with bichloride of mercury, the results of which are given in the tables. My first experiments (not given in the tables) were in reference to the decomposition of the solution of the bichloride when exposed continuously to light. These experiments showed conclusively that for a period of two months, the addition of five per cent of hydrochloric acid to the solution of 1-500 of the bichloride, protected it perfectly ; so that its range of antiseptic value was the same at the end of that time as at the beginning. The plan of experimentation was to mix the solution and set it in the full light of day (not in the sun). This solution was tested for its limit of antiseptic value in a certain broth infected with saliva. Other tubes of the same broth were kept for that purpose, and two tests made each week for the period of two months, without showing any diminution of power. The same solution, without the addition of the acid, lost power very rapidly.

The experiments for testing the influence of albumen were first made with two solutions. Each contained one of the bichloride of mercury to 500 of water. To the one five per cent of hydrochloric acid was added, to the other ten per cent of chloride of sodium. The chloride of sodium was added through the suggestion that it would prevent the precipitation of the albumen by the bichloride, which, indeed, seems to be correct. I found that the addition of this solution to broth containing five per cent of albumen, caused no clouding of the liquid, while the addition of the other in even very minute quantities, rendered it milky and if much were added, the albumen was thrown down.

The tests made with these solutions when compared with the power of the bichloride in the absence of albumen, show plainly that the two substances are antagonistic ; and that the addition of chloride of sodium is of no substantial advantage, notwithstanding the fact that the albumen is not precipitated.

I then made other solutions more carefully, in that a solution of 1 to 500 of the bichloride was divided into three parts in order to be sure that the three were exactly alike, and I give the results with these in the tables. The first was left plain. The second received five per cent of hydro-chloric acid, and the third received ten per cent chloride of sodium.

These solutions were then tried, using for the purpose a new broth, and gave a slightly higher range of value, either from a difference in the broth or in the solutions, it is difficult to tell which. These experiments show a great reduction of the range of value of the bichloride

in the presence of albumen ; and, when we consider that in many of the positions in which the antiseptic is used, there is present from eight to ten per cent of albumen, we can not expect much good from it in a dilution that could safely be placed in contact with the tissues. There is, however, a range of restraint, shown by the frequent asterisks in the table, which may account for some benefit in the use of the drug even though it does not fully inhibit growth. It will be noticed that the results with the plain solution are the poorest and the results of the hydrochloric acid solution are much the best. I take it that this effect represents the antiseptic value of the hydrochloric acid rather than any beneficial effects of this agent on the action of the bichloride of mercury.—Black, G. V., *Dental Review.*

ANÆSTHETICS IN DENTAL OPERATIONS—ETHER, CHLOROFORM, MIXTURES, NITROUS OXIDE.

THE USE OF SULPHURIC ETHER AS AN ANÆSTHETIC IN DENTAL OPERATIONS.

He said that at an early period of life he was appointed Junior Medical Officer to a large Metropolitan hospital, and it was part of his duty to anæsthetise all the patients about to undergo operations, and for twelve years he was constantly chloroforming patients. During that period he suffered terrible anxieties, so much so, that he even still looked back upon it with horror. Happily he never had a death, but he knew that he escaped fatal results by a very narrow margin on at least three occasions. Impressed with the great responsibility of his position, he longed to discover some means of inducing anæsthesia with greater safety, to find a drug which would not necessitate unceasing anxious watching of the pulse. In 1871 he had the good fortune to see the late Dr. John Morgan, of Dublin, using ether in the Lock Hospital, and he felt at once that he had seen what he had so longed for. Since then (just eighteen years) he had used ether almost without exception in the numerous cases which required an anæsthetic, and had never observed a symptom to cause him grave uneasiness. Dental operations were most easily performed in the erect or semi-erect posture, the very position in which chloroform seemed most apt to induce cardiac failure. So far as his experience went the invariable effect of ether was to improve the heart's impulse and the circulation generally. Moreover, the vapour of ether undiluted was practically safe with ordinary

attention, while chloroform vapour was most dangerous if exceeding four per cent. in strength. He took it for granted that in short dental operations, such as the extraction of one or two teeth, the most suitable anæsthetic was nitrous oxide. On the other hand, he was strongly of opinion that in prolonged operations, such as the clearing away of a number of teeth or stumps, the inhalation of ether was both safe, satisfactory, and perfectly convenient. The mode of proceeding which experience had led him to adopt was as follows: First, he arranged that the patient should not have taken food, even liquid, for at least four hours previous to the inhalation. This was a most important condition in order to avoid nausea and vomiting. Next, he saw that the dress was so loosened and arranged that no restraint whatever was exercised upon respiration. Then, having placed the patient in position, he stethescoped the heart and proceeded to give the ether. There were very few, if any, conditions of the heart, short of a state of depression indicating impending death, which would prevent him from proceeding with etherization. For administering the ether he always used Allis's inhaler, which was of the simplest possible construction, allowing of the exhibition of ether vapour, either with the admixture of air or nearly pure. The inhaler consisted of numerous folds of a cotton fabric, held close together by a metal framework, the whole being enclosed in an india-rubber case open at both ends. The ether was poured on the cotton fabric, and the outer case being of a shape to fit accurately over the nose and mouth, the patient was made to breathe a vapour of mixed ether and air. The latter could be diminished in quantity by closing the india-rubber over the free end of the inhaler. He commenced with one ounce of ether on the inhaler, and rarely had to exceed four ounces in any case for a dental operation. If the patient was an adult and not nervous, he always commenced with ether alone, invariably using pure ether, sp. gr. 730, and never the methylated kind. It was less irritant, more effective, and caused much less headache and subsequent disturbance. Occasionally some patients found it a little difficult to bear the ether vapour at once, as it irritated the larynx, and induced cough and a feeling of suffocation, therefore the inhaler must be cautiously brought over the mouth and the patient encouraged to bear it. If he did so, a very short inhalation sufficed to dull the sensibility of the larynx, the head was felt to throb, the face to flush, some vertigo was experienced, the respiration became rapid, and then drowsiness came on. From this moment the ether was borne without inconvenience, and might be pressed. This was readily done by pouring fresh ether on the cotton fabric, and

by closing over the india-rubber covering of the inhaler so as to lessen the quantity of atmospheric air. In certain cases, especially with children and nervous subjects, it was not possible to get over this stage without the use of a few inhalations of bichloride of methylene, or the administration of nitrous oxide. This initial stage of etherization was the one which required the most skill and tact on the part of administrator. When once that was passed all the rest was easy. The ether might then be pushed until the stage of "struggling" ensued. A gentle but strong assistant easily kept the patient in position, and the ether being persevered with, complete insensibility came on, indicated by some stertor and absence of reflex sensibility of the cornea. When this point was reached the inhaler might be removed, and the mouth opened with the gag forceps, and the operator might go to work for from three to five minutes with the conviction that the patient felt nothing, even though he groaned and resisted somewhat. If during the operation the patient seemed to become partly conscious, he wiped the mouth clear of blood and saliva, and re-applied the inhaler. The operation being completed, the mouth should be cleansed out with a sponge, the face bathed with cold water, and very soon the patient would wake, feeling somewhat stupefied, and with more or less of headache. The latter was seldom troublesome if pure ether was used and the inhaler such as he had recommended, and not one of many varieties in which the vapour inhaled was a mixture of ether and the patient's own exhalations breathed over and over again. It was sometimes objected to ether that it was slower in administration than chloroform, and also in recovery. This was but a small disadvantage considering its greater safety as proved by statistics, but he was not at all sure that if properly handled, it required more time than its more dangerous rival. He lately took ether himself to avoid the pain of the extraction of a very bad tooth, and he was able to write a letter and see a patient within half an hour of the moment when he sat down to undergo the operation. He could not say that the after effects were considerably more disagreeable than those he experienced from the use of nitrous oxide on a previous occasion. Many times he had entered the dentist's house with patients, and left it with them, all completed, within half an hour. As to the slowness of recovering, if it occurred, it caused little inconvenience, as most dentists had a room set apart for patients who required anæsthetics. A more tangible objection to ether was the nausea and vomiting it was liable to cause, but this complication might be avoided in nearly all cases ;

first, by arranging that no food should have been taken for at least four hours previously ; secondly, by using pure ether, and giving it as quickly as seemed safe ; thirdly, by carefully cleansing the mouth during the operation, which could be done with a small sponge, held in a suitable forceps, so as to prevent the patient swallowing the abundant mucous secretion caused by the ether, and blood caused by the operation. If either the mucous or the blood reached the stomach, it would certainly act as an emetic. It would be asked, what signs should the etherist watch in order to avoid danger to life. Firstly, he always watched the heart, and could aver that he had never yet seen it fail under ether ; on the contrary, its action seemed invariably to improve. Herein lay its incaluable advantage over chloroform, which, however carefully administered, would sometimes cause sudden, unforeseen and irremediable syncope. Secondly, the respiration should be carefully watched. If any danger existed in etherisation it was here. Occasionally the mouth became fixedly closed, and inspiration was impeded. All that was needed was to open the mouth with the gag forceps and draw forward the tongue. A greater risk arose in those cases where, about the stage of struggling, the chest wall seemed to grow fixed, and lividity of the face ensued, but he had always found that the removal of the inhaler for a short time, with cold sponging of the face, sufficed to bring all right. Were it otherwise he would at once adopt artificial respiration, but he had never yet been obliged to do so. Thirdly, if vomiting occurred while the patient was stupefied with the ether, it was necessary to turn him promptly on his side and see that the vomited matters had free exit and did not fall back into the larynx and trachea. If they did, tracheotomy might possibly be required, but he had never seen such a case. Finally, it might be asked, "Are there ony cases in which the use of ether is contradicted?" There were some, but they were very few and far between. In cases of operations done by artificial light, its inflammable nature rendered ether unsuitable. In patients with bronchitis, emphysema, advanced Bright's disease, degenerated arteries, the risk of etherisation was increased. However, in these cases a severe dental operation was to be avoided altogether, and it seemed doubtful whether any other anæsthetic would be practically safer.—CRUISE, F. R.

CHLOROFORM.

Dentists, he said, knew full well that there were many cases which required operative interference, the pain attendant upon which was

almost beyond average healthy human endurance, and which if inflicted upon a body already weakened by suffering, physical and mental, would undoubtedly produce an amount of prostration which might terminate in death, or the recovery from which would be slow and probably imperfect. Under such circumstances, it was incumbent upon dentists to accept the responsibilities which followed the practice of the profession, and in using an anæsthetic to use that which gave the greatest good to the greatest number. He would place them in this order :—(1) Chloroform, (2) Nitrous Oxide, (3) Ether. In the administration of chloroform, in view of the now pretty well ascertained sources of danger, and their antidotes, the risk was but small, and the attendant good more than amply justified the administration. It was curious to note that the authorities of to-day had but emphasized and systematized the methods and rules advocated by Sir J. Y. Simpson and his fellow practitioners, namely, that the drug should be pure, the stomach free from undigested food, the patient recumbent, and all obstructions to free breathing removed. No complicated apparatus should be used in the administration. A folded towel or a piece of flannel stretched over a convex wire frame was all that was required. It induced no alarm on the part of the patient, and permitted the operator to feel the breathing and watch any change of the normal appearance of the face which might presage approaching danger. The time for operating was when the patient was said to be "under." This was indicated by the suspension of all reflex action except those of respiration and circulation, and could be best ascertained by the condition of conjectiva. Any operation before this condition was reached was fraught with danger at any time, and more so when the fifth nerve was involved. It was sometimes the cause of death, and under such circumstances the result could not justly be attributed to the drug. The dangers and troubles attending chloroform administration were respiratory and cardiac. The arrest of respiration when sudden might be due to the falling back of the tongue or to the pressure of foreign bodies. The possibilities of such occurrences should be narrowed by removing artificial teeth, etc., from the mouth, and tilting the head well back, though not to the same extent as recommended by Howard before beginning the inhalation. In the case of sickness the patient should be turned completely on his side, and when vomiting ceased the mouth should be sponged. If the stomach was empty and the patient only retched, the administration of chloroform should be pushed, and so the reflex action abolished. The heart complications were those associated with and

those secondary to difficulty of breathing when the right side of the heart became distended, and congestion resulted. The restoration of respiratory action usually removed this dangerous complication ; but in especially anxious cases, the external jugular vein might be opened, or, as a last resort, the right ventricle might be punctured, blood withdrawn, and the endocardium at the same time stimulated. Should the action of the heart become depressed, as indicated by extreme pallor, and weak and intermittent pulse, a hypodermic injection of ether might be given, or it might be administered on the towel. Chloroform was contra-indicated only in those suffering from weak and intermittent heart. The best antidote to all chloroform complications was fresh air. The advantages attending the use of chloroform in preference to other anæsthetics, were extreme simplicity of administration, and agreeableness in its inhalation. It did not irritate the fauces, nor induce an extra flow of saliva, the latter being a distinct disadvantage in the use of ether for operations in dentistry. It induced a profound narcosis, which, when attained, endured sufficiently long to permit of a very painful and prolonged operation being performed. The usual precaution being taken with regard to food, it was very rarely attended with sickness. It afforded a pleasant and rapid recovery, and was more free than ether from subsequent inconvenience or complications. The one thing above all others to avoid prior to or during the administration of chloroform was shock or fear. In an address by Surgeon-Major E. Lawrie, Principal of the Hyderabad Medical School, the results were given of 200 experiments on animals and personal observation of the effects of chloroform on between 40,000 and 50,000 human beings. The conclusion arrived at by the Commission was clearly stated in a letter to the *Lancet* of May 11th, 1889, in answer to an article in that journal controverting the finding of the Commission, and upholding the theory taught by the English school. Surgeon-Major Lawrie said : "The *Lancet* would trust to the heart and circulation for signals of danger in chloroform administration. Our contention is that if the administration is ever pushed far enough to cause the heart to show signs of danger, the limits of safety had already been exceeded, and a fatal result must inevitably ensue. So far from disregarding the heart as a factor in chloroform dangers, we say that any affection of the heart, either direct or indirect, is the one danger to avoid. But we say further, that the respiration invariably gives warnings when a dangerous point is approached, and consequently that it is possible to avert all risk to the heart by devoting the entire

attention to the respiration during chloroform administration." No agent had been so well abused, so miserably used, so misunderstood, and hitherto so carelessly handled, and this being so, it was no wonder that so many untoward results had followed in its wake. There still remained the one great broad fact that an equally good and more reliable anæsthetic had been sought aud not found. Many had been introduced and their advent proclaimed with jubilation. All had had their prognosticated powers and merits curtailed as experience proved their limitation. Each new general or local anæsthetic had been hailed as the champion which was to unseat chloroform from its throne, yet amid all the din of opposition it had not only held its own, but had gradually and steadily maintained its supremacy, and it remained to this day the one anæsthetic which best met the varied requirements of serious, delicate, intricate, or very painful operations; and which, notwithstanding the many charges, mostly unjust or exaggerated, which had been laid at its door, still remained supreme, the one most used by surgeons, the one most appreciated by the patient. As evidence of its increasing use he would mention that having occasion lately to be in the laboratory of Messrs. Duncan, Flockhart & Co., he inspected their new distilling apparatus devised and arranged by Dr. Clarke of that firm, an apparatus which with mathematical precision ensured the absolute purity of the drug, and he was then informed that for every one hundred pounds of chloroform made by them in 1881 they now turned out 175 lbs. That was a broad incontrovertible fact from which more reliable deductions could be made than from statistical tables which gave relative percentages, and which could at best be only drawn from varying and incomplete records.—Macleod, Bowman.

Certain Anæsthetic Mixtures with Special Reference to those in Use in Dental Surgery.

He said the mixtures to which he would confine his attention were nitrous oxide and ether, and nitrous oxide and oxygen. They were indebted to the late Mr. Clover for the first valuable combination of anæsthetics. Either nitrous oxide might be used in the ordinary manner, narcosis being fully established, and then a small quantity of ether added; or nitrous oxide might be used as a preliminary to deep etherization. Those were two distinct ways in which the anæsthetics might be combined. Some time ago at the Dental Hospital he conducted an investigation with nitrous oxide with what

might be called a whiff of ether in accordance with Mr. Bailey's suggestion, and was surprised to find how very little nausea and vomiting occurred after a small quantity of ether. The anæsthesia from nitrous oxide was prolonged some ten or fifteen minutes, and the patient recovered very completely indeed. The administration of nitrous oxide as a preliminary to etherization was often a matter of some difficulty. Nitrous oxide was a gas which could not part with any free oxygen ; it could only be given to a certain extent, and if it was given with a face-piece possessing expiratory valves so that all expirations escaped, a time came when the patient was seized with certain symptoms which were in reality due to the deprivation of oxygen. If at that particular moment ether were given without the admission of any air, respiration could not and would not proceed. Hence the difficulty in giving nitrous oxide as a preliminary to deep etherization resolved itself simply into knowing exactly how much air to admit between the gas and the ether. There were various forms and apparatus for giving nitrous oxide and ether, but without referring further to them he would mention what he regarded as the principles upon which the two anæsthetics should be combined. In the first place, nitrous oxide should be given so that expirations escaped from the expiratory valve ; in the second place, ether should be gradually admitted, and on the word "gradual" he would lay great stress. In the third place, to-and-fro respiration should be promoted. In the fourth place, a small quantity of air should be admitted when the patient showed any sign of embarrassment of breathing, which usually occurred at the close of the administration of nitrous oxide by itself. When any of these symptoms occurred a small quantity of air must be admitted, in order to maintain respiration. In the last place, ether must be increasingly administered. In that way it was possible to pass from nitrous oxide narcosis to deep etherization. With regard to the adimnistration of nitrous oxide and oxygen, that had not been practiced to any great extent in this country, but from what he had seen of the anæsthesia which might be obtained by the admixture of those gases he believed the time would come when nitrous oxide and oxygen would be very widely used in dental practice. Among the disadvantages of nitrous oxide was its power of setting up symptoms due to the deprivation of air. If it were given with a certain proportion of air anæsthesia would not become fully established, and the more air there was mixed with the gas the less profound would be the anæsthesia and the less marked the asphyxial symptoms. It had been argued that it was

necessary that patients should have 100 per cent. of nitrous oxide in the lungs in order that the particular blood tension of the nitrous oxide should be established to produce anæsthesia, and that supposing the atmospheric pressure in which the patient existed to be double, it should be possible by giving equal quantities of air and nitrous oxide to maintain the anæsthetic effect of gas, and to exclude all asphxial symptoms by reason of the air that the patient was breathing. Experiments made upon lower animals showed that the theory was perfectly correct, and the more perfect form of anæsthesia resulted. Attempts were then made to give nitrous oxide and oxygen together at what some termed ordinary atmospheric pressure, but when employing the face-piece and bag it was very difficult to say that the gas was being given at an ordinary atmospheric pressure. It was therefore well to use the term introthoracic pressure. At the present time in Germany and America nitrous oxide and oxygen were given together very largely by means of a gasometer, but the results seemed unsatisfactory. Dr. Hewitt then exhibited and explained a portable gasometer which he had made. It contained about twelve gallons. After a very great number of cases he found that the best percentage of oxygen was about one-eighth. In comparing nitrous oxide anæsthesia with that obtainable by the mixed gases a very remarkable contrast appeared. With nitrous oxide and oxygen there was an entire absence of lividity, the colour of the patient's lips and cheeks remained perfectly good, and in fact often heightened rather than diminished. There was no stertor, no irregularity in breathing, no embarrassment of respiration, in fact the respiration was so real and calm as to be almost imperceptible. The pulse was full, soft, and regular, and there was no jactitation. As a general rule, when about twelve gallons had been inhaled, the patient was quite flaccid. The usual signs of nitrous oxide narcosis were entirely absent. If the face-piece were then removed an anæsthesia of a somewhat longer duration than that obtainable from nitrous oxide resulted. He had administered it in 250 cases, but thousands of cases should be known before any tables were drawn up. He had taken the mixture twice himself, and could testify to the rapidity with which consciousness was lost, and to the absolute loss of all painful impressions. One of the gentlemen who helped him counted aloud so that he might be heard, and at every ten another gentleman pricked him with a long sharp needle. He remembered the pricking when ten and twenty were counted, but from that time up to seventy, when he came round, he had absolutely no consciousness either of

pain or of surrounding objects. There was conclusive evidence to show that nitrous oxide was a true anæsthetic and that the symptoms referable to the deprivation of oxygen were purely accidental. He could not himself see that there was the slightest danger in continuously breathing this mixture. Patients could go on respiring it almost *ad infinitum*, because of the oxygen it contained. If a patient should be found who did not take the mixture well it was very easy indeed by a simple arrangement to give pure nitrous oxide.—HEWITT, FREDERICK.

ON RECENT RESEARCHES UPON NITROUS OXIDE NARCOSIS AND THEIR BEARING UPON THE PRACTICAL QUESTION, WHEN AND HOW SHOULD LAUGHING GAS BE ADMINISTERED?

He said the questions which practical men asked themselves in considering the value of an anæsthetic were: (1) Is it efficient? (2) Does its use entail danger to the patient? Among medical men there was still a curious dread of nitrous oxide, and time after time he had been told that Dr. So and So considered Miss Blank "not strong enough to take gas." This arose from the fact that the average medical mind regarded nitrous oxide narcosis as a modified form of asphyxia, and was prone to communicate this idea to the patient, who very properly translated "asphyxia" as being smothered or choked. But nitrous oxide was no asphyxiant. It possessed a specific action upon the organism which differed widely from that which obtained when a different gas was respired while oxygen was withheld. By actual experiment it was found that nitrous oxide produced gross changes in the organism. Thus if the skull of an animal were trephined and a sufficiently large window were made in the bone to expose an area of an inch or so across, the pulsation of the brain beneath the dura matter could be watched, and the colour of the membrane observed. Under ordinary circumstances there existed after trephining a very distinct space between the bony calvarium and the dura matter, and rhythmic pulsations occurred, bearing a direct relation to the systole or general arterial dilation. As soon as nitrous oxide was administered the brain began to swell up, and although preserving its normal colour for a time, the hemispheres assumed a most remarkable appearance. Simulating a hernia cerebri, they protruded into the trephine hole. The colour of the brain now changed from a bright vermilion to a laky purple, the undulations changed in character, becoming less in frequency and amplitude, the volume increased, and at length movements

ceased. The dura matter then was pearly and glistening with a bluish lustre, and upon examination of the vessels of the pia matter, the well-known appearance of commencing stasis was seen. Upon resumption of air and a shutting off of nitrous oxide, these phenomena were repeated in a reverse order. Experiments had also been made on the spinal cord. Several laminæ were removed, and the spinal cord exposed, in some cases the theca being incised, in others left in its entirety. Nitrous oxide was then administered and the following phenomena were observed. The pinal cord underwent an increase in size, which was pretty clearly evidenced by the overflow of cerebro-spinal fluid. The difference anatomically between the brain and cord made the former an easier organ upon which to study the changes in the vascular membranes, but no more striking proof of the enlargement of the whole cord could be obtained than that afforded by the overflow of cerebro-spinal fluid, which took place as soon as the animal was brought under the influence of the nitrous oxide. It appeared necessary to grapple with two questions, viz. :—(1) Are these phenomena really due to nitrous oxide, or (2), are they due to deoxygenation of the tissues? To deal with the second question, certain apnœal experiments were made. In one series, the trachea was tied, while in the other a curarised animal was, after a time, left without artificially performed respiration, this being done to avoid the struggles which by their very violence produced a rise in blood pressure, and so gave an illusory resemblance between the states of apnœa and nitrous oxide narcosis. The conclusions he arrived at were that apnœa produced changes far more slowly than those occurring in nitrous oxide narcosis; that the brain and cord, although when much muscular struggling was permitted, undergoing some engorgement, and becoming purple and almost black, did not swell up, but actually lessened in volume in apnœa. The lessening in volume, provided the apnœa had not been carried too far, might be checked, and even changed to a state of enlargement if nitrous oxide were administered. Experiments showed that besides causing anatomical alteration in the spinal column and encephalic centres, nitrous oxide produced physiological phenomena —a loss of certain reflexes, such as skin, conjunctival, persistence of the patella, sometimes its exaltation, development of ankle clonus, the occasional development of clonic and tonic contractions, opisthotonos, emprosthotonos, and occasional transient pareses and hemipareses; all symptoms of extreme significance and interest. About the cardiac and vasomotorial systems there were very important facts

to be considered. Regarding nitrous oxide as an asphyxiant, it had been customary to caution persons with weak hearts against its use, and indeed were it a member of that class it would be most detrimental in nearly every form of heart and pulmonary disease. There were several ways of observing the heart's action,—placing one hand upon the chest, removing the chest wall and watching the viscus in its pericardium, taking cardiographic tracings, and the less satisfactory method of recording the pulse at the wrist or elsewhere, either by the use of a sphygmograph or simply trusting to the finger, and these, if carefully carried out, showed that the heart was but little affected by nitrous oxide. If an animal were made to inhale until the respirations grew slower and slower, and finally ceased, the heart would be found to beat steadily on in marked contrast to its laboured, tumultuous action during the conditions of apnœa. In the sphygmograms the normal pulse tracing consisted of the initial rise as the tidal wave distended the artery, and the gradual descent as the tidal wave passed onwards, which descent was marked by secondary waves, partly those due to oscillation and partly due to reflux of blood driven back by the obstruction caused by the capillaries. There appeared to be a lessened tension evidencing a lessened tidal wave, this lessened tension being shown by the greater acuteness of the initial curve, the dicrotic wave being placed lower down the curve, and the dicrotism increased, while to the finger the lift was perceptibly diminished. These results were at variance with much that had been published elsewhere. The rhythm of the heart, at first accelerated, usually returned to its normal rate during narcosis, or dropped a few beats. The blood pressure under nitrous oxide must next be considered. For the first period but little change occurred. Later on, there was a gradual fall in blood pressure, a fall which, although occurring throughout the whole body, was most marked in the splanchnic areas. Upon the animal's breathing air again a short gradual recovery of blood pressure took place. Control experiments made upon curarised animals showed that when they were rendered apnœic blood pressure at once rose and became extremely high, while the heart's beats became weaker and weaker *pari passu* with increased blood pressure. Upon respiration nitrous oxide acted as follows: the respiration grew slower, and at first fuller; as narcosis progressed they became still more retarded but less full, and at length they ceased. At this point the heart still beat, and if a gentle pressure were made upon the thoracic parietes respirations were resumed, and, provided access of air were allowed,

continued, and consciousness was regained. This was wholly different from the wild convulsions incident upon a correspondent period of apnœa, and strongly suggested that the cessation of respiration under nitrous oxide was due to a sedative action exerted upon the medullary centres. Having thus reviewed the subject of the action of nitrous oxide, he would point out the practical deductions they were justified in drawing from it. How far was nitrous oxide contra-indicted in organic heart disease? Broadly, the matter might be considered under two heads :—(1) When the heart muscle was diseased. (2) When the valves were diseased. With the overgrowth of muscle there was usually some thinning of the walls of the heart. A person having such a heart took nitrous oxide, and as a result his heart beats were but slightly accelerated, the blood tension was slightly lowered, while the medullary centres were subjected to the influence of a sedative. If, however, as Dr. George Johnson erroneously asserted, nitrous oxide acted as an asphyxiant, there would be an engorgement of the pulmonary vessels, and as a consequence a waterlogged heart, and the patient would be in urgent danger. Even in cases of fatty degeneration there was no reason why syncope should be determined by nitrous oxide. His own experience was that cases of syncope were not usually associated with old fatty hearts, but occurred in persons in whom anæmia was present, and in those whose nervous system was more or less enfeebled. Syncope was a frequent and dangerous symptom of advanced valvular trouble, and upon the frequency or infrequency of these attacks he should decide whether or not to administer gas. The group of cases falling under the heading of functional heart disease were far more dangerous. Persons suffering in this way would take large quantities of sedatives without much effect : they were timorous, peculiarly liable to fear reflexes, and nitrous oxide had but a transitory effect on the cerebro-spinal axis. Another reason why nitrous oxide was often so unsatisfactory in these cases was that there was commonly a lack of due oxygenation of the tissues, and so when the full dose of nitrous oxide gas was administered there was a concurrent impoverishment of oxygen, which induced an amount of apnœa such as should be absent when gas was properly given. In cases of displacement of the heart by pericardial adhesions or pleuritic effusions, nitrous oxide gas from the friction of the thorax which the tonic spasm of the muscles might bring about, would be contra-indicated, and it would be wise while commencing with nitrous oxide to continue with ether. He had never found nitrous oxide when pure

act as an irritant. He could find no record showing that any organic or functional lesions of the cerebral hemispheres or spinal cord interfered with the administration of nitrous oxide. That a small minority of persons suffered from severe headache after gas he could well believe, although he was apt to accept the accounts of such cases with a grain of salt. The one lesson of all others to be learned was to administer nitrous oxide pure and simple, all his previous remarks had referred to nitrous oxide narcosis, and not to the mixed narcosis of the agent and suffocation. Chloroform, whatever its merits, could not be used as freely as gas, nor could precautions as to posture, after effects, &c., be neglected as they could be in giving nitrous oxide. Ether, from its offensive flavour, its after effects and its too violent action upon the blood pressure, could not be taken in the hundred and one cases in which nitrous oxide proved itself a friend. He was told that one drawback of gas was the briefness of the anæsthesia it ensured, but he was not at all sure whether it was not one of its main merits, as it prevented laceration of the fifth pair of nerves, which in very many cases was not free from danger. —Buxton, D. W., *Dental Record.*

UNION MEETING AT ELMIRA—THE 5TH, 6TH, 7TH AND 8TH, IN JOINT SESSION.

This year the Sixth Society plays the part of host, and for the fourth time these societies unite their forces for the common good. Except perhaps the annual meeting of the First society, and that of the State at Albany, these are the most interesting and profitable held in this commonwealth. Society men throughout Western and Central New York are always on hand; also able representatives of the profession in other parts of the country. As in the past, so now success is certain to wait on this event.

The energetic business committee of the Sixth, Drs. Jewell, Hall and Stewart, have left nothing undone, and with the help of the sub-committees of the other districts, prepared a programme, to carry out which will call for the economical use of every hour of the three days' meeting.

Dr. Birdsall will discuss "Ethics of professional charges" Dr. Low, "Between two Evils." Drs. Southwick and Emens, "Copper amalgram;" Dr. Snow, "Vulcanizers and vulcanization;" Dr. Cur-

tis (I. C), "Treatment and filling of pulpless teeth;" Dr. Ritter, "New method of treating foul pulps;" Dr. Butler, "Finishing fillings;" Dr. Arnold, "Foundation Principles in Dentistry;" Dr. White, "Conventions and their Benefits;" Dr. Lee, "The use of the matrix in filling teeth;" Dr. Green, "Aluminum as a base for Dental Plates." Drs. Curtis, Ritter, Emens, Butler, Jones and Green are down for demonstration.

The meetings will be held in the Masonic Temple, Lake St., Tuesday, Wednesday and Thursday, Oct. 29th, 30th and 31st.

A UNIQUE EXAMINATION FOR HOSPITAL APPOINTMENT.

SIR: It is customary for the management of the Bellevue Hospital to issue notice that on certain dates a committee will be in session for the examination of candidates who seek places upon the hospital staff. These announcements generally reach the students of the various medical colleges in the country. They turn eagerly to compete for positions upon this hospital's staff, not only because of the standing of the Bellevue medical college connected with the hospital, the fame of individual members of its facultiy, and their operations in the hospital, but because other and exceptional advantages are attendant upon such work. The notices, or announcements, must, therefore, always bring into competition a number of the ablest of the more recent graduates in medicine. Those who come—at least those who come from afar—naturally and reasonably look for an examination in keeping with the dignity of the institutions, and the importance and responsibility of the positions under competition.

On March 26th last, a number of such men presented themselves at the hospital at the hour appointed for examination for the Fourth Division. After standing corralled in the rotunda for half an hour, they were given seats in an adjoining room. Shortly after they were summoned to the rotunda corral again, and left standing to the end of the examination—nearly three hours. They were called in turn before a member of the examining committee, and afterward returned to the rotunda to await the call before the next examiner. Every man on returning mingled with his friends. It is needless to add that he brought word of the character of the examination. Early in the contest it became known that some of the examiners

were plying repeatedly the same questions—a matter beyond cavil had the contestants been kept apart. Happy was the man, therefore, who had "friends gone before." Such an one possessed a double advantage—what his friends had to report, and what the text-book, which he immediately consulted, had to say on the subject. And thrice and four times happy was he who was invited up stairs—to consult the authorities!

There were two kinds of examiners on the committee, professors from the New York colleges, and practitioners pure and simple. The questions of the former were invariably *essential* and to the point; those of the latter were often non-essential "catch questions," and one examiner, pregnant with his own ideas, often overrode well-accredited authors. For examples: One applicant was asked what he would do in case of stone in the bladder. "Crush it, and wash out the bladder," he answered. But he was met by the rebuke, "Under no circumstances wash it out—let it alone." On venturing the opinion that a stone in the pelvis of the kidney might be removed by cutting, he was ordered never to cut into the pelvis of the kidney. By another man, atony of the bladder and congestive stricture were given as causes for retention of the urine. This was met with contempt galore—"What do *you* know about congestive stricture and atony of the bladder?" Still another man lost his rating because he neglected to mention that fish-bones in the rectum are the cause of *fistula in ano*.

The question of the derivation of nephrectomy (commensurate in importance with another profound interrogatory of a previous examination as to the number of ova in the segment of a tape-worm, commented on in THE MEDICAL RECORD in '86) cost another man his head. Misfortune overtook another who came from a distance, and consequently pleaded ignorance as to what the invaginated catheter might be. The judgment of men learned in medicine must be at one upon the foregoing examples. Otherwise the examination was marred as to its fairness by the failure of applicants to appreciate the idiosyncrasies of some of the examiners. The gentlemen who presided over catch questions, and who stated before the examination that questions would be asked that nobody could answer, and afterward admitted that such had been asked and nonssential details exacted only "for the fun of it," might have made Sitting Bull envious with the many scalps at his belt. Still a third element, peculiarly unfair, was the omission of any examination whatever in Practice, Obstetrics, and Gynecology.

Such were some of the phases of the examination. Was it in keeping with what the announcement would lead one to expect? The candidates had been preparing themselves for years in hopes of filling important positions. They were for the most part mature men, educated and gently bred, many of them worn with long and exhausting study. Was it considerate or decent treatment to oblige them to stand for hours on the cold marble floor of a hospital rotunda, exposed to drafts and colds to which the ordinary boss would not subject his laboring men? By what sort of foresight did the examiner propound the same question to men in turn?—the first to be examined retiring to post his friend upon the subject. Could the man coming from a distant college, with no friend in the arena, hope to win? Is it any wonder that ten *fratres in urbe* out of twenty-three competitors stood perfect on a most difficult question? Is it a wonder that the first were last and the last first? That the patient waiter was no loser? That the rank of the last men went up with the rapidity of Jonah's gourd? Who is so idle as to suppose that, where four are to be chosen, a man would not post his friend, and innocently tell the questions asked and his answers thereto?

Again, can it be said that an examination is conducted with fairness when the competitor's answers, according to a standard text-book, are discredited because that individual examiner holds an adverse opinion? It is hardly known whether the adverse opinion is in print. And is a man, reputed to be erratic, impulsive, falling short of considerate courtesy, and easily prejudiced, the best person to hold an examiner's position and deal fairly?

Further, catch questions cannot give an examiner the best inkling of the applicant's knowledge. Is it fair or dignified to press an applicant with such "for the fun of it?"

Again, it goes without saying that an applicant should be carefully examined in those branches of which he makes the most use in the position he seeks to fill. Any place in Bellevue Hospital demands such examinations. It has been noted that practice, obstetrics, and gynecology were omitted. This omission worked injustice in the examination, in that men best qualified in the above-named branches fell short in the general average. They lacked the advantage they might have gained if the examinations had been carried out roundly and completely. And what can be said in defence of the omission of so important a subject as the practice of medicine?

It may be added, in consideration of the rewards of the contest, that the fact of a man's fitness to serve is, outside of the examina-

tion, never gone into. "What have you ever done to develop executive abilities? What qualifications have you to recommend you outside of your book learning?" is never asked.

Is an examination possessing the unique features of this one as it decently should be? Is it consistent with what an applicant had been led to expect? Is the medical faculty of New York City cognizant of its scope? Is it what the people should expect and demand?

In the event of the appointment of a State Board of Medical Examiners, the question has been raised whether such a body shall be made up from the medical professors of the State or from practitioners. The question in all its fulness applies to boards of examiners for hospitals. A study of the details of the late Bellevue examination might give arguments upon one side. But why should not the hospital examinations for Bellevue possess in the future the merit of courtesy—and also fairness and thoroughness?—*Achorn, J. W.—Medical Record.*

NATURE—GIVE HER A SHOW.

BY W. W. B.

Nature hath framed strange fellows.
—*Shakespeare.*

The importance of Nature as a factor in the practice of dentistry cannot be overestimated. The subject suggests posies, woods and waters—all nature's works—the same old dame Nature who has been mending bones and broken heads these thousand years gone by. We pride ourselves on the great progress made in dentistry as a science and as an art, giving to ourselves all the credit. Nature has played her part in all this advancement, and a very important part. Nature it is that rebels against improper living, excesses and insufficient food, whereby causing decay, and consequently a living for the dentist, and indirectly the great factor that has made possible the advancement of dentistry as a profession.

Nature ever stands ready to assist the intelligent practitioner, a silent partner as it were in the treatment of every disease. Too often we do not give her a chance; it is so easy to follow nature, so difficult for nature to follow us. Pleasant and sunshiny are the paths of him who follows nature; steep and rugged, dark and uninviting

when nature follows you. We trust nature so little—trust ourselves so implicitly. In our treatment of a case it is so easy to overdo, to *push* nature instead of assisting.

Not infrequently is it that the teeth are *overtreated.* Medicines and irritating acids are continually employed, keeping the surrounding parts in a constantly engorged condition. The dentist in despair gives the tooth a rest for a few days, when behold, nature left to herself has completed the cure.

It is so easy to pump carbolic acid into teeth that we forget that it can be overdone ; many times a simple syringing with warm water or a very mild carbolized solution is the very best treatment that could be employed. Let us be an assistant to nature, not a pusher. It is related of a great physician who, on arriving in the spirit land tired and weary, was assaulted by an unknown form : "What did you kick me that way for?" asked he. "I am Nature," was the reply, "and seeing you tired and weary I thought I would assist you the way you used to assist me."

In treating teeth, after having established a vent, give nature a chance. If you have time let the tooth severely alone for a week or more. Perhaps the patient announces after a day or two, "My tooth doesn't ache, but is quite sore," and you, to hurry matters, poke a broach through the canal, or perhaps pump a bottle of creosote through the apex. Don't do it my friend, *let it alone.* You by your untimely interference only irritate and do not help nature. Again, the tooth has been through a course of treatment, and you carefully introduce a cotton test filling ; patient returns next day—tooth quiet. Now *don't* take out the cotton only to introduce another. What are you doing it *for?* Let the cotton remain for a week, or even longer if you are so inclined ; oft' times the irritation resulting from a change of the dressing is disastrous. You loose nothing by waiting, you gain time, and save labor and anxiety.

INVESTING, BACKING, SOLDERING, TIPPING.

"*What is your method of investing, backing and soldering?*"

I use for investing either sand or marble dust, and plaster equal parts. I do not like asbestos as well, as it does not make as solid an investment.

I enclose in a sheet-iron ring, a little larger than the case, three-fourth inch wide, because less investing material is needed to heat

and keep hot, and there is no danger of portions of the investment breaking away.

Heat the case sufficiently to remove the bulk of the wax, and dash boiling water upon it to clean thoroughly.

The backing should be thicker than the plate, about twenty-four gauge. I prefer backing in the investment, especially gum-teeth.

For the anterior teeth, do not cover the entire surface but round the top, and in plain teeth do not let the backings touch anywhere. In gum teeth allow the backings to meet as high as the gum shoulder. If there are spaces under the teeth pack in foil. The pins should not be riveted, for in the first place, there is not the slightest necessity for it ; secondly, it cannot be done without removing from the investment, or backing before investing ; third, there is danger of cracking the teeth, unless an expert ; fourth, when riveted the solder holds only upon the surface.

On the other hand, if the heads of the pins are split with a sharp instrument, that holds the backing in place, and the solder flows into the hole around the pins and they are consequently fastened more firmly.

The solder should never be of a lower grade than 18k ; if the plate is 20k, use same caret of solder. The nearer the melting point of the plate the better the solder works. Otherwise, the solder melts before the plate is hot enough, and "balls." Use plenty of borax, putting it on, and the solder also, before heating. Heat slowly over the large gas burner, until as hot as that will make it, then place upon whatever is used for holding it conveniently (I use a semi-circular sheet-iron pan, open on the straight edge, one inch deep, with handle diagonal to the surface). Apply the full blast to the outer surface for a little, and then upon the plate, so as to insure its being as hot as the backings, then throw it upon the backings and plate at once.

I prefer the mouth blow-pipe. It should be larger than the ordinary blow-pipes which are made for jewelers, who use low caret solders, and do not have to heat and keep hot a mass of plaster and sand. The White Co., at my request, are making a large blow-pipe The mouth piece is large so as to throw a volume of air into it, and also so it may rest against the lips, and not be placed inside, tiring the muscles. The other aperture should be one-eighth inch in diameter, so as to take in the full blaze of gas.

"*What is the best method of tipping the anterior teeth, and of preventing the teeth from checking during the soldering process?*"

The best method, perhaps, for "tipping" the anterior teeth is to do it with pure gold, soldering it when the teeth are soldered, either in a separate investment or when soldered to the plate.

I have no trouble with teeth cracking; do not remember the time when such an event happened, and I take no especial pains to prevent it. This is true either of plain or gum teeth, Justi's or White's. I heat the case over the gas for perhaps half an hour, then apply the blow-pipe; after soldering, lay upon the bench; if in haste to finish after a few minutes lay upon a wet cloth, drawing it around the sides of the investment.—HASKELL, L. P., *Ohio Journal.*

DR. SAMUEL D. FRENCH.

FRENCH—In this city, July 21, 1889, suddenly, Dr. S. D. FRENCH, aged 58 years 4 months and 10 days.

With feelings of profound sorrow, the Third District Dental Society of the State of New York records in its minutes, and announces to the dental profession of the State, the death of Dr. Samuel D. French of Troy.

Dr. French died suddenly at his residence, July 21st, of paralysis of the heart. The news was everywhere received with surprise, and was immediately followed by expressions of sorrow and sympathy.

He was a charter member of this society, and during the twenty-one years of its existence, his congenial presence, and friendly nature, endeared him to each and every member. Those who knew him best loved him most, and by his death, this society suffers an irreparable loss.

Standing in the front rank of our profession, he was honored throughout the State; for twenty years he was a member of the State Board of Censors, and for ten years treasurer of this society. As a husband and father, loving and thoughtful, as a neighbor, courteous and friendly, ever moved by a kind and generous heart, and ever prompt to express sympathy for others in distress.

A strong and symetrical life, esteemed by all.

J. L. APPLETON, M. D. S., President,
F. LE GRAND AMES, SECRETARY.

Writing for magazines, when well done, is one of the highest and most useful accomplishments and one by the means of which any person who has the interests of the profession at heart can do much toward elevating it. It is a safe rule never to allow those moments to pass when one is in the mood to write, or "when the spirit moves." Most dentists feel at times prompted to record their

observations or to note down certain ideas entertained on topics with which they are especially familiar, or in which they are particularly interested. On these occasions notes should be made for future reference and compilation. It is a good practice to have a tablet of paper in the operating case and jot down anything of interest, practical or theoretical, so often occurring or being presented to us while operating. In leisure moments these slips may be torn out and placed in envelopes labeled, "Operative Dentistry," "Tin," Gold Filling," "Amalgam," "Saliva," or as the case may be. It is astonishing how soon by these means wholesome food for a paper is secured and how readily interesting points unknown to some, or which may readily escape from an erratic memory are preserved and made beneficial.—*Illinois State Dental Society.*

INTERNATIONAL DENTAL CONGRESS.

The International Dental Congress of Paris has just closed after a six days session. The Congress was organized, and successfully carried through, by the combined efforts of the Odontological Society of France and the Odontological Society of Paris; and they deserve great credit for the grand success of this, the first International Dental Congress ever held. It being held in this great capitol, and during the Universal Exposition, has had much to do in getting together so many dentists from all parts of Europe and the United States. They came from Russia, Germany, Austria, Hungary, Holland, Spain, Italy, Switzerland, Cuba, United States, and the South American States, and England and Australia; but of course the greatest numbers came from France, nearly every city and town of importance being represented.

The Congress was opened at the Trocadera Palace, under the presidency of the minister of commerce, assisted by Professor Gariel of the faculty of medicine, of Paris. Each morning was devoted to clinics and exhibitions of instruments, at one of the dental colleges, and the afternoon was devoted to the reading of papers, and discussions. The papers read were of a fair order of merit. I was struck with the great number of papers on anæsthetics—in point of number as great as all the other papers, showing that the French dentist must still resort to the forceps, to a great extent, in his practice. But one has only to practice among the French to know how badly they bear pain. One cannot do heroic operations for them, as he can for an

American. They prefer to lose their teeth rather than submit to much pain. Perhaps it is a fault in their constitution, or in their education. But I have known many a dentist, fresh from America, who was going to educate them to appreciate and endure American dentistry, to be compelled to at least modify his methods, or starve.

Much bridge and crown-work was shown. A movable bridge was exhibited by a dentist from Panzance (a descendant of one of the pirates), which was far ahead of anything of the kind I have ever seen. He had it in working order in his own mouth. The one great thing to recommend it is that it can be removed and cleansed, which, to my mind, has always been an objection to the bridge-work ordinarily made; for it stands to reason that a plate which cannot be removed must become foul. I hope a description of it will be published, and if so will send it to the *Journal.*

The Congress closed by a banquet, at which 220 persons sat down. After the inner man had been abundantly refreshed with solids and liquids, the outer man was entertained by toasts and speeches, in various languages, which made one wonder if it was not something similar to the first banquet given after the confusion of tongues, occasioned by the failure of the first attempt at building Eifel tower.

An old dentist, said to be ninety years of age, was present, and replied to a toast drank to himself. He is said to be still in practice, and one may believe it, as they say he has just married a new wife.

Our country was represented by Harlan, of Chicago, Bonwill, of Philadelphia, Parmly, Brown, and Parr, of New York. Bogue, of New York, was one of the Vice-Presidents. Each person present was presented with a medal in bronze commemorative of the occasion. On one side it reads, "Republic Francaise Exposition Universelle, Congres Dentaire International de Paris, 1889." On the reverse side, "Societe Odontologique de France, Societe Odontologique de Paris." After which the banquet closed by singing the Marssillaise.—WILLIAMS, N. W.—*Ohio Journal.*

METHOD OF MODERN MEDICINE.

Take typhoid fever; much study has taught us that this fever has a course which cannot be put aside; that in the majority of cases it tends toward recovery; but that it sometimes kills by the exhaustion which it produces, by the diarrhœa which it causes, or the burning

fever that accompanies it, or by various accidents. The doctor, knowing that he can no more cure typhoid fever than the captain of an ocean steamer can cure the coming storm, tries, not to put aside the storm, but makes tight and trim the barque whose freight is life, and strives to guide it safely through the tempest. The moment he sees the health barometer falling he puts the patient in a state of absolute rest so as to save the last grain of strength, for he knows that the time may come when a hand's breadth shall make the difference between being wrecked on the promontory or scraping by the cruel rocks into the safe harbor of convalescence; by the careful selection of food and the use of local remedies he lessens the irritation and keeps the diarrhœa in check; by cold he takes out the extreme heat of fever; and so, everywhere watching, he guides his patient safely through; perhaps during the whole course of the disease giving very little medicine, but fearing not in a crisis to support most boldly and vigorously some failing vital function.—Wood, H. C., *Address in Medicine, at Yale.*

Conductors' Department.

THE AMERICAN BACKING DR. CROUSE.

In view of the injustice the profession has sustained in the past, as well as the annoyance to which it may be subjected in the future, and fully appreciating the arduous and important labors of Dr. J. N. Crouse, of Chicago, be it—

Resolved, that Dr. Crouse is entitled to the earnest and practical support of every dentist in the United States; and further be it—

Resolved, that the American Dental Association fully approves of the formation, the plans, and methods of the Dental Protective Association of the United States, and pledge to it our united and continued support and moral aid.—*Southern Dental Journal.*

PELLETS.

The Indiana Dental College had 51 matriculants at its last session.

Dr. I. B. Davenport's present address is 30, Avenue de l'Opera, Paris. His partnership with Dr. Bogue terminated Oct. 1st.

The *Dietetic Gazette* has absorbed the *Philadelphia Medical Times*, *Medical Register* and *Polyclinic*.

Humiliating though it be, yet it is true that an American Medical Diploma has in itself no meaning.—WOOD.

The Byrnes mallet attracts much attention from those who are "gone" on engine attachments. It has several features that are characteristic.

Where is the *Dominion Dental Journal* for April? The July reached us a few days ago. Must have it regularly or our "cribbing" will suffer curtail.

A sample copy of the German Dental Directory (Part II of the Dental-Kalendar) for 1889 may be obtained gratis of Dr. E. Richter, Konigs-Strasse, Breslau.

The classes at the three dental schools of Philadelphia are larger this session than ever before. *Crowded* seems to be the proper word to describe their condition.

Merck's *Bulletin* comes once a month with its list of new discoveries, etc. Much that passes for new in dental materia medica has this publication as its source.

Mrs. Horace Wells, widow of Dr. Horace Wells, the discoverer of anæsthesia, died at her home in Hartford, Conn., July 17, 1889. She was seventy-two years old.

Dr. C. S. Chittenden, for many years at Hamilton, Ont., is dead. The old Western New York society rarely met without him, and the 7th and 8th districts saw him often.

Landois' "Text-book of Human Physiology" is reviewed in the July *Dietetic Gazette* in a manner that leaves the reader without recourse—he must have a copy or lose cast.

In the discussion of Dr. Sudduth's lecture before the New Jersey society, much spice and not a little personality was indulged in. It appears in part in the *J. D. J.* for September.

International *Dental* Congress—There will be a congress. It will be dental—likewise international—in 1892. Chicago? New York? We'll write Chauncey M. Depew forthwith for his decision.

The Gundlach Lens is the title of a beautiful four-plate souvenir recently put out by the Gundlach Optical Company of this city.

Photographers, both professional and amateur, will prize it for its artistic merit.

Dr. F. B. Darby, chairman of the Union Committee of Arrangements, writes us in answer to a recent communication that he does not read print readily. Hereafter all letters must be writ. We have discharged our typewriter.

"Pits and Fissures of the Enamel," with six reproductions from photo-micrographs, by Dr. R. R. Andrews, has the leading place in last month's *International*. When Dr. Andrews talks he not only says something, but much of it.

To improve the common air syringe or chip blower, add a few inches of rubber tubing in place of the valve, transferring the valve to the free end of the tubing. With this change it may be depended upon to pull wind every time, and hold it.

I made various tests with the oil of cassia in connection with albumen and all of these gave results that coincide very perfectly with the experiments in broth without the addition of albumen. With this agent the presence of albumen is of no consequence.—*Black.*

"Student" wants to know, "Which will give me the better standing in the dental profession—M. D. or D. D. S.?" Your standing will depend primarily on yourself, degree or no degree. Secondly, on where and how you obtain your degree. There are some pretty scaly degrees in dentistry, and they are not all of the "partial culture" kind.

A foreign funny (?) paper (*Judy*) advertises "Ross' skin tightener;" also a machine for torturing the nose into any desired form or position; also one for "outstanding ears." We have ordered the last named, and after a fair trial will forward it to some one of several of our brother editors similarly afflicted with anatomical superfluities. Don't all speak at once, gentlemen We're going to have a hard winter, but selfishness has no part in our make up.

Dr. J. W. Ivory, in describing the method of using his clamps, states a fact or two none too widely known. He says: "An opening is made in the rubber a little larger than ordinarily made by punches for that purpose, 'on the scientific fact that a large opening in the rubber for an irregular molar is better than a small one,' as the

rubber has a chance to accommodate itself to the grooves in a tooth, while if small, the rubber stretches over the grooves and leaves a space for the fluids of the mouth to leak in and destroy your filling."

Dr. Barrett has a mallet of which he says: It does not, when one is most busy, stop to look out the window, or to scratch its head, or pick its nose. It does not come on duty in the morning full of onions, or cabbage, or other breath perfumers. It does not get up flirtations with the impudent dudes who visit the office, and its grandmother does not die and give an excuse for absence every time there is a picnic. It never helps itself to your perfumery, meddles with your letters, nor talks back when you attempt to shoulder upon it the responsibility for failures in operating.

This unique affair was made by the Buffalo Dental Manufacturing Company.

Books, Pamphlets, Etc.

The Etiology of Typhoid Fever. By Thos. G. Lee, M. D., Pp. 8.

An interesting paper by an old contributor to the Odontographic Journal.

The Medical Profession—The Medical Sects, the Law. By H. C. Wood, M. D., Pp. 19.

An address in medicine at Yale University. A most readable production, but characterized according to some by temper rather than tact.

A Study of Windbreaks.

This is Bulletin number IX of the agricultural experiment station at Cornell University. Members of the profession who contemplate attendance upon the next meeting would do well to obtain a copy in advance. It discounts both chest protector and liver pad.

Dissemination of the Knowledge of Dental Hygiene among the Masses. By L. P. Bethel, D.D. S., Pp. 7.

The author would have this done through schools, the dental office, physicians, periodicals, books, pamphlets and lectures.

Marine Biological Laboratory, 1888. Pp. 40.

The first of a series of reports describing the work at Wood's Holl. Students and investigators are welcomed and assisted in their work or preparation therefor.

THE

Odontographic Journal.

VOLUME X.—*January, 1890.—No. 4.*

STRUCTURE AND PHYSIOLOGY OF THE TEETH.

BY J. HENLE, LEIPZIG, 1841.

[TRANSLATED EXPRESSLY FOR THE ODONTOGRAPHIC JOURNAL.]

STRUCTURE.

Every tooth consists of two parts, the root and the crown. The root is implanted in a socket of the jawbone, the crown rising free above the superior margin. Between the two, however, can be distinguished the neck of the tooth—that part which lies, it is true, outside the socket, but yet is covered by the gum. The crown is entire and sharp in the incisors and canines, dividing, however, into from two to four prominences in the back teeth ; the root of the latter is divided more or less deeply into separate prongs, and thus becoming one or more fold. The root and part of the crown are hollow, the cavity opening by way of one or more apertures in the apex of the root. It contains a soft substance, rich in vessels and nerves—the tooth-pulp—which is continuous with the periosteum of the socket, and which, through the opening in the extremity of the root, penetrates into the tooth. Teeth with more roots contain a single cavity into which through each root leads a canal, and a single branch of pulp having horn-like continuations corresponding to the roots.

The crown is composed mainly of two substances, the outer being the harder and polished, overlying like a crust the inner substance; the former is called enamel, (Fig. I. *e*) the latter dentine (*d.*) The root consists inwardly, for the most part, of dentine, which is uninterruptedly continuous with the dentine of the crown. The enamel, however, ends at the neck of the tooth, and the root has instead of this a cover-

ing of a distinctively peculiar substance known as cement or crust substance (*c.*) This extends itself likewise continuously over the enamel of the crown. The cement, in regard to its structure, resembles in all points bone tissue. It has the same lime-filled cavities, with the stellate continuations and canaliculi, as bone substance. The medium size of the cavities amounts to 0.0062,''' the diameter of the canaliculi to 0.0002—0.0001,''' (Retzius). The layer of crust substance is thickest in the root toward the very apex, and in the cleft always between two roots at the superficies alveolaris. Thus does Purkinje name that surface of the tooth opposite the masticating surface. In the case of a single root it is not seen, but pushes downward with the root; but when more roots are present, they are immediately separated at the point of origin by the superficies alveolaris lying free between them. The cement layer of the root is thinner, the younger the tooth ; in older teeth, it becomes thicker, and builds up what is known as exostosis. In deformed roots, according to Linderer,* cement occurs in the deformity. From the apex on, growing by degrees thinner, the cement disappears where the enamel of the crown begins, although Fränkel† once followed it a short distance above the enamel, and Nasmyth‡ describes under the name of persistent tooth-capsule, a covering-part of the enamel of human teeth, which can be nothing else than cement. Yet treatment with muriatic acid made it appear like a thin membrane which extended itself within the tooth socket and covered the whole tooth like a capsule. At the best one sees it in evenly fractured teeth, but isolated remains also occur in teeth much worn down. The outer layer of the thin membrane is said to be fibrous, the inner reticulated; while connected by hexagonal cells, may be traces of the outer enamel fibres. Nasmyth saw no bone corpuscles in human specimens.

The cartilage of the crust substance of human teeth, from which bone-earth has beeen dissolved by acid, may be stripped off in the form of a thin membrane. According to Fränkel, it is lamellate, and seems less consistent than the cartilage of dentine. Seen in cross-section the bone corpuscles in the cement of the tooth appear in

*Zahnheilk, page 171, plate xi, figure 3.

†Dent. structura, p. 7.

‡Medico-chirurg. transact. xxii, 312.

concentric rings (Retzius). According to Lassaigne,* the cement of the crust consists as follows :

Animal matter	42.18
Phosphate of lime	53.84
Carbonate of lime	3.98

The dentine or ivory is in its relation to bone nearly akin. It consists likewise of an organic basis, which by means of extraction of the calcareous matter by boiling, becomes readily converted into glue and the lime salts of ordinary bone, though in somewhat different proportions. According to Berzelius, human dentine contains :

Cartilage	28.00
Phosphate lime and fluor-calcium	64.30
Carbonate lime	5.30
Phosphate magnesia	1.00
Natron and chlornatrium	1.40

According to Pepys :†

Gluten	.28
Phosphate lime	.58
Carbonate lime	. 4
Water and loss (*verlust*)	.10

The amount of animal matter in proportion to the mineral, and the ratio of carbonate of lime to the phosphate, is also somewhat less than in bone. Dentine is composed of a homogeneous base and of fibres which are probably hollow. In these bone-earth in granular form is deposited, and the homogenous substance is impregnated by lime salts just as is the matrix of bone. By means of treatment with caustic potash the cartilage is eaten out and the mineral parts remain in the form of little granules cohering together, which, being friable, break down with equal quickness. The canal of the pulp may be looked upon as a central canal, from which issue other canals which traverse the tooth substance in all directions. According to the description of Retzius, with which later observations agree, the tooth-cavity is over its entire surface perforated by a multitude of openings, and these lead into the canals which run across through the thickness of the dentine as far as its surface where it is limited by the enamel or the cement. These canals are seen like parallel fibres in thin transverse sections of the tooth cartilage, which one has previously, though not too long, treated

*Rousseau, Anat. comp. p. 262.

†Fox, Nat. hist. i, 92.

with muriatic acid and freed from the bone-earth, likewise in thin cut plates, or the ragged surface of the firm dentine broken across. In order to fit these for viewing with the microscope, it is necessary to give them an even surface with water, oil or turpentine varnish. By more thorough saturation, the tubuli, however, disappear again, and indeed from the finest branches on to the mass, as they become perfectly saturated with the liquid. In the human specimen appear first of all the tubuli lying in juxtaposition, parallel to each other. All the tubuli of the tooth radiate, those on the masticating surface being tolerably perpendicular, those on the sides horizontal. In teeth with more roots the fibres have a direction perpendicular to the cavity, both upon the masticating (Fig. II. *b*) and the alveolar (*a*) surface, so that they appear only interrupted by the tooth cavity.[1] In the crowns of the molars, one can best imagine the dispersed arrangement of the fibres by figuring as many canines as the crown has cusps, united together and covered with a continuous coating of enamel. Upon the interruption in the course of the fibres probably depends the fact, discovered by Rudolphi,[2] that teeth under the influence of muriatic acid, cleave in certain fixed places. However, Meckel[3] observed with reason, that the cleavage is not so regular as Rudolphi asserted, and that it is not confined to the crown, but extends to the root. Here it appears to exist, but to be quite fortuitous; the division can be continued ad infinitum. Only in a few situations, and those not constant, do the tubules extend in a straight course from the tooth cavity to the surface. Such places are those which are in the cusps, or correspond to the cusps of the crown, and the beginning of the lowest third of the root. In other places they mostly have the form of a line with three curves; the first curve turning its concavity toward the masticating surface, the second toward the root, and the third again toward the masticating surface. Sometimes occurs a fourth additional curve, like the second; in the root occurs in the shortest tubule one simple S-formed curve. The curves appear to tend, in well formed teeth, in directions corresponding to each other on both sides, according to a determined symmetry; towards the middle of the crown occurs, accordingly, the middle curve, whence the others diverge. In their greatest regularity these curves are found in thin sections of the front teeth, which have been cut in a direction from front to back,

[1] Fränkel, a. a. Op. 10

[2] Reil's Arch. iii. 401.

[3] Dessen Arch. iii. 471.

parallel with the axis of the tooth. They cause here a satiny brilliance, a play of light in lines of splendor in the more concentric zones near the tooth-cavity, which have already been remarked by Schreger.[1] Besides the greater curves, it is seen by a strong magnifier, that the tubules otherwise short, have incurves tightly folded upon each other, in the form of an undulatory bent line. In 1‴ of length, occur as many as two hundred curves of this last kind. In the milk teeth they are, in general, fewer in number, and they are fainter toward the other ends of the tubuli than in their middle portion. Moreover there occur, chiefly in older teeth, stronger and weaker curves, which in a great number of consecutive tubes, correspond to each other and thereby produce zones, concentric in the transverse section of the inner surface of the tooth, which might appear to be caused by the flowing lines of the tubuli. In thin sections of tooth cartilage the curves are smoothed out by pressure. Throughout the whole extent of the tubuli both inside and out occur dichotomous divisions, and fine branches are given out both ways, whereby the lumen of the tubuli especially from the last third on, diminishes toward the outer end. The branches divide again and in part fill up the interspaces between the tubuli lying next each other, in part they curve away past these, and seem to wind into the next interspaces.[2] Next the tooth cavity the branchlets are fewer, and often appear but as little irregularities or peaks. It does not appear that the branches of different tubuli unite except somewhere at their extremities. The diameter of the tubuli, entire near the tooth cavity, I found to be in man never above 0.001;‴[3] at the end they become immeasurably fine, or pass into little, irregular, round, scattered cells. The distance of the tubules from each other is in their middle almost three times as great as the diameter of a tubule, in their beginning they are nearer together. The canals are filled with earthy substance, which by aid of light falling through, is seen to consist of minute granules in little groups. Cross-sections of the same, seen against a dark ground, appear as white dots, and become translucent by the use of dilute acid; the broken off tubuli also, at the edges of the fragments, are rigid and white ; by means of acid they can be made pliable and transparent, and one can follow with the eye the dissolution taking place in the tubule. It appears that the salts are infused into the parietes them-

[1] Isenflamm and Rosenmüller, Beitr. i, 2.

[2] Retzius in Müll. Arch. 1837, Taf. xxi, fig. 2.

[3] 0.0023,‴ Retzius; 0.0008—0.0015,‴ Lindérer; 0.0007—0.0023,‴ Krause; 0.0013—0.0016‴ in the vicinity of the tooth cavity, Bruns.

selves of the tubuli, and the tubule contains more than the lime deposit, as it takes up readily, by means of its capillary structure, colored fluids, as ink for example.[1] In thin cross-sections of dentine, are seen the lumina of the tubuli, some round and some oval, according as the tubuli cut through are straight or oblique. Often the cut is through the middle of the lumen of a tubule, and then appears a bend in the cut edge. The tubuli which are cut straight allow the light to pass through ; those obliquely cut are perfectly white, or entirely dark. The lumen of the greater number of the tubuli is, in polished cross-sections, surrounded by a second circle, and the ring which borders the lumen, is somewhat darker and more yellowish than the fundamental tissue of the tooth.[2] Purkinje and Retzius take this ring for the cross-section of the tube-wall, and see therein evidence that the material which composes the wall does not entirely accord with the homogeneous ground substance of the dentine. It can hardly be doubted, in accordance with the facts stated, that the little canals deserve the name, and are hollow, but I hold the walls to be immeasurably thin, and have not been able to convince myself that the dark rings in the cross-sections do not arise from an optical illusion. In the tooth cartilage left after extraction of the lime, they are not visible. In lengthwise sections of dentine or tooth cartilage, the tubuli often stand out a little distance ; they are white, lustrous, and rigid in the dentine, confused, finely twined or bent, like thin fibres of the elastic tissue, when the lime has been extracted. The diameter of these tubules is like the diameter of the lumen in transverse sections in the same place. It would be conceivably much greater if the rings belonged around the lumen of the wall.

I have called the fundamental substance of dentine homogeneous. So it has hitherto been described by most observers, so it appears in thin cut plates of dentine, in the profile and transverse sections, and in cross-sections of tooth cartilage appears but rarely a network of fine lines between the tubules, which indicates a connective tissue. On the other hand it is easy to perceive in the profile sections, that the whole tooth cartilage consists of fibres, which lie in the same direction as the tubules, so that each tubule runs always between two fibres. Tooth cartilage macerated but a short time in water, can easily be torn apart into fibres, which frequently

[1] According to Purkinje and Müller, *cf.* Miescher, Infl'. on p. 272.

[2] Retzius, a. a. O., Plate xxi, figs. 3, 6.

expand from the cavity outward to the surface of the tooth, broad, thick, and wedge-shaped. Each of these fibres is a bundle of microscopic filaments which in color has much resemblance to those of the middle arterial coat, in form to the outer fibres of lentils. They are somewhat flattened, some of them 0.0029,''' broad, pale, granular and particularly on the edges where they lie together, rough, almost toothed. In acetic acid they become somewhat paler, but not disconnected. Bifurcation or ramification I have not seen, and therefore must regard them as extremely rare if they ever occur. If, therefore, the separated fibres expand in bulk from the inside outward, this cannot be in consequence of increment by division, but I believe rather, that between the fibres which spring close to the cavity, are interpolated new ones here and there, or else folded back, so that not all the fibres which end at the outer surface extend back to the cavity. As it happens ordinarily, the space between each two fibres is filled by a tubule. This often juts out at the cut edge beyond the cut ends of the filament, and is often separated from them, so that a space lies open between them. Other fibres are often seen, between which lies no tubule, or only short and interrupted fragments of such. Whether this state of things is normal, or the tubules are lost in the preparation, I am unwilling to decide. Could one imagine the division of the tooth substance into fibres not spontaneous, and plainly dependent upon the direction of the tubuli, still it must at least appear a homogeneous substance where attenuated by pressure of the adjacent tubuli. If one compares, however, the fragments of tooth cartilage with other fibrous tissue, if one, for example, considers the resemblance of the tooth fibres to the true fibres of the middle arterial membrane, that of the dental tubuli to the nucleated fibres of the latter (the bifurcation and ramification being common to both), it cannot be doubted that the structure is identical in origin. A decided proof of this will the manner of development of the tooth tissue furnish us.

The fibrous structure of the fundamental tissue does not extend through the whole of the dentine. If the cement of the root be torn away from about the pulp cavity, the fibres of the inner surface of the cement break irregularly, and the cement remains as a firm plate (lamella). A similar but finer plate, not fibrous, exists in the crown at the dividing line of the dentine next the enamel; it is the thin layer in which the canaliculi ramify to the finest degree and

pass around true bone corpuscles. Here also the structure of the tooth cartilage is lost, as of the bone cartilage and cement cartilage.

The enamel is yet poorer in animal elements than the dentine. It leaves after solution in very weak acid, an extremely delicate, membraneous tissue, in which a faint fibrous structure can be discovered.[1] If the acid works longer, a fine brown membrane collects, which Berzelius believed to lie only on the inside of the enamel, between it and the dentine, and in which Retzius detected by microscopic scrutiny, numerous fine openings closely set together. The animal substance is only 2 per cent. of the enamel, according to Berzelius. Its constitution, according to the latter, is as follows:

Phosphate of lime and fluor-calcium	88.5
Carbonate of lime	8.0
Phosphate of magnesia	1.5
Organic matter, alkali and water	2.0

Lassaigne, on the other hand, gives the amount of the organic matter much higher, namely:

Phosphate of lime	.72
Carbonate of lime	. 8
Animal matter	.20

and with this agrees tolerably well the analysis of Pepys, according to which enamel consists of:

Phosphate of lime	.78
Carbonate of lime	. 6
Water and loss	.16

The enamel is made up of solid, 4–6 sided prisms or columns, of which one end rests on the dentine, the other being free on the upper surface of the tooth. The upper surface of the dentine is rough and full of little peaks and hollows, in which the inner ends of the enamel columns take hold. The outer ends are somewhat rounded, though in worn teeth, or across polished ones, they are flat, polygonal, quadangular according to Purkinje, according to Retzius, haxagonal.[2] So long as the tooth is concealed in its capsule, the enamel is soft, and easily divided into single prisms which appear in the form of small, angular needles of 0.002,‴ in diameter, scarcely perceptibly thicker at the outer end than at the inner.[3] In some are seen small, close lying cross-stripes, part of which extend entirely across the prism, others only part away.[4] Linderer[5] did not find

[1] Fränkel, a. a., p. 8.

[2] a. a., D. Tav. xxi, fig. 9.

[3] 0.0015—0.0023,‴ Krause; 0.0013—0.021,‴ Bruns.

[4] Fränkel, a. a., O. fig. 6. Retzius, a. a., O. Tav. xxi.

[5] Zahnheilk, S. 185.

them; it occurred to me that they were the ends of prisms lying together cut off obliquely. If the tooth has erupted and the enamel become firm, in order to see the prisms in coherence it is necessary to cut thin slices lengthwise through the pulp cavity and near the axis of the tooth. The prisms become more distinct if the section is placed a short time in dilute acid and then in water (Fránkel). Here too, the cross-stripes appear not to be at equal distances from each other,now setting forward in a line beyond other fibres, now alternating with two contiguous fibres. The direction of the enamel fibres is in general like that of the dentinal tubes, perpendicular to the surface of the pulp cavity, so that they stand vertical on the masticating surface, and become gradually horizontal toward the neck of the tooth; they do not, however, continue in the same direction as the dentinal tubes, but form with them an obtuse angle, open toward the axis of the tooth. Neighboring enamel fibres run parallel to each other, frequently in undulatory and even strong zigzag curves; sometimes the curves of different fibres run oppositely, and part of them end in surfaces cut off obliquely against others, without reaching the periphery of the tooth. On the other hand, there occur in the outer parts of the molars, systems of fibres almost driven in like wedges, which do not reach the surface of the dentine. In the crowns and depressions of teeth with several cusps, they proceed from single points as from vertices.

Upon the outer surface of the enamel and in transverse sections are detected with the naked eye and with the microscope, many striæ and markings whose causes have not yet been adequately fathomed. Very regular undulating transverse veins are dispersed over the front surface and around the crown, especially of the incisors and cuspids, so thickly set that Retzius counted twenty-four to a line. Leeuwenhoek[1] held these striæ to be traces of the passage of the tooth through the gum, which he supposed intermittent in its progress. According to Retzius they push out in such a way that the enamel fibres are produced in encircling rings which ascend obliquely from the crown to the cusps, and of which a part of each overlies the next beneath like roof tiles. Krause[2] discerned throughout the whole enamel, bluish and chalky white fibres, which, correspondent in color, build up even layers. The striæ lie faced together, are turned with the edges toward the inner and outer surfaces of the enamel layer, and therefore appear on the surface, and likewise in

[1] Opp. I. C. p. 5.
[2] Anat. 2 Ed. I. 152.

polished transverse sections, as alternate ring-stripes each two layers thick, amounting to 26‴.

It seems to me that this striping is produced in the same way as the bands upon tendon and nerve fibres, that is, by a wavy or zigzag curvature of the enamel fibres, which curving may be seen in thin plates of still soft enamel from the outer surface of young teeth carefully scrutinized.

Another marking exists in parallel, mostly brownish lines, which in the cusps run concentrically at the edge of the dentine; at the sides, almost parallel with the axis of the tooth.[1] With the naked eye are seen but few of these, but under the microscope come to light yet finer ones between the coarser. Schreger held them to be the limiting edges of three separate layers of enamel.[2] Retzius is inclined to think they originate from the overlapping and thicker cross-stripes of the enamel fibres. Purkinje believes them to be caused by sinuous curves, Linderer by intermission in the forming process. A third kind of stripes, Schreger's fibre-stripes,[4] appears in enamel broken lengthwise, if viewed under the microscope, against a dark ground. They are short, white, nearly bow-shaped, half in similar directions to the enamel fibres, half in different directions. These, according to Retzius, are produced by parallel shadows of the cross-stripes meeting together; Krause made them originate in a shorter curve of the whole rank of enamel fibres. The explanation of Purkinje[6] seems to be more correct, according to which they arise from the circumstance that the curves of the undulating and parallel lying fibres are partly cut across, and the cross-cut surfaces reflect the light in different ways. At the boundary between the dentine and enamel appear fissures in the latter at tolerably regular intervals, which proceed from individual prominences or points of the dentine, and extend to a certain depth and ramify in the enamel.[7] Their signification is unknown. Fissures, through which the fibres are disposed in larger bundles, occur also in the soft enamel of the fœtus.

In man and the other mamalia, neither vessels nor nerves extend beyond the pulp cavity into the substance of the tooth; the

[1] Fränkel, a. a. O. Fig. 1 c. fig. 2. 4 O. Retzius, a. a. O. Tav. xxi, fig. 7 x. Linderer, Tav. xxi, fig. 2, f. g. o.

[2] a. a. O. S. fig. 5.

[3] Fränkel, o. a. O. p. 16.

[4] a. a. O. S. 5., fig. 7, 8.

[5] a. a O. S., 13.

[6] Fränkel, a a. O., p. 17.

[7] Fränkel, p. 17. Linderer, S. 182.

pulp, which at the apex of the root is continuous with the periosteum of the alveolus, lies entirely loose in its cavity and may be taken out without laceration. Under the microscope it shows an entirely sharp contour. It can easily be pulled apart lengthwise into fine filements, and these consist, besides vessels and nerves, of distinct, finely granular, somewhat flattened fibres, of the consistence and appearance of the gelatinous nerve fibres, with which lie cell nuclei, oval or more often lengthened out into short and thin, wavy, opaque fibres. The distinct fibres do not split into fibrillæ, and the opaque, nuclei-produced corpuscles, do not unite with the nucleus fibres. At the outer surface of the pulp is a tissue resembling that of the mucous membrane. It has in a homogeneous matrix, little dark granules, isolated cytoblasts, and cytoblasts with narrow cells. A regular epithelium does not exist. The trunks of the vessels lie in the axis of the pulp, their capillary branches producing meshes throughout its length; the plexuses and terminal loops of the nerve fibres have been spoken of before.[1] In the gum of the fœtus and newborn animal, near the superior margin, Serres[2] detected granules grouped together, of the size of millet seed, like the Meibomian glands, filled with a white substance. They can be emptied by pressure; under the microscope some of them show a little brown point in the center. Serres considered them glands, whose secretion is discharged through the brown point, if it be an aperture, otherwise by effusion through the walls themselves. They have been said to secrete tartar after the eruption of the teeth, whence they received the name tartar glands, glandulæ tartaricae. Raschkow,[3] Frânkel,[4] and Linderer,[5] examined microscopically the contents of these vescicles, and found, in a clear, thin liquid, polygonal plates with a round nucelus, like the flattened epithelial cells, partly filled with a granular substance. According to Raschkow they are entirely closed. Whether they persist in the adult is still doubtful. Blandin[6] asserted it; Meckel,[7] on the other hand, has only seen them at the period of eruption of the teeth, and considered them abscesses; Rousseau[8] and Linderer have

[1] The older anatomists and Fränkel yet, (a. u. O., p. 3.) speak of a *Membrana dentis interna* (the periosteum of the alveolus is distinguished as the *Membrana dentis externa*) and understand by this a membrane rich in vessels, which lines the pulp cavity. There is none such present. When the pulp is removed, the dentine is left bare.

[2] Essai, p. 28.

[3] Meletemata, p. 11., fig. 12.

[4] a. a. O., p. 4.

[5] a. a. O. S., Tav. iii., fig. 4, 6.

[6] Syst. dentaire, p. 61.

[7] Anat. iv. 220.

[8] Anat. comp. p. 44.

not found them in adults. Before this point is settled, it would be rash to decide upon their function. The view expressed by Serres is not very probable. I formerly supposed them to be pituitary glands, certainly of the simplest kind, starting up here and there as closed cells, which upon opening disappear again. One can easily, especially in the morning before cleansing the teeth, by pressing the gum, force out from between the gum and the neck of the tooth, a viscous white substance which consists of nothing but minute mucous globules. These probably issue singly from the glands opening at the neck of the tooth.

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About the middle of the third month, within the thickened superior margin of the jaw, is found a row of whitish, opaque cells or vesicles, formed of soft membrane, each of which encloses the rudiments of a milk tooth. Herissant,[1] indeed, describes openings in the gum, with which the capsules communicate by canals which are to enlarge themselves upon the eruption of the teeth; Bonn[2] seems to have seen the same openings, but would only introduce into them bristles to a trifling depth; Delabarre[3] found the canals specified by Herissant solid in the normal conditions; by treatment with dilute nitric acid, however, he saw little depressions in the gum, at the bottom of which, corresponding to the attachment of cords, a whitish point allowed the introduction of a fine probe into the capsule. Upon similar observation, Arnold[4] came to the conclusion that the tooth capsules were inversions of the mucous membrane of the mouth; in the embryo at the ninth week, he noted in the thin superior margin of each jaw, a furrow with ten little hollows, and somewhat later, the same number of openings which permitted the introduction of a bristle into the capsules. They closed themselves immediately, nevertheless, in the third month the capsule of the second molar was in still more open communication with the buccal cavity.

This conclusion, which stands opposed to most of the earlier observations, would also either overturn or conflict with the later ones. Purkinje and Raschkow[5] deny the existence of the hollows and openings, and maintain that the tooth-capsule is free from the

[1] Acad. de Paris, 1754, p. 433.
[2] De contin, membranarum in Sandif. thes. ii. 276.
[3] Odontologie, p. 10.
[4] Salzb. ztg. 1831, S. 236.
[5] Meletemata, p. 20.

beginning and has no connection with the gum. On the contrary, Linderer[1] has discovered anew, the openings in the superior margin of the jaw, and finally Goodsir[2] gave a description in detail of the first incidents in the development of the teeth, which asserts that Arnold saw rightly, although his explanation of what he saw was not entirely correct.

According to Goodsir the origin of the tooth-capsules and tooth-germs is as follows: At first, in an embryo at about the sixth week, which measures from the crown of the head to the apex of the coccyx 7½,''' were found in the place of the maxillæ, deep and narrow furrows between the scarcely indicated lips and a smooth, horseshoe shaped ledge which in the upper jaw answers to the first rudiment of the palatal arch. Soon rise up in the furrow between the lip and this ledge two ridges or dykes, one behind the other, the front or outer one next the palate. Between both dykes is a shallow gutter, the primitive tooth furrow. The dykes become steadily higher and the gutter deeper in the same measure. One must pull apart the lip from before and the palate from behind in order to see the gutter with its dykes.

In an embryo at the seventh week, 1'' in length, the outer dyke was entirely formed, the inner only at the sides. The outer (Fig. III. *a*), was on its inner margin three times inflected, and thereby divided the gutter into three tracts, of which the posterior (*b*), lay between two dykes, the middle and anterior were open inwardly. In the inferior maxilla of the same embryo, on the contrary, the outer ridge was wanting, the inner bounded the gutter toward the buccal cavity, and arched itself away toward a single spot beyond. In a two months embryo the inner ridge of the superior maxilla extended more widely anteriorly and posteriorly, and in the inferior, the furrow was more marked and deeper. At the bottom of the posterior division of the furrow in the upper jaw appeared an isolated small tumor, a second showed itself at the edge of the ridge in the second division; this was on the outside protected by a thin plate growing out from the ridge. At the point of origin of the lower jaw were two little tumors of entirely similar character. In the ninth week, both papillæ (Fig. IV. 1, 2) had increased in size, the ridges before and behind the posterior papillæ were fast joined together. At the same time started in each jaw at either side of the lip band, two little swellings side by side, (3, 4),

[1] Zahnheilk, S. 68.

[2] Edinburgh Med. and Surg. Journ., xxxi. 1, sqr.

each protected by a high ridge. That situated nearest to the mesial line was the largest and seemed to have started first. In a ten weeks old fœtus the papillæ 1 and 2 had already retreated into the capsules which had elevated themselves like thin plates from the base of papillæ, but the latter could still be perceived through the opening of the capsule; and the bordering ridges of papillæ 3 and 4 are more distinct. These also were soon transformed into open capsules, while they became united with like ridges at the posterior surfaces of papillæ. In the outer angle of the furrow, back of papilla 1, appeared at the bottom a new swelling, at first in the superior, two weeks later in the inferior maxilla. In the eleventh to the twelfth week, the edges of the ridges blend together in the interstices between the capsules, only a suture remaining, which is interrupted by the openings that lead to the cavities of the capsules. The ridges now form the anterior and posterior wall of the processus alveolaris; in the processus alveolaris of each jaw lie ten capsules, in each capsule a papilla. Each papilla has its base fixed at the bottom of the capsule, and projects in the thirteenth week on a level with the opening, as is seen in lengthwise section of them side by side, where the rami of the vessels are also seen to enter the papillæ (Fig. V.) Each papilla has already the form of the kind of tooth it is destined to build. The form of the opening of the capsule corresponds in some degree to the form of the tooth germ. The margin of the incisor capsules has a depression at each side and is accordingly two-lobed, that of the capsules inclosing the canines, has one outer and two inner lobes, in the molar capsules are four and five lobes; each lobe corresponding to a prominence of the crown, each depression to a furrow of the same. From this time on the papillæ grow less rapidly than the upper parts of the jaw, accordingly they sink back into the capsules, while at the same time the openings draw themselves together. Close behind these, at each tooth, appears a sharp, crescentic depression, whose concavity is directed toward the opening, the same will be spoken of later. Not till the sixteenth week are the margins and sides of the ridges grown together so firmly that they cannot be separated, and in the cross-section no trace of the former fissure is found except a firm dark cicatrix which extends from the former opening of the raphe of the gum. Of the milk teeth taken collectively, the superior pre-molar is first developed, the upper canine follows it, then the central, next the lateral incisor, last the molar. In the inferior maxillary the germs follow the same order, only somewhat later. The capsules lie

close together at first, and directly above the stems of the vessels and nerves of the alveolus, only separated by a soft substance which is fibrous ; toward the middle of the embryo-life the septa between the capsules become firmer at their bases, stronger, by little and little ossify and build themselves out to the alveolus. First ossifies the bottom, then the septum from the bottom out towards the alveolar margin. To the cartilage coat of the alveolus, the gum cartilage, the capsules are attached as by broad stalks rich in vessels, at the opposite part, the bottom of the alveolus, vessels and nerves pass in the form of a cord from the canalis alveolaris to the capsule. The cavity of the latter is filled with a viscous fluid, which is reddish, later yellowish, and according to Meissner's[1] analysis, contains some albumen, phosphate of lime, muriate and sulphate, in the human specimen, also a free acid (lactic); in the calf a free alkali; but for the greater part it consists of a mucus, of which after mixture with water for some time, part remains suspended in fine flakes, part is precipitated and is curdled by acid. These without doubt are cells resembling mucous corpuscles, which either float free in the serum of the capsule or have become detached by maceration from the side walls and fallen in. The proportion of phosphate of lime seems to increase with the begining of tooth development, but the absolute quantity of the fluid diminishes in bulk as the tooth grows.

The inner surface of the capsule is smooth like a serous membrane ; in the spot where enter the vessels of the alveolus, springs up in immediate connection with the capsule of the tooth germ, a solid body built up of cells, in which later are developed vessels, and still later, nerves. Its periphery is invested with a transparent, firm, thin membrane, the membrana præformativa, which is destitute of vessels, and contains in a structureless matrix, round granules or cavities. The next true cells beneath it stand in more regular rows than the inner ones, are drawn out lengthwise and are at right angles or deviating but little from right angles, to the outer surface. Each contains a nucleus (Schwann). In the deep part are only round cells, and between these and the cylindrical forms of the outer part, occur all states of transition as in the cylinder-epithelium, for which reason I deem a more extended description unnecessary. While, however, the germ is growing, fresh layers of roundish cells undergo transposition into the cylindrical form, join themselves together lengthwise, and become fibres, which lie radial from the axis of the

[1] Mech. anat. iii, f42.

pulp to the periphery, and at regular intervals are provided with their nuclei. These, roundish in the beginning, become gradually oval, are transposed into the familiar short bodies, and finally join themselves also together, as fibres, in which likewise cross branchings become visible.

When calcification is imminent, the Membrana præformativa elevates itself in single nodes, that are the foundation of those prominences in which becomes engrafted the enamel layer of the mature tooth.

Facing the tooth germ, and, as it appears, also in connection with the capsule, is the enamel organ (the outer pulp—Hunter, organon adamantinæ—Purkinje) ; it exhibits, in the beginning, when the tooth germ is barely indicated, a globular body with surface somewhat rough, and consists interiorly of granules which gradually assume a polygonal form and are held together by fibres.[1] Possibly the granules correspond to the bone corpuscles, and the fibres to the out-going canaliculi of the same. In proportion as the germ grows toward the concavity of the capsule, in the enamel organ facing it is a corresponding recession, growing continually deeper, and when the germ (Fig. VI. *a*) becomes invested with the membrana præformativa (*c*), in a way the papilla takes on the form of the future tooth, sharp at the free edge, contracted at the base, widest in the middle, so that the enamel organ (*b*) is set like a cap over the germ, a close-fitting mold of the same, and can be loosened from it. When the enamel organ has attained this form, its concavity, into which the tooth germ fits closely, lines itself with a layer of elongated, regularly arranged cells (*d*), that all stand perpendicular to the face of the enamel organ. The cells are cylindrical or polygonal, truncated at at both ends, like the cells of the cylinder epithelium, and like them provided with nuclei.[2]

They originate in the same way as the fibres of the tooth germ, by elongation of cells, and become fibres by blending together of the elongated cells. The nuclei seem soon to disappear. There are seen only bundles of fibres separated by darker lines, and in these no neucleated fibres. At first this close-fitting envelope-like fibre-layer is joined to the enamel organ, gradually it loosens more and more and becomes an independent membrane, which may be known as enamel membrane or membrana adamantina. It is easily loosened from

[1] Raschkow, a. a., O. fig. 7. a.
[2] Schwann, Mikrosk, Unters. Taf. iii, fig. 4.

the parenchyma of the enamel organ, in all except the molars, where the enamel organ preserves considerable thickness up to the time of the eruption of the tooth.

To each capsule comes a branch of the arteria dentalis. It ramifies at the outer part upon the same, and anastomoses with branches from the gum ; from this mesh go fine branches through the wall of the capsule as far as its inner surface. The main branch of the arteria dentalis goes to the pulp and forms in it a plexus. The enamel membrane is without vessels. Likewise the outer layer of the capsule becomes by degrees firmer, poorer in vessels, and builds itself out to the periosteum of the alveolus, or blends with the latter, and now lies in the closed cupsule, the tooth germ, which meantime has assumed the exaet form of the future tooth, and in the molars shows as many cusps as the mature tooth ; the outer layer of the tooth germ forms the Membrana præformativa, the form of the latter is repeated by the membrana adamantinæ,[1] and this finally the attenuated parenchyma of the enamel organ invests in spots, receiving its vessels from the surface of the gum, while the pulp is supplied with bloodvessels from the canalis alveolaris.

As soon as the soft parts have attained completion, begins the ossification, according to Meckel[2] in the following order : the central incisor, the anterior molar, the lateral incissor, the cuspid, the posterior molar. The pulp becomes very blood-rich, and deposits at the outer layer bony particles which gradually extend themselves toward the root ; in several-cusped teeth, such particles begin at each cusp ; they extend toward the crypt of the superior margin of the jaw, and toward the side walls, and soon come together in the former. In proportion as they augment in thickness from without inwardly, the pulp diminishes, contracts itself, withdraws from the alveolar margin, and finally becomes shrunken to the circumference which it retains in the mature tooth. As in the mature tooth, so also at the beginning of calcification, the inner side of the bone and the

[1] In the disagreement over the number of membranes of the capsule and whether they contain vessels the enamel membrane is now described as a part of the capsule, now as a separate structure. Hunter (Naturl. Gesch. S. 90) assumes two laminæ of the capsule, an outer without vessels, and an inner rich in vessels. The enamel organ and the enamel membrane he has described very exactly as extremely gelatinous substance. According to Blake, on the other hand, (Reil's Arch. ix, 316) the outer thickness of the capsule is spongy and vascular, the inner firm, not injected ; the inner thickness is the enamel membrane. Serres (Essai. p. 13) ; Fox (Nat. Hist. i, 20) ; Meckel (Anat. iv, 214), and E. H. Weber (Hildebr. Anat. i, 212), speak of both membranes as full of vessels, have also divided the capsule into two thicknesses and overlooked the enamel membrane. According to Dietrich (Anleitung das alter d. Pferde zuerkennen, 1822, S. 72) the capsule ossifies ; here is the enamel membrane taken for the capsule. Bichat (Anat. gen. iii, 114), and according to him Delabarre (Odontologie, p. 10), ascribes to the capsule an inner thickness without vessels, which in the manner of a serous membrane doubles upon itself, and thus covers over the germ.

[2] Arch., III. 562.

outside of the pulp appear to be only in contiguity, not in immediate connection, and the very smallest calcified particle allows itself to be removed from the pulp without perceptible resistance. In the same proportion as the bone particles grow at the pulp from without and deposit new material within, thin layers of enamel are deposited at the outer boundary and thicken gradually outward by new additions. With the progressive thickening of the enamel layer diminishes the thickness of the enamel membrane, and when the enamel is completed, the enamel organ has wholly, or almost wholly disappeared.

These facts, which have been established by the evidence of a very great number of observations, and are easy to corroborate, have nevertheless to undergo very diverse interpretation. The question is, to decide whether dentine and enamel are only deposits at the surface of the pulp and the enamel membrane, in the nature of excretions from these substances, and whether the shrinking of the excreting organ is only an adventitious circumstance perhaps conditional upon the pressure of the deposited and hardened material; or whether the pulp and enamel membrane themselves calcify, and consequently their diminution necessarily keeps pace with the generation of dentine and enamel. The newest researches have decided in favor of the acceptance of the latter theory, which had indeed, because of the resulls of chemical analysis and the resemblance of tooth tissue to that of bone, maintained considerable ascendency.[1]

The difference between the tooth germ of the fœtus and the tooth cartilage of the adult is certainly not greater than between bone car-

[1] The first observers were also inclined to this opinion, namely, Volcher Coiter (Corp. past. tab., 1573, p. 59), Jourdain (Essai., 1766, p. 55), and Berger (De dentibus, 1788, p. 4). Jourdain noted that when the hard particle is lifted and viewed with the microscope, fine filaments are seen on the particle as well as on the horny membrane which was in contact with its inner face. Bichat (An gen. III, 118), and Sommerring (Knockerd, S., 205), explain the origin of the tooth in this way. Herissant (Acad, de Paris, 1754. p. 433), made the compromise, while he indeed held the dentine to be calcified pulp, he believed the enamel a secretion; glands were said to exist in the capsule, in the form of little bladders, which were visible with a lens of 3–4‴ optical distance. Him follow Bourdet (Art du dentiste, 1757, 1, 25), Blake (Reil's Arch., iv. 316), and Delabarre (Odontol, 1806, p. 11), without, however, conceding the existence of the enamel glands. Hunter (Naturl. Gesch , S. 98), holds the enamel pulp itself to be a gland which secretes enamel; his opinion also inclines to the structure of the dentine by secretion and forming in layers from the pulp out. This theory became prevalent and was maintained by all authorities up to a very late date. I name only Rosenthal (Reil's Arch., x., 317), Cuvier (Dict. des. sc. med. art. dent), Fox (Nat. hist., p. 22), Meckel (Arch. III, 566), Serres (Essai., p. 62), Burdach (Physiol. II. 473), G. H. Weber (Anat. I. 206), Miller (Physiol. I. 387), Blandin (Syst, dent., p. 52). The cement has even been held to be a *precipitation from the saliva*. (Rousseau, Anat. comp., p. 208). In *den Rochenzahnen*, Müller observed the ossification, but holds it to be exceptional. Perkinje (Raschkow, Melet., p. 7), does not express himself clearly. He says indeed that the membrana præformativa calcifies; but there must be layers of tooth fibres deposited between it and the tooth germ, germinis dentalis parenchymate materian suppeditate; further (p. 8), that the cells of the enamel membrane are little glands which secrete the fibres. Valentin (Entwickelungs gesch, S. 483), says. "It almost seems to me that the globules (of the pulp) themselves, dissolved, enter into the fibres," and Schwann (Mikrosp. Unter. S. 124), concludes the account of the development of the teeth with the words: "I rather incline to the older view, that the tooth substance is the pulp ossified," the easiest separability does not testify against it, whereas, in fact, some of the pulp remains attached to the tooth. and the separation must be always easier, the greater the difference in consistence. Among the later ones, Leville (Blandin Syst. dent., p. 94), and Owen (Am. des. sc. nat. Qe. ser. XII. 209), spoke decidedly in favor of this opinion.

tilage before and after ossification. The dentine is also ossified tooth germ, and the distinction lies mainly in the fact that the cartilage begins the hardening within the tooth germ at the periphery ;[1] that in the cartilage cavities and tubes for vessels first develop themselves at the time of ossification, in the dentine, on the contrary, the vessels are obliterated by advancing ossification.

To begin with, I do not know whether the membrana præformativa ossifies earlier or later than the fibers of the pulp ; but it appears, in any case, to be the matrix of the layer with bone corpuseles, which, in the mature tooth, lie between the enamel and the fibrous dentine. The fibers of the germ calcify from without inward, and in proportion as the outer part receives lime earth, the vessels withdraw from the periphery, and in the deeper part the roundish cells are transposed to cylindrical, and these to fibers. The calcified parts are but slightly connected with the still soft ones, and can, as we know, be loosened in the form of fine, earthy particles. Such earthy particles are, however, on the inner surface here and there covered by a cover of cylindrical cells, like the outer surface of the pulp, and the fibers of the new formed bone substance are in immediate connection with these cells, so that the little canals are doubtless in connection with the nucleated fibers of the pulp, though I am not prepared to make the assertion. The true tooth fibers seem to be solid, and the bone earth is chemically combined with the organic substances in them contained ; the nucleated fibers, however, contain the lime earth in microscopically perceptible particles, and are probably hollow tubes filled with a fluid from which the lime earth is precipitated. But how the anastomosis with the pulp cavity on the one hand, and the cell cavities in the cement on the other, comes to pass, has not yet been made clear. As soon as the dentine has acquired a certain firmness, commences the calcification of the enamel membrane likewise from the outer surface, that is, next to the membrana præformativa. To the free enamel layers adhere outwardly fragments of uncalcified fibers or cells, and it is worthy of remark, that already the cells from which spring the enamel fibers, are mostly inclined toward each other, so that, when one even tier of ossified cells leans from left to right, the next adherent, still soft cell layer stands leaning from right to left.

From the membrana præformativa the ossification advances inwardly in the tooth germ, in the enamel outwardly ; in the tooth

[1] Raschkow (Melet. p. 5), observed in the molars of the hare, the pig, and the deer, stony masses in the form of translucent, oval or roundish granules in the axis of the tooth toward its edge, in several irregular rows. I have seen similar ones in the pulp of the adult human tooth. They seem to be formless deposits, having no relation to the regular ossification.

germ as far as the axis in which is left an uncalcified residuum, in the enamel as far as the enamel pulp, which finally becomes metamorphosed into cement. Perhaps in the structure of the cement the tooth capsule has a share; concerning the crust layer of the root, Purkinje [1] conjectured that it was formed by calcification of the capsule, and Nasmyth [2] shows that the crust substance of the root is uninterruptedly continuous with that of the crown even in man; in that case it must originate from the capsule. In the enamel the calcification goes farther in a certain measure, than in the rest of the tooth substance, whereby the organic material diminishes so much the more. Schwann [3] thought this the result of chemical solution by the fluids of the mouth, but it is not explained why such a result should confine itself to the enamel, and not effect the dentine or cement.

Toward the time of birth, and when the formation of the crown is complete, first begins the development of the root. The tooth pulp extends itself with the capsule to the bottom of the alveolar process, and this part of the pulp then calcifies from within outwardly, and to its outer surface the capsule attaches itself, also calcifying, and becomes the cement layer. In the case of teeth with several roots, calcification begins at the alveolar surface, as soon as completed, in single bridges, whereby the pulp is divided into separate processes. It begins at the middle of the alveolar surface, and extends anteriorly and posteriorly toward the edge of the crown, so that the bridge between the roots presents, in a certain time, a little rhomboidal plate, of which the points anteriorly and posteriorly rest against the side of the crown.

With the formation of the roots, and as it appears, contingent thereon, begins the eruption of the temporary teeth, usually in the following order: first the inferior central incisors, then the upper incisors, the anterior molars, the cuspidati,[4] the posterior molars. Previous to the eruption, absorption of the gum takes place. Herissant [5] discriminated between a deciduous and a permanent gum, the former atrophies at the time of eruption, shrinks to a mere tattered fragment and leaves beneath the permanent gum.

[1] Raschkow, Melet, p. 7.

[2] A. a. O. p. 312.

[3] Mikrosk, Unters. S. 122.

[4] Meckel's Arch., iiii, 573, Blandrn, Syst. dent. p. 102.

[5] Acad. de Paris, 1754, p. 429.

As to the manner in which the permanent teeth begin to develop, there has been much investigation, but as yet not entire agreement. Fallopius, indeed, describes openings in the alveolar process behind the temporary teeth, through which a *cauda* of the permanent tooth passes to the gum, "*iter dentis.*" Albin[1] says, that the alveoli of the permanent incisors open outwardly behind the temporary teeth, while the alveoli of the permanent molars open into the alveoli of the corresponding temporary teeth, and the permanent cuspids, sometimes the one way sometimes the other. Serres[2] agrees with him and thinks that the *iter* or *gubernaculnm* is hollow. Meckel[3] finds, however, the opening in the alveoli of the permanent molars, also behind the alveoli of the corresponding temporary teeth in the posterior wall of the jaw almost as late as the third year; Linderer the same.[4] The first preparatory beginings toward the permanent teeth, are made, according to Goodsir, by the fourteenth or fifteenth week. The above mentioned cresent-shaped depressions behind the openings of the capsules of the temporary teeth, become reserve sockets for the corresponding permanent teeth. They deepen, and their walls are in contact, but not grown together. In the fifth month of the fœtus, life, appears in their depths a fold, the future tooth germ, and near the opening two other folds, from which is developed the capsule. When it is finished, the permanent teeth lie so close to the posterior wall of the capsules for the temporary teeth, in the recess of the same alveolis, that they might appear to grow out of the latter capsules.[5] Later, at the eruption of the temporary teeth, the sacs of the permanent teeth withdraw in the opposite direction; their alveoli enlarge and finally only connect with those of the temporary teeth by a sort of neck. Through this neck pass connecting cords, which, however, are not tubular, the *gubernacula* of the permanent teeth. For the last three permanent molars, a part of the tooth furrow remains open behind the last temporary molars; in this first start the germ and capsule of the third permanent molar. The capsule closes, and the margins of the furrow unite, but not the walls, and thus remains between the capsule of the third permanent molar and the jaw, a cavity not lined with mucous membrane. In the seventh or eighth month after birth, this cavity begins to lengthen backward, at the bottom of it appears a papilla, that of the fourth

[1] Adnot. acad. ii., 14.
[2] Essai, p. 36. 109.
[3] Arch. iii, 558.
[4] Zahnheilk, S. 71.
[5] Meckel, in Arch., iii. 557. Bell, Anat. of the teeth, p. 61.

permanent molar ; that part of the cavity which contains the papilla separates itself, and in the remaining part finally starts the germ of the wisdom tooth.

At the time of transition, as we know, first the roots of the temporary teeth are absorbed, whereupon the crowns loosen and fall out. Obliteration of the branch of the dental artery which ramifies to the milk teeth, precedes this decay. The bone canal in which it lies contracts, and in the ninth year becomes empty. That the new teeth destroy the roots of the old ones by pressure, has already been refuted by Hunter[1] and Albin.[2] According to Retzius,[3] the capsule of the closely succeeding tooth tumefies at the surface in contact, forming a thick body, rich in vessels, which secretes a fluid that dissolves the root of the temporary tooth. This explanation would not be sufficient, if, as Hunter noted, the temporary teeth fall out when no permanent teeth are present. The latter was disputed by Nasmyth,[4] he holding that temporary teeth remain when the permanent teeth are wanting. According to Nasmyth, the capsules become enriched by vessels, and absorb the roots of the temporary teeth. In their eruption the permanent teeth follow the same order as the temporary.

Having attained their full growth, the teeth become gradually changed and worn by use ; the enamel of the masticating surface is worn off, the prominences become smooth and even, and frequently the dentine itself is denuded and visible as a yellow stripe upon the masticating surface. According to Prochaska,[5] if the pulp cavity is by this means exposed, it throws out new bone substance. In the case of many animals the loss sustained at the crown is supplied by continuous growth from the root ; some portions get in advance, and a tooth which is no longer worn down because its opposing tooth is lost, attains an enormous length, as for instance the incisors of the rodents.[6] In man this gradual restoration does not take place.

Though it sometimes happens that the teeth are preserved until extreme old age, yet so frequently, and in otherwise sound individuals, they are lost, that their atrophy must probably be called normal. The coherence between enamel and dentine also becomes slighter in age ; in the attempt to cut thin sections, both separate

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[1] Serres, Essai, p. 17.
[2] Naturl. Gesch. S. 184.
[3] Anat. acad. ii. 12.
[4] a. a. O. p. 318.
[5] Adnot. anat. p. 14.
[6] Lavagna, Carie dei denti., p. 151, Tenon, Mem. de l'inst. an vi., p. 558.

much more readily than in young teeth.[1] As a rule, calcification of the pulp precedes the shedding of the tooth, and is perhaps its immediate cause. This newly formed bone substance, according to Fränkel,[2] in the crown resembles dentine, in the root is like cement; according to Nasmyth,[3] it resembles dentine, though its formation is not so regular, and it contains bone corpuscles. The alveolus, after falling of the teeth, becomes in part absorbed, partly calcified.

By no means infrequent instances of a third dentition in old persons, were collected by E. H. Weber, Hildehr. Anat. iv, 123, with which must be counted one by Hunter (Naturl. Gesch. S. 88), and by Linderer (Zahnheilk, S. 246).

In the calcified tooth are neither vessels nor nerves. The teeth have often for this reason, been declared to be inorganic parts, like horn structure, that have no relation to the nutrient fluids of the body. It is true that cavities occur in the substance of the teeth which are not filled up, parts lost and gone that are never restored, and a new formation, if it occurs, is only seen at the periphery of the pulp. Besides, tooth caries begins at the periphery, by the setting free of the lime earth; the affected spot is broadest outwardly at first, and in the dentine (Fig. VII. *b*) as well as in the enamel (*a*) has the general form of a cone whose base is directed outward and its apex toward the pulp cavity (*c*), in such a way that the base of the carious part in the dentine is usually somewhat wider than the adjoining apex of the carious part in the enamel, as well as smaller than the base of the latter.[4] Accordingly the conclusion seems justified, that tooth caries is entirely different from bone caries, and only dissolution by an agent working from without, that is from the buccal cavity, upon the tooth. But were the dissolving of the lime salts by the fluids of the mouth the only and sufficient cause of dental caries, all the teeth would become carious simultaneously, since all are in like manner exposed. In that case all would sometimes become carious at once from an acid state of the saliva.[5] Since this very seldom happens, there must be a predisposing cause in individual teeth, that this is an inward one is manifest in the fact that symmetrical teeth often become carious, and the cause can only be connected with the nutrition of the teeth. Defective nutrition

[1] Fränkel, a. a., O. p 10.
[2] p. 15.
[3] a. a., O. p. 325.
[4] Linderer, a. a., O. S. 167.
[5] Regnart, citirt bei Donne' Hist. de la salive. p. 47.

alone does not necessarily induce caries, since the temporary teeth and those of old people are often loosened for a long time and fall out without being affected ; indeed implanted teeth are sometimes attacked, though very rarely.[1] When, however, an injurious influence from without is not counteracted by continual renewal of material, than decay gains a foothold in the tooth substance. The injury which attacks the tooth from without is usually held to be chemical in its nature ; especially that an acid state of the fluids of the mouth acts as a solvent upon the salts. That an acid condition of the saliva might affect the teeth, cannot a priori be denied ; yet teeth treated with acid appear quite otherwise than carious. Indeed the organic permanent part of the teeth plays a leading part in disease of the same. The peculiar appearance of carious teeth, the offensive odor in long-standing cases, arouse the suspicion that parasitic animals or plants may induce the destruction of tissue, especially if one knows what a number of low animal and vegetable organisms swarm even in teeth kept constantly clean.[2]

The facts that contiguous teeth infect each other, that decay may be checked by removal of the affected portions, are easily explained under this theory.[3]

In favor of the theory of continued renewal of substance in adult teeth, speaks their alteration, their half transparent appearance in hectic patients. A renewal of lime earth appears not to take place in these cases, and for this reason the teeth would be deprived of bone, in which lime earth is renewed, though slowly. Madder dye, if fed to young animals, has no influence upon the completed teeth, but only upon layers in which calcification is just taking place. [4]

In rachitis, in which the bones are deprived of lime, the teeth remain unimpaired.

The sources of nourishment of the teeth are as follows : 1. The pulp, as it were the matrix of the teeth, as through it circulates and is renewed the nutrient fluid ; in very minute quantity the plasma may

[1] Linderer, a. a., O. S. 488.

[2] Vide page 77.

[3] Leeuwenhoek (Opp. III. 40) first called attention to the vibriones and a kind of filaments found between the teeth. The latter were accurately described by Buhlmann (Müll. Arch. 1840. S. 442.) It is to me very probable that they are of vegetable character, and it i well worth the trouble to investigate whether they are concerned in the production of tarter.

[4] Hunter, Naturl. Gesch. S. 42. Blake, a. a, O. S. 336. Linderer, S 194. Flourens, Ann. des. ee. nat. XIII, 110. According to Hunter and Flourens the enamel does not become reddened by madder Blake and Linderer found it also dyed The first named probably made their observations at a time when the enamel was already calcified. Flourens asserts that he has observed in the teeth of swine fed with madder, that the outer layers disappear in the same proportion that the inner ones are renewed

extravasate and run through the tooth by imbibition, perhaps preferably through its tubuli. Congestion and exudation from the vessels of the pulp have therefore the same relation to the tooth that exudation from the cutis has to the cuticle. This explains why pain often so long anticipates the caries, which could not occur if caries were only decay from without, and the pain only induced by irritatation of the air or the decaying tooth substance. The remarkable immunity of the lower incisors is perhaps because of the sparseness of their nerves or vessels. 2. The periosteum ; this furnishes the nutrient fluid to the root ; hence the root becomes carious so much more seldom than the crown, and is often preserved when the latter is destroyed. The fluid, which is contained between the gum and the tooth, gushes out upon pressure, and its richness in mucus granules proves it a living plastic substance. The tooth is protected by it, its coagulation or dissolution into its composing elements, causes insensibility. This insensibility of the tooth cannot result from the enamel being affected, as has usually been claimed, as in that case it could not so soon disappear. There is no restoration of tooth tissue. As to the bullets found in the tusks of elephants imbedded in tooth substance, it can be asserted that they were introduced into the soft pulp during the forming period. Accidentally formed teeth occur in tumors, especially of the ovaries, they have not yet been particularly studied in regard to their structure. Freshly implanted teeth can through exudation from the pulp grow fast. Hunter succeeded in healing up a tooth in a cock's comb in such a manner that its pulp could be injected.[1]

Among the varied forms of teeth of animals, we have the so-called enamel-containing molars of the ruminants and pachyderms. Here the pulp, as well as the enamel organ, divides from the beginning into a number of lobes mutually interposed. The enamel organ consists of a layer without vessels, corresponding to the pulp of the enamel organ. The enamel membrane lies next to the periphery of the germ and becomes enamel ; from the enamel, gradually calcifying from the apices toward the base or the edge of the tooth, springs the cement, which in enamel—containing teeth, occurs in so large a proportion. (Blake, *diss. de dentium formatione*, Edinb. 1780. Reil's Arch. ix, 329.)

In the incisors of the rodents, the canines of many pachyderms, and the molars of the ruminants, which as before mentioned,

[1] Naturl. Gesch. S. 256.

continue to grow after eruption, the enamel membrane does not stop so abruptly, but extends into the socket always calcifying outwardly and growing from within. At the inner surface of the gum which is next to the erupted molars of the ruminants, there is, in young animals, a layer of perpendicular fibres, similar to that in the enamel membrane. (Raschkow, *Melete*, p. 11.)

In the proportion of true tooth substance to that which resembles bone, exists the greatest variation. In the human tooth, the layer with bone corpuscles occupies only the outermost part of the crown and root; in many animals the bone corpuscles and stellate branches are found throughout every part of the crown, and here cement takes the place of true dentine. In the lynx and sheep are bone corpuscles between the tubuli, the latter curving around the former; in the horse, the elephant and the rhinoceros, are in the pulp cavity concentric layers of bone corpuscles; in the walrus the enamel is protected by cement, and through the whole tissue of the tooth run a great number of fine longitudinal medullary canals conveying blood. Such are found also in the cement of the horse (Gerber), in the teeth of the pike and other fishes. Outside the cement, Nasmyth observed in oxen, elephants, and other mammals, a peculiar, laminated layer, clear yellow to dark brown. C. Mayer called attention to pigment in teeth, for example the incisors of beavers, the molars of ruminants, on the outer surface of the enamel, not constituting of itself a layer. It is sharply limited by the edge of the gum, and appears to be conditional upon plant food.

In the cartilaginous fishes, the tooth germs develop, as in the higher animals, in a furrow of the mucous membrane of the mouth; no capsule and no socket are formed however, to enclose the germ, but the germs stand exposed, take the form of teeth, calcify and gradually pass out of their furrow to the margin of the jaw to be shed, while new papillæ erect themselves in the furrow.

Note.—F. Cuvier, Dents de mammifères, Paris, 1820; Heusinger, Histology, S. 193. Rousseau. Anat. comparée du systeme dentaire, Paris, 1827; Retzius, a. a., O. S. 498; Linderer, a. a., O. S. 27; Owen, Ann. d. Sc. nat. 2 eser. xii, 210; Derf. Odontography, Lond. 1840. P. I. (Fischer); Nasmyth, a. a., O. p. 315; C. Mayer, Metamorphose der Monaden. S. 24; Gerber, Allg. Anat. S. iii, fig. 67, 98.

In the beaked animals, some cetacea and birds, the teeth are restored by a structure having the texture of horn tissue. Camper, Observ. sur la structure des cétaces, p. 63. Heusinger, Histol. S. 197 (Schnabelthier, Fischbein). Rousseau, a. a., O. p. 167, pl. xvi, fig. 9, 10 (Schnabelthier). Rosenthal, Abhandl. d Berl. Akad. 1829, S. 127 (Fischbein). Brandt, Ueber den Zahnbau der Stellerschen Seekuh. Abhandl. d. Petersb. Akad. 1832; Hesse, De ungularum, barbæ balænæ, dentium orn thorynchi structure. Berol. 1839.

Among the older observers, only Leenwgenhoek knew the structure of dentine (Opp, I, c. p. 2). According to him the teeth consist of straight, thin, transparent tubes, which rise in the pulp cavity and proceed outward to the periphery, 6—700 times finer than a hair; in the transverse sections they resemble granules, in ivory they run zigzag. The fibrous structure of the enamel, on the contrary, has often been noted: Gagliardi (Anat. oss. 1689, p. 61) discerned the fibers after calcination, Malpighi (Opp. posth. 1697, p. 52) distinguished the enamel as substantia filamentosa, which ends at the root; the crust of the root also as filamentous, which had formerly been noted as a material like tartar. De la Hire (Acad. de Paris, 1669,) added that the fibers stand perpendicular to the grinding surface, and Broussonet (ebendas. 1787, p. 555), that they lie horizontal at the side. Herissant (ebendas, 1758, p. 334), said that enamel differs from bone in the fact that after

treatment with muriatic acid no cartilages remain, and that its fibers were crystals; Hunter also described enamel as crystalline (Naturel, Gesch. 1780, S. 37), and likened it to gall and bladder calculi.

Schreger (Isenfl. and Roseum, Beitr. 1800, S. 2) detected the above described concentric striæ in dentine; Cuvier (Dict. des sc. med. Dent 1814), Heusinger (Histol, 1822. S. 201) and C. H. Weber (Hildbr. Anat. I, 206) argued therefrom a lemellate structure. In the year 1835, however, the dentine was again studied microscopically, its tubuli were detected anew by Parkinje (Frankel Dent. struct.) and their ramification described. Parkinje detected further the structure of cement and its relationship to bone, as well as the finer structure of the enamel fiber. J. Müller (Arch. 1856. S. 11) showed that the tubuli contain lime earth, also that it is found in the intervening substance; he describes the enamel fibers of the new formed enamel layer, as needle pointed at both ends (Poggend, Ann. xxxviii, S. 352, Tav. iv. Fig. 2). Retzius (Müll. Arch. 1837, S. 486) gave as the result of his researches undertaken simultaneously with Parkinje's, a very complete account in detail of the dentinal tubuli and the enamel fibers, which we have fully communicated. Linderer (Zahnhielk, 1837, S. 168) confirmed it by his own researches. Schwann (Mikrosk, Unter, S. 117,) whom we thank for accurate particulars as to the origin of tooth tissues, first studied the fibrous structure of dentine in the fœtus, but without divining the relation of the tubuli to the fibers. Krause (Anat. 2te. Anfl. 1841, S. 147), noted in appearance as if dentine were composed of fibers of 0.0023—0.004‴, in teeth treated with muriatic acid. Of the cement layer in the crown, and its development from the capsule, we learn from Nasmyth (Medico-chirurg, transact. xxii, 1839, p. 310).

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PERFORATED ROOTS.—TREATMENT.

BY BENJ. J. HERT, D.D.S., ROCHESTER, N. Y.

[READ BEFORE ROCHESTER DENTAL SOCIETY.]

The subject I wish to bring before the meeting this evening is one which fortunately does not occupy much of our time in practice, and yet sufficient, I think, to make a discussion of it profitable. It is: Filling teeth which have a hole through the side of the root, or through the floor or walls of the pulp chamber.

I have not had, within my recollection, more than half a dozen of this class of teeth to fill. Of these I will speak of three or four. The first was a left superior lateral incisor, cavity on proximate surface. As the pulp was exposed, I killed it with a stick, and then enlarged the pulp canal at the lower end in order to gain easier access to the upper part. As the blood did not cease flowing, I placed a dressing in the root, allowing it to remain until the patient came again. On removing the dressing I found that the hemmorhage had not ceased, and that there was a sensitive spot in the canal about half way to the apex, and which I finally, after treating it several times, concluded was an opening through the side of the root. I thereupon filled the upper part of the canal beyond the opening with wood, then pressed softened gutta-percha into the canal, took it out, trimmed it where it had passed into the opening, replaced it, and finished with oxy-phosphate, and up to the present time the gentleman has experienced no trouble from it.

In another case two lower molars had each a hole drilled through the floor of the pulp chamber. When the patient came to me one of the openings had been filled with a zinc filling, and the other had not been touched after the hole had been made. I did not fill the latter opening, but flowed soft phosphate of zinc over so that none would enter it, and neither of these have given any trouble—both have been filled about one year.

Another case I had, however, that did not turn out quite so successfully. A lady came to me who had had a hole drilled through the posterior wall of a wisdom tooth root. It had been treated for some time before she came to me. I treated it several times, but the soreness did not abate. I then decided to fill the root, which I did as in the first case, by pressing gutta-percha into the canal and opening, then taking it out and trimming and replacing it; but I first put a little iodoform in the lower end of the cavity. In about a month the soreness passed away, and for several months she had no trouble from it, after which the soreness returned, she of course doing the same. I removed the filling a few weeks ago and have the tooth under treatment again. Of course, I am unable to tell what the ultimate result of this case will be. The soreness returned after it had once passed away, because, as I believe, of the fact that the entire filling was of gutta-percha, and in using the tooth she eventually pressed a small portion of the filling through the opening in the root into the adjoining tissues, and therefore, almost necessarily, the irritation and soreness returned. I have never heard nor read of any special method or manner of filling such teeth, but have several times heard them spoken of as being almost hopeless; but my experience has lead me to entertain a different opinion.

THE RIGHT RELATION OF DENTISTS TO PATENTEES AND TO MEDICAL CODES.

BY JOHN T. CODMAN, D. M. D., BOSTON, MASS.

GENTLEMEN,—I call your especial attention to the following sentences, as they are worthy of profound thought:

All labor deserves just compensation. The foundation and permanence of civilization depends on the fulfilment of this law, and the only danger to our grand republic is its non-fulfiment.

The professions were intended for the rich and educated. The poor expected to till the land and work at the trades, for in older times poverty meant ignorance as well as poverty.

The kings and the nobility were the rulers, the aristocracy of possession and faith. The professions, arising from wealthy and educated classes, grew into power by their increasing control over the masses of the people's minds through the *clergy;* over their

bodies by the *physicians;* and their estates by the *lawyers.* They were the founders of a new aristocracy, the aristocracy of *talent*, which is slowly unseating the older one of birth and station.

Transferred to our democratic country, the professions still have a strong tenure on the minds of the people, and as we have no station or rank, they more or less represent three aristocracies.

By the growth of modern society new and vast industries and interests have developed, and are developing, that demand a high and constantly increasing higher grade of talent, so high indeed as to vie with and rival that of the so-called liberal professions. From obscure beginnings they have increased into enormous developments that require learning and education of so profound a character that the professions are rivalled or eclipsed by them, and the young man of to day of education and wealth, instead of being sure, as formerly, as destined for one of the three professions, hesitates, and often casts them aside to enter some new occupation not yet dignified by the name of profession.

It is a new profession, that of dentistry. Simply that it comes in close contact with medicine does not make it less a new one. It has at its base two feet or principles, one of which is mechanical and surgical and the other medicinal and curative, both being necessary for success, but the first being absolutely fundamental, so much so that many to-day are still questioning whether dentistry is a profession or an art.

The professions, from an early day, have been endowed with special privileges. The hand of government has stayed proceedings against them when it has fallen heavily on non-professionals. Special ownerships and rights have been secured by which the path of progress and success has been made comparatively easy.

The legislature of 1887 made the dentist's art in Massachusetts a legalized profession by enjoining from practice all who do not graduate at legalized colleges or pass a board of appointed examiners. Therefore there remains no argument on the question as to whether dentistry is here a profession or not, but by the fact of its being allied to the medical profession by one of its bases, it is claimed, and unwisely, I think, that all its formulas and methods should conform to the formulas and methods which were adopted by the medical profession before the science of dentistry was developed enough to be more than a mere trade or calling, and recorded long before the wonderful and tremendous developments that have taken place in other

spheres and occupations of life, and before the modes and ways of modern business had come astonish the world. But, primarily, dentistry is a mechanical profession, that is to say, the major part of its employment demands mechanical and adaptive skill of no mean order, and however well any man be up in anatomy, surgery and all branches studied in the medical schools; however well he may be covered with titles, without the talent for and the practice of mechanical skill well in hand, he cannot be a good dentist. On the other side, with practice of the teachings of the medical school alone, a man may become a successful physician, and carry comfort and peace into many a sick chamber without having mechanical skill enough to crack a walnut or drive a nail without pounding his fingers.

What is a profession? Something that we individually, or, as a body, profess or pretend to do or be. The physician professes to cure the sick; the clergyman professes to save souls; the lawyer professes to interpret the laws justly.

These are what constitute the outward signs of the professions—their attitudes before the public and externally. Internally they are governed by laws or sentiments that are called codes of ethics. These codes define general principles of government and stand paramount to law in the regulation of professional intercourse, duties and courtesies and in their relation towards other bodies of men and individuals and oftentimes to the taking or withholding of fees and the amount of fees in given cases. The medical profession has a code established by the American Medical Association. The State Society has one, and the county societies have them. These codes impress me strongly that, beside the element of courtesy and justice they desire to cultivate, their one great and prominent idea is to eliminate from the professions all the principles of trade, and thus, whether wisely or not, setting the stamp of inferiority on the merchant and his modes of accumulation.

We are called upon to-day by some restless spirits in our societies to voluntarily go forward and offer to sign the code of ethics of the American Medical Association, and I propose to show wherein the new profession of dentistry should not do it; to show why it should mark out for itself an independent position, untrammeled by anything that has gone before it, and having its own and improved code substantially what our profession needs, and differing from what the medical profession needs, in as much as our own profession differs from the needs of that profession.

But, were we inclined to adopt the medical code, would it be prudent to do so? Would this society represent the majority of the profession? Would the combined societies of this state represent one-half of the dentists of the state? Would all the societies in in New England represent one-quarter of the dentists of New England? Would all the dentists in the societies of the United States represent one-fifth of the dentists of the United States?

It seems to me the first duty of dentists is to try and reach their professional brothers and make them members of our societies before we agitate an addition to our code of ethics that may have an effect to divide rather than to unite our body.

To harmonize all dentists; to bring about a united profession; to build up a union that is strong; to teach men to be in honorable relation to each other; to be truly a profession, and that is to live up to what we have already proposed; to come together and discuss issues; to care enough for their profession and themselves to so come together, are among our first duties. Not to pass resolutions and codes that some must entirely dissent from, and have already dissented from, and which will have a tendency to keep members farther apart than now and stir up opposition, but to join hands and go as a united body towards universally agreed ends.

A supposed inducement offered by the agitators to sign the code of ethics of the American Medical Association is that no member will be allowed to patent any article of use to the profession or have a financial interest in such a patent. There are those who continually harp on this idea, as though it was morally wrong to own a patent, and harmful to the professions, and that the exclusiveness given by a patent right was wrong in principle when applied to anything that might adduce to the comfort of a sick person.

I have tried to sympathize with this idea, but am unable to do so; in fact, find myself fast drifting in the opposite direction, for it is by a patent that the professions have any right to live at all as professions. It is by a patent of the legislature that dentistry can lay claim to be a profession, *i. e.*, the open right to be exclusive, for we now have the right to exclude, for our financial or moral benefit, any whom our patent covers.

To deny the right of a man to a claim on his invention because it adds comfort to the sick would deny him the right of recompense for an invention of a softer spring bed, a new invention for a pillow, a softer wool blanket, a better ventilator, a more convenient drinking

cup, a new couch, a better chair, a nicer ambulance, an easier vehicle, a safety bit or patent horse shoe, as it might be that the use of any one of these at given times could have saved a life.

Owning, as we all do, and must without exception, the great personal and national value that patents have been, and are to-day, is there any man so befogged in his mind that he cannot say that the one great inducement that has stimulated invention has been that of personal reward.

And who more likely to see the wants of a profession or business than the man who is continually in its practise? And this I say, that the man, whoever he is, who turns aside from his professional duties at the call of the inventive genius, be he physician or be he dentist, he who invents for *all time* something that gives special relief, at a cost to himself, either in dollars, brains, work, or any other labor, has a right to be repaid in the coin of the country, and the country acknowledges it to be so by giving him the use, or a royalty on the invention, covering a *few years* time. And the inventive genius both of the physician and the dentist will wane in proportion as this right is unrecognized. I cannot see how in any possible way this fact can be ignored.

This does not prevent any man, who so desires, from giving his services, if he wishes, giving his ideas or his money, if he can afford to, but to deny his right to be an honorable man, worthy of a place in the most honorable societies in the world because he is a workman worthy of his hire, is to deny one of the fundamental principles which binds society together, and the ignoring of which will tend towards its disintegration, and though it may not be fatal to a profession whose special function is to give drugs and medicines, in our specialty I am sure it will work harm.

But suppose we ignore patents, and our brother over there has invented a good thing and wants to bring it out, what is to be done with it in face of this tremendous fact, that no manutacturer will make it for the public if it requires considerable outlay in models, tools and experiments, without the protection of a patent, unless the inventor pays the expenses out of his own pocket. No one who is not up in all the modern ways of manufacturing knows what expensive tools and appliances are required to make many things that look very simple after they are finished.

Shall we let our inventions be dormant for want of a patent to secure the manufacturer. Shall we let our inventive faculties rest for want of a stimulus. It is well said that inventors are usually

poor. Yes, that is why they invent—for hope of reward—and as society never voluntarily offers any one his dues; as every man has to demand them; the patent laws are intended to prevent the inventor from begging from society what is his natural right—the right of compensation.

Now if the patent laws are unjust, repeal them, alter them, change them, regulate them; but never deny the right of the inventor or the equity of his just compensation.

Much stress is laid on the past existence of a Dental Vulcanite Co. and its relation to the dentists. Here let me say that if any man felt aggrieved at paying for the use of rubber he need not have used it. There was no moral necessity for using it. I never knew that the dentists were so penurious as to feel the outgo of a license fee was a grief, but this I did know that the grievance under which we all suffered was that it was by fraud and incompetent judgment in the patent office, and on the bench, the patent was granted and sustained. It was the theft from us of what belonged to us. That was our grievance.

I defy anyone to prove that any dentist has injured his profession by a patent or any contrivance that has ever been made; and, if your are sensible, you must see that the ingenuity that has invented many things, daily advertized and in daily use by us, has been of incalculable benefit to us and to our patients, the public, who pay the bills. Then why should we exclude patentees from a mechanical profession; we who need all the invention we can stimulate? Why should we call the atmosphere of patents *foul?* To do so is simply absurd!

But the anxious writer of the "Footprints of a Profession" gives himself away so thoroughly in the following paragraph that I am tempted to quote him. Page 12, first paragraph:

"I cannot see the justice of such men as Dr. Black or our own Dr. Andrews working on year after year in faithful earnest work, a work that they can best do, a work that can never be repaid by the profession, while another may see elsewhere a mechanical contrivance, apply it to dentistry then sell to a dealer for thousands; for the work of each is but their work, or thought, or idea for their profession."

Exactly, my friend. Just so. I cannot see the justice of Drs. Black and Andrews working without financial reward, for the profession (and mind you they are doing a thousand times more for the public than they are doing for us);—but because they do not

receive a present financial reward, is it any argument that another man who works in another line should be without his reward also. On the contrary, pay, I say, all your creditors you can.

There may be a time when such men as Andrews and Black will be paid, but if all the brain work and all the inventive genius of our specialty is appropriated by us, as our right, with only oftentimes an unappreciative "thank you" for a reward, what stimulus to future inventive activity in our young and glorious specialty will you hold forth and will it have.

I think my honorable friend of the "Footprints" is looking through the object end of his spy-glass and narrows down his ideas. He would that one could be paid in coin of the realm, but the other, God save him, he is only a patentee—let him go. His atmosphere is foul. He thinks himself the liberal man, but I *know* I am, because I advocate the reward of both. The one goes unrequitted only because it has been the habit of our people and our times to appropriate ideas of certain sorts without pay. Dr. Andrews works well and beautifully, but had he also the stimulus of financial aid, would he work any the less well? Nay, you all knew he could do more, if not better.

But I leave this point, simply saying that if you drive from our societies its inventors, they will claim more as outsiders than in our ranks; for, while in, they will have, as all have, some feeling of fealty and loyalty, which, when out, will be replaced by disregard and positive contempt.

We are invited to surrender our independence. Sink our individuality in the older profession of medicine. To be no longer independent but liberal. We are told we are not liberal, but that the medical profession is.

This is a very broad assumption, and before the surrender of our individuality; before we lose the distinction and the rights that have from the first belonged to us, it is well to pause and consider the step—whether it leads upward towards clearer atmosphere, or down into the fogs that hang like a pall over the intellects of the special workers on the human organism.

Hippocrates, the father of medicine formulated the code of ethics that for two thousand years has swayed the medical profession. Was it a liberal code, and is it a liberal code viewed in the light of to-day? It had its distinct points of doctrine. First, brotherly sympathy and protection: to teach the sons of physicians, without

fee, and look after them as their own children. Second, to instruct their own sons, those of their teachers and disciples, and *no others*. Third, to follow the system of regimen that was considered best for their patients, and to abstain from what they knew to be injurious. Furthermore, there were moral instructions and a promise that whatever in connection with professional practise, or not in connection, should be seen or heard should not be divulged, but kept secret.

At best, though kindly and liberal for its day, it was a class legislation. It was intended that certain families should monopolize the medical profession, become its guardians, and that it should have none others.

Later in the centuries the trades organized under the name of guilds, dispensing their own charaties and keeping their own secrets, and finally, after uniting in larger guilds or corporations, exercised important influences in society and government, and became through their unity, their skill and knowledge, the predecessors and probable founders of the Masonic order of to-day.

In England, where patents took their rise more than in any other country, their cost was large. The inventions of artisans were kept as secrets and handed from father to son, as in the days of old Hippocrates, and it was natural that after a time this exclusiveness should be followed by a better system; one giving to the public the secrets of the artisans only under restricted conditions and with the certainty of recognition or reward to the inventors. For often the inventors of valued improvements died and the improvements were lost to society.

I wish to show by this that from the medical profession sprang the exclusive system which was the ancestor of the patent right system of to-day, and that the exclusive system has never been ignored up to this present moment, and the china wall built around to keep enemies out has dwarfed its usefulness by standing in the way of medical progress, and brought about a spirit of conceit that vastly narrows its influence. I am not speaking about men. The medical profession contains some of the best and ablest men the world knows. But I am speaking about the system to which we are asked subscribe.

Do not think I am hard on the medical profession. Do not think me hard if I say that, with the abundant opportunities it has had, it is a tremendous failure in the part of it relating to the general science of cure. I stand on the border land and can say so with less

offence than others. To be a member of so old a profession should be a great honor. I cannot but think our young branch of it is a branch will bear fruit earlier. At least a thousand years have gone by and yet so simple a question as, What is the normal diet of man, the diet that will keep him in health? cannot be answered. Would our people living on fruit and grain be as strong and healthy as now? Would the absence of hydro-carbons in diet be a loss or a gain? Is there any relation between a mild winter and a prevalence of colds, pneumonia, asthma and diseases of the hydro-carbon sort? Do physicians say to their patients on their way to warmer climates that they need to change the diet to agree with the climate? Do they say to us who live in a heated atmosphere of furnaces and warm clothing, that you should change your diet to correspond to that condition, it being opposite to the normal. Is there a diet that will absorb morbid growths? Is there a habit of diet that will produce consumption? Is there a habit of diet that will cure consumption? These are a few of many very, very simple questions, and who can answer them? Certainly not the profession, who cannot tell what a common cold is, and how anyone may avoid it or cure it.

Is it necessary for me to suggest that experiment can tell? Is it necessary for me to say that if the physicians will try dietetic experiments as faithfully as they have tried innumerable drugs, as faithfully as the chemist tries his varied combinations and experiments, there would be as certain and as sure results. And if they are too busy to occupy themselves with "provings" on themselves, there are men and women who have surrendered their rights to life, liberty and human happiness, and indeed some who society slaughters like beasts, who are dietetically unprejudiced, upon whom the experiments may be tried, and who in their lonely cells will be more than glad to assist in this work, if by so doing they may be redeemed some days or years earlier to their lost privileges and liberties. Yes, remuneration always from society to the individual, for what the individual has done is everyone's right.

But I am warned that I must close. Is there any here who do not see the drift of my discourse—independence and freedom. It is said, that if we do not do thus and so, we shall not be recognized as professional by physicians and others. It is not so. I am happy to quote the words of the essayist of our last annual meeting: "We are being recognized as professional men by physicians, lawyers, clergymen and the public, fully as fast as we deserve. It is not

modest for us to seek such recognition. It will not change the facts for this society to resolve, or if all the dentists in Christendom should declare we are a profession. It is for us to so educate and conduct ourselves that our work shall compel all to accord to us the honor of being a profession."

That we will truly become so I have no manner of doubt, but being the youngest, I desire that it shall take the broadest platform, in conformity to the grander times in which we all live, and that it shall not bind itself in the swaddling clothes that were made for the father profession when it was a babe. But it will never become what it ought until every member is so proud of it that he will want to bring its achievements into the foreground every time.

DENTAL EDUCATION.

Education is a practical matter. Consideration of practical subjects has two natural divisions or parts,—consideration of the end, and consideration of the means. We must first know what we want to accomplish. Then we may proceed to consider the means of its accomplishment.

First, then, the end. What is it that is sought by dental education? Plainly, to make dentists.

What is a dentist? This question, I believe, has never been answered. There are dental colleges in operation in all parts of the country, but we have as yet had no description or characterization of the article which they produce. No criterion has yet been given by which we may judge—may recognize the dentist in the first place, and appraise his dental value in the second.

For our present purpose a criterion is necessary. In order to know the end or object of dental education, we must know what a dentist is. And our knowledge must be clear—definite. It will not do to rest content with saying that a dentist is a specialist in medicine; we must go on to note what a specialist in medicine is. In a word, we need, not a synonymous definition, but an analytical definition.

The dentist is a person who cares for the deeth. I say "cares for" rather than "treats," because a large share of dental effort is prophylactic rather than restorative; and "cares for" embraces "treats," as the whole includes a part. The dentist, then, is a "doctor" in the true sense of the word—a "teacher;" his function

is "cure" in the original sense—*cura*, "care." The object of dental education must be to produce such a person—a "doctor," capable of general "care."

The dentist, then, is an adviser. He is a man of the same class as the architect or the attorney—a man who does more than merely execute the will of his client—a man who advises, by reason of superior wisdom.

Is the dentist only this? No. He is an adviser certainly; but he is more than an adviser. Dr. Bonwill says that the fundamental principles of dentistry are mainly mechanical. This statement is too strong; but it expresses a truth. The dentist is, like the general surgeon, a mechanic.

An adviser and mechanic—such is the dentist. Such is every surgeon, general and special. But the dentist is, in common with the surgeon, something more; he is a therapeutist. Even beyond this the dentist is something; he is something which the general surgeon is not; he is an artist.

Let us rearrange this matter. We have seen that the dentist is adviser, mechanic, therapeutist, and artist, and we have spoken of the last three characters as if they were separate from the first. In fact, however, no separation exists. It is as mechanic, therapeutist and artist that the dentist is an adviser, and he can only competently advise through familiarity with the principles of mechanics, therapeutics and esthetics. (Surgical mechanics includes, of course, as its basis, human anatomy.)

But in mechanics, therapeutics, and esthetics there are two classes of men. There are those who direct, and those who execute. There are the advisers, and the workers. We find the two in the machine shop; there is the mechanical engineer, and there is the machinist. We find the two in the sick-room; there is the physician who prescribes, and there is the nurse who applies the remedies. We find the two, less widely separated but still showing some distinctness, in the studio; there is the artist, and there is the painter. In some cases the two classes have become so distinct as scarcely to come together at all. The architect advises; the carpenter executes. The navigator advises; the sailor executes. In dentistry, and indeed in other departments of surgery, no marked separation of the two classes has taken place. The differentiation may be one of the great professional advances of the future; but at present the dentist both

advises and operates. He is mechanic, therapeutist, and artist, and in all these capacities he both directs and works; he is, in everything, both adviser and executor.

Such is the dentist. He is both adviser and operator. He is mechanic, therapeutist and artist. But he is more even than this. As operater, he is mechanic, therapeutist, and artist. As adviser, he is, in addition, necessarily, biologist and sociologist. His advice must be largely based on biological principles; and scarcely less largely must he, in giving that advice, consider social principles.

Such being the dentist, the proper object of dental education is the production of such a person.—*Dental Cosmos.*

CLOSE JOINTS.

Vulcanite is probably one of the most insinuating substances we, as dentists, use. It must be closely related to "Paul Pry," who though he always "hoped he did not intrude," was always intruding. So is it with Vulcanite; despite the utmost care, it will poke itself where it is not wanted and makes an ugly blemish between the joints of the gum sections we use in our dentures. It is our custom before filling the impression in a partial denture, to put pins into the depression of each tooth, by way of strengthening the teeth on the plaster model. Before such cases are flasked we cut off the plaster teeth from the model and then withdraw the pins. After such cases are vulcanized, we have seen the vulcanite *forced into all of these pin holes their entire length*, showing how the rubber will insinuate itself.

For preventing this, many suggestions have been offered, but none are so effective as to secure absolutely close joints. Dr. How, in the *Dental Cosmos* for July, offers some valuable suggestions on flasking vulcanite cases, as well as making close joints. On the former subject he recommends a *groove* in the plaster investment around the entire circumference of the invested denture *in that part of the flask containing the model*, instead of the radical gates which are most generally used for the escape of the surplus rubber.

For making close joints he says: "An excellent method for making close joints is to grind the section sides to fit squarely in front and bevel slightly half-way to the front from behind until they are nearly in the exact relations desired. Then, while still in the wax, press the edge of a knife blade into the joint, to separate the section

evenly, a very little distance. A thin diamond disk rapidly revolved in the dental engine hand-piece may then be steadily passed dry through the joint and simultaneously cut both section sides true and parallel, so that a square tight joint along the gum faces of the sections will be insured. In fact, a large diamond disk jointer will be found to be of great value in the labratory."

Besides this close jointing, he recommends the use of Zinc Phosphate Cement over the joints. We have used this ourselves, but not always successfully in keeping out that insidious rubber, despite of close joints.

Before flasking we fill the cement over the joints mixed thin, letting it come over the teeth as well, and over this we lay a piece of moderately thick tin foil in a strip about a quarter of an inch wide, and when the case is flasked we put the cement on the inside, commencing at the joint near the pins and bringing it upward, until it unites with that which was placed on the outside before flasking. This is likewise covered with a strip of tin foil, so as to use every effort to exclude the vulcanite from the joints.—CHUPEIN—*Dental Office and Laboratory.*

MICRO-ORGANISMS OF DENTAL CARIES.

Messrs. Gillippe and Vignal have studied the microbes which penetrate into the little dentine canals, and which alone play an effective part in the destruction of teeth. They cleansed the dental cavity, crushed the tooth, enveloped in sterilized paper, in a vice, and sowed the several particles in different media. In this way they obtained six varities of micro-organisms.

1. Small, short and thick bacillus is found constantly, coagulates milk with formation of lactic acid.

2. Bacillus twice as long as broad, slightly narrowed in the mindle, also forms lactic acid in milk.

3 Bacillus, similar to the preceeding one, without narrowing, forms long chains, does not coagulate milk, prevents easeine from coagulating with acids, and transforms milk into a yellowish brown fluid.

4. Very short and tender bacillus, about as long as broad, resembling a coccus. Transforms caseine, which soon exhales an unpleasant odor and takes a brown coloration, such as the media of culture. It dissolves fibrine.

5. Roundish bacillus 4–5 fl long, found eight times only. It transforms milk without coagulating it into a brown fluid, which after some time becomes black and exhales a bad odor.

6. Coccus, comparatively voluminous 6 fl in diameter, found five times only in teeth of advance cariousness with wide canaiculi. It coagulates milk and forms lactic acid.

In addition, the pulp furnished the following three varieties:

1. Bacterium termo, which is met with in all albuminous substances in a state of decomposition.

2. Acts in the same way on albuminous bodies, interverts sugar and lactic acid.

3. Staphylococcus pyogenes aureus in a pulp intensively infected.

The biological properties of the microbes enumerated explain the process of caries. The microbes form lactic acid, and dissolve the mineral substances of the tooth. The microbes disapper in the organic substance and destroy the albuminous bodies. The work of detructions is promoted by the saprogenic microbes present in the mouth.—*Dental Register.*

INTENTIONAL DEVITALIZATION OF THE DENTAL PULP.

Various attempts have been made to modify the operation of devitalizing a dental pulp so as to lessen the risk of after trouble. Arsenic, the agent usually employed, has been charged—unjustly, I think—with causing many of these evils. In careless hands, we all know it is capable of doing a great deal of mischief; but we are not considering that now. We are presuming that the operation from beginning to end is carefully and skillfully performed. It has been asserted that the arsenic may escape through the apical foramina, or in the same way that it acts upon the pulp, without really passing through this opening; it may, and in many cases does, produce its peculiar effect upon the tissues at the apex of the root, and thus lay the foundation for future trouble. To avoid this, extremely small quantities have been recommended, or it is left in contact with the tissue but a short time. How arsenic effects the destruction of a dental pulp is, I think, an unsolved problem. We are taught that it is absorbed by living tissues only, and when applied as an escharotic for the removal of tumor, etc., its action is limited by using it freely, so that it quickly destroys the tissue

with which it is in immediate contact; this dead tissue then acts as a barrier protecting the living tissue beyond. In these cases, were it applied less freely, it is quite probable that so much would be absorbed that serious systemic effects would follow. Many years ago, when it was recommended and used for treating sensitive dentine, it was soon found that no precaution prevented the complete devitalization of the pulp; it was utterly impossible to limit its action to the dentine alone. Even when the arsenic was finely pulverized, used dry, in its least attractive form, and for a few hours only sealed up in a superficial cavity, the tooth-issue, immediately after its removal, being excavated so deeply that evey portion with which the arsenic had been in contact was removed invariably; notwithstanding all these precautions, the complete devitalization of the pulp was a question of time only. This being the case, how absurbed the idea that by pricking into the exposed portion of the pulp a minute quantity of arsenic a portion only of the pulp will be destroyed and the apical one-third or two-thirds remain vital! I cannot conceive this to be possible in any case. I know that on attempting to remove a divitalized pulp we may find the apical portion quite sensitive to the touch of the instrument; I know, also, that in teeth with more than one root the pulp may readily and without pain be removed from one while its removal from the others—usually the smaller roots—may be painful and difficult; but is this any evidence of vitality? We frequently find the same sensitiveness upon first opening into an intentionally devitalized pulp,—so sensitive are they, occasionally, that it is hard to realize that the arsenic has done its work; and yet, after thorughly exposing the pulp, there has been no difficulty in effecting its complete removal painlessly, showing conclusively that it had been completely devitalized. What reason have we to suppose that the sensitiveness in one case indicates vitality, when we know that in the other, precisely similar, it does not?—Trueman, *International Dental Journal.*

IN THE YEAR 2,000.

There will be no code, for all men will be properly educated, and be gentlemen. With perfect confidence does the family practitioner refer his patient to the specialist, well knowing that the latter will send him back again, with diagnosis stated and a line of treatment suggested. There will be no rivalry to be appointed physicians to

the new hospital, for each one chosen will offer to resign in favor of his unsuccessful competitor, and the only possible embarrassment will come from the excess of self-abnegation. The occupation of the consequential and patronizing hospital manager will be a lost art. Contributors to medical journals will never write on both sides of the paper, will *never* send their manuscripts rolled up, nor desire reprints and extra copies, and will wait their turn for publication. Their thoughts will be condensed, and their great aim will be to say as much as possible in the fewest number of words. As all men will be educated, and the private research of each be made public property, the opinion of the retiring, common-sense, professional neighbor will be as worthy of at least as courteous a reception as that of some unknown Herr Professor, with an unpronounceable name, from the middle of one of the southern provinces of Austria.—*Medical Record.*

NITROUS OXIDE NOT AN ASPHYXIANT.—A CRITICAL STUDY.

So much attention has during the past few years been bestowed upon the subject of anæsthetics, that it is surprising to find so important a matter as the *modus operandi* of nitrous oxide still shrouded in doubt, at least in some minds. The researches* which I commenced in 1885 were in a measure forced upon me by the consideration that if nitrous oxide were simply an asphyxiant, its range of utility and the limits of its safe application were necessarily very much straitened. Whereas, if upon the other hand, nitrous oxide, acting as such, possessed a power of producing anæthesia and could be so employed without provoking asphyxial phenomena, it was evident that we should have much more confidence in commending its use, and should not hesitate to employ it even when the pulmonary circulation were in a condition which would wholly negative the administration of an agent acting as an asphyxiant.

Dr. George Johnson's letter, contained in your last issue, cannot be taken as a serious attempt to disprove the evidence of facts now familiar to all physiologists and students of anæsthetics, but Dr. George Johnson's name is rightly held in such high esteem among

* See "*Transactions*, Odontological Society of Great Britain, 1886." *Ibid*, March, 1887. "On Ankle Clonus, with special reference to its production under Nitrous Oxide."—*British Medical Journal, August*, 1887. "On Recent Researches in Nitrous Oxide Gas."—*Journal of the British Dental Association, September*, 1889.

all students of science, that his utterances are liable to be accepted without the reserve which I am sure he would be the first to set upon them when dealing with matters lying outside the province of medicine proper. I propose to leave untouched Dr. Johnson's interesting, although to me inconclusive, arguments in favor of his view of the mechanism of apnœa (asphyxia), and merely to review the brief mention of nitrous oxide contained in his essay on "Asphyxia," as well as his letter contained in pages 526–7 of your journal. Logical analysis of this letter may thus be put: "Nitrous oxide anæsthesia may be obtained without complete asphyxia." *In conversation* [the italics are mine], Dr. George Johnson has learned from his friends, that "if inhalation be sufficiently prolonged, the invariable result is cyanosis with epileptiform (*sic*) convulsions." With the aid of Mr. Hamilton Cartwright Dr. George Johnson slew two rabbits, killing them by means of nitrous oxide, and found upon opening their chests a condition due to asphyxia. Evident importance is attached to these (?) experiments, as they are mentioned also in the "Essay on Asphyxia." Then follows the curious *petitio principii*, "Unquestionably nitrous oxide is a rapidly asphyxiating gas." To this is appended the rider, "but from what I have seen of Dr. Frederick Hewitt's interesting experiments with a mixture of nitrous oxide and a small proportion of oxygen, I believe that it will henceforth be possible to ensure as a constant result the production of a complete anæsthesia without the distressing and perilous phenomena of asphyxia. This sentence is interesting as showing (1) Dr. Johnson's unhesitating belief that complete anæsthesia with nitrous oxide necessarily predicates the perilous phenomena of asphyxia, and (2) either ignorance, or a curious ignoring of Paul Bert's most important and classical researches upon the mixture of nitrous oxide and oxygen published more than ten years ago, and (3) the same omission to recognize the more recent work executed with rigid particularity of detail undertaken to explain the true physiological action of nitrous oxide, and carried out in this country, in America, and Germany. Lastly, we are asked to accept Dr. Snow's views, which suppose that a common action exists for all anæsthetics, viz., various ways of impeding the oxidation of the nervous tissues, and to regard this as more natural than "the assumption that each of these agents has a 'specific anæsthetic action.'" But why we should do so is left unsaid. I propose firstly to consider this analysis, and then to state the case for the plaintiff —nitrous oxide—showing why we should not regard that useful

agent as "unquestionably a rapidly asphyxiating gas." Dr. George Johnson can hardly expect us to accept "conversations," when held with persons, even though they have "a large experience with the administration of the gas," as evidence, without being told (1) Who the witnesses are? (2) What their special knowledge may be of the physiology of the question at issue? (3) What their methods of administering the gas may be? Nor will the canons of scientific research permit us to accept without grave reservation the experience made upon two caeatures (rabbits), and conducted by unknown methods, many years ago. Possibly every precaution to avoid error may have been adopted, or possibly the animals were simply placed under a bell jar, as in Sir Humphrey Davy's experiments, and no effort made to exclude asphyxial symptoms due to (*i*) prolonged deprivation of oxygen (*ii*), re-breathing exhaled and therefore noxious air and gas.

I have elsewhere pointed out that unless we exclude in a rigid way (1) re-breathing once exhaled gas, and (2) we supply fresh and carefully purified nitrous oxide gas so freely that no difficulty is felt, or exists in filling and emptying the lungs in respiration, we are dealing with a problem the terms of which are complex, and include not only the action of nitrous oxide, but others—the direct result of which must be the condition called apnœa (asphyxia). I do not for one moment deny that nitrous oxide may be given in such a manner that the patient is partly narcotised by nitrous oxide gas and partly asphyxiated by insufficient supply of the gas, and re-breathing exhaled gases. This "mixed method" I hold to be pernicious in fact and unscientific in principle, and I submit that no argument based upon the phenomena which follow this practice can be admitted as proving for, or against the specific action of nitrous oxide. Indeed, I should almost claim an *alibi* for nitrous oxide gas in the lungs of persons subjected to this "mixed method."

The arguments, based upon rigid experiments, showing nitrous oxide gas (*i*) is not an asphyxiant, are positive and negative.

It produces anæsthesia before it kills, whereas animals simply asphyxiated (rendered apnœic) are not anæsthetic until moribund, if then.

It kills in less than two minutes, whereas apnœa takes five. (These figures vary for different animals, but the ratio is maintained.)

Nitrous oxide, if given in such a way that the oxygen of the tissues is not exhausted, as by Paul Bert's well known method, produces profound anæsthesia, but without any apnœal symptoms, and

this state of things may be prolonged with continuous inhalations presumably indefinitely (over an hour). (This can of course only be done by the use of Fontaine's chamber, and the inhalation of both the gases, under the pressure of two atmospheres. As given in this country and Germany, no result like this is obtainable, as it is impossible to administer a gas under pressure unless the patient's whole body is subjected to an equivalent pressure).

The process of events during the inception of narcosis by nitrous oxide is:—

The heart's action is hardly at all interfered with; there is certainly no tendency in the large majority of cases towards lessening, much less abolition of the apex beat. Indeed, if the narcosis is pushed to the extent of stopping the respiration, the heart still beats on, so that animals are easily restored, even subsequent to respiration having been suspended. The pulse, when taken in persons not the subjects of fear, is at first slightly accelerated; but as soon as consciousness is lost, it drops to the normal rhythm. In no case have I seen in a healthy person the radial pulse stop, or even materially weaken during the administration of laughing gas.

The record of the blood pressure under laughing gas also supports these statements. For the first period, that is until the blood becomes fairly saturated with the gas, the pressure remains almost unchanged; later on a slight fall occurs, which is steadily recovered from if access of air be permitted, in a way quite in contrast with the wide excursions which occur in the post-asphyxial state. These gradual curves are not respiratory as they are present when artificial respiration is maintained in urarised animals.

Upon the rhythm of respiration nitrous oxide acts as follows: At first, during the stage of excitation, some acceleration takes place, as consciousness fails, however, the respirations grow slowly and more profound, the amplitude of the respiration curves being markedly increased. If, however, death is superinduced by the gas, the respirations grow more and more shallow and finally cease, while the heart quickly beats until at length that also stops. The wild conscious convulsions which obtain, when death is brought about by asphyxia, find no place in the procession of events under laughing gas.

I will not in this place narrate the phenomena which occur during nitrous oxide narcosis as regards the muscular and nervous systems. I will simply remark they evince, in the most striking manner, the most absolute non-accord with those which are brought about by asphyxia.

The experiments which led me to formulate the above data were in every case repeated, substituting asphyxia for nitrous oxide. If, as is contended by Dr. George Johnson, the conditions are the same, the results should have been the same, whereas, they are utterly diverse. Animals asphyxiated by breathing indifferent gases, such as nitrogen, breathing through a tube, or after ligature of the trachea, presented the well known phenomena of the apnœic state. The hearts action, at first labored, subsequently became tumultuous and incoordinate, the pulse, from extreme acceleration, passed to intermission and finally died away. Respiration became, after the usual irregular and ineffectnal movements, marked by the peculiar rhythm which consists in a sort of Cheyne-Stokes gathering of respirations into a group followed by a period of stillness to be succeeded by a further group. Blood-pressure rapidly rose, and when access of air was permitted, rose and fell in wide curves reaching far above and far below the normal base line.

Experiments, if such be justifiable at all, when conducted upon patients are, in the matter of nitrous oxide gas, of little value as proof, because persons about to undergo an operation, however trivial, are the subjects of psychic perturbations of greater or less severity, which invalidate arguments relying solely upon phenomena observed whilst they are being anæsthetised. It is, I think, in this way that we can explain the curiously unusual train of events which Dr. George Johnson witnessed when standing beside patients taking gas. In page 31 of the "Essay on Asphyxia," we read, "After a period (of inhalation of nitrous oxide) which varies in different cases from forty to eighty to ninety seconds, the pulse suddenly becomes almost, or even quite imperceptible, the features become livid, the pupils are widely dilated, there is a state of general muscular rigidity; in short, all the phenomena of the first stage of an epileptic fit are present." This purports to represent nitrous oxide narcosis, as seen at the Dental Hospital of London, but is a record absolutely opposed to my experience alike at Leicester Square and when experimenting upon friends not about to be operared upon, and not the subject of craven fear. Further sphygmograms taken upon my own radial and that of friends, confirm the accuracy of my results. I may name among my friends Professor Schäfer, F. R. S., Professor Victor Horsley, F. R. S., Professor Mac William, of Aberdeen, Professor Dobinson Halliburton, and Dr. Rose Bradford, who were either actually supervising, as in the case of the first named, or helping me with the experiments; so that I venture to assert that the results may be considered fairly credible.

In reference to Dr. George Johnson's remark about adopting Dr. Snow's theory of the mechanism of anæsthesia, I may be permitted to point out that Dr. Snow possessed no knowledge of nitrous oxide as an anæsthetic. He died in June, 1858, and it was not until after 1866 that this agent began to be used in this country. Dr. Snow's remarks referred to the alcohol series of anæsthetics, and could not, unless uttered prophetically, refer to the reagent of which I am writing.

It is certainly matter for regret, unless actual experiment and carefully weighed evidence can be put forward to disprove the facts and arguments which have been accumulating during the past ten or twenty years concerning nitrous oxide, and which incline to show it possesses a specific action; and does not narcotise by reason of its asphyxiating qualities, that any one, least of all so staunch a lover of truth and so keen and astute a physiologist as is Dr. George Johnson, should spread erroneous views concerning that most safe and valuable anæethetic, nitrous oxide gas.—*Baxter, Dental Record.*

PROPOSED VICTORIAN DENTAL ASSOCIATION, COLLEGE, AND HOSPITAL.

Our dental friends are to be warmly congratulated upon the *esprit de corps* suggested by the meeting of the profession held on 7th inst., a full report of which appears in this issue. As will be noted, the primary reason for calling the brethren of the forceps together was to secure affirmation of the proposition that it was necessary to provide for the local education of those desirous of obtaining legal qualification. At present the dentist of the future is in the unhappy predicament of having to proceed to some country where recognised schools are maintained, in order to obtain his diploma, and it was to remedy this very serious deficiency that the meeting was called together. In our opinion the expressed views of Mr. Potts should strongly commend themselves to the craft. The gentleman spoke from an intimate knowledge of the society with which he has been especially identified; and in view of the success which has attended the Pharmaceutical Society of Australasia, it would be strange if the association of the dentists in a corporate society should not prove most beneficial to the profession, and prove a material factor in promoting the proposed educational scheme. Indeed, it seems to us that the formation of

the association is the first thing to be accomplished; that without the association the carrying out of the educational scheme would be attended by a multitude of difficulties; and that, in short, effect could only be given to the ambitions of the profession through an accredited executive such as the establishment of an association would call into being. The munificent gift of land and building for the proposed hospital by Mr. Blitz deserves more than passing mention. It is highly gratifying to record so pronounced an act of generosity. And that the meeting should have produced so emphatic an approval of its aspirations and incentive to exertion speaks eloquently for the prospects of the dental profession of the colony.

We take great pleasure in expressing our hearty sympathy with this movement and will hail the accomplishment of a Dental Association and educational scheme with fraternal greeting.—*Australasian Journal of Pharmacy.*

DENTAL CARIES.

The only remote or predisposing causes of caries of which the existence has been demonstrated, and of which the action is demonstrable, are those named in my papers, namely, inherent structural defects in enamel, vitiation of the buccal secretions, and crowding and irregularity of the teeth. The statement that enamel, through causes acting from within a tooth, can undergo a process of softening or deterioration—a kind of degeneration—rendering it less able to withstand attacks of caries, is pure hypothesis, resting on very insufficient foundation; and it is besides entirely unnecessary, all the phenomena being accounted for without its introduction. If any one really believed that enamel were capable of physiological, and therefore of pathological action, he would never fill a simple cavity of decay. Is it to be believed that a tissue so highly organized as the hypothesis in question supposes, would passively tolerate the presence of a foreign body like a stopping wedge into its substance? One consideration like this is almost enough, to show the falsity of the views upon which you have asked my opinion; but there are many more equally cogent. The amount of organic matter in enamel is so minute as to be indistinguishable by the microscope, and we are justified in affirming that enamel is devoid

of those tissue elements without which physiological action is impossible. An American observer states that he has stained enamel with chloride of gold, but if this observation were correct—as to which there are grave doubts—the organic matter must be in a state of almost inconceivable tenuity. You will see from my book that Mr. Charles White, one of the most distinguished living dental histologists, agrees with me that there is probably some error in the observation. But if it were true, can we imagine the passage to and fro of nutritive and effete material via the dental fibrils to the surface of the enamel; and can we imagine their assimilation and rejection by a quartz-like inert mass such as composes almost the entire bulk of enamel? And furthermore, if in some systematic states teeth were to undergo degeneration, owing to abstraction of their solid constituents through the vascular system, surely the morbid process would begin, if not always, at least very often in the surfaces nearest the vessels—in the cementum and the dentine forming the walls of the pulp cavity? Does any one allege that he has observed such a phenomenon? and can any one produce a single specimen of enamel in process of softening or disintegration, displaying any appearance not equally visible in a carious dead tooth. Indeed, with the exception of pain, the single subjective symptom of caries, all the phenomena of this malady, whether as regards appearances visible to the naked eye or disclosed by the microscope, are to be observed not only in dead human teeth replaced in the mouth as artificial substitutes, but in blocks of ivory used for the same purpose. And the remote as well as direct causes of decay in these dead substances when worn in the mouth, are precisely the same as govern the onset of caries in living teeth—teeth with living pulps and living periosteum. Dead teeth and ivory blocks are under similar conditions neither more or less liable to decay in the mouth than their neighbors implanted in the alveoli. Some few years ago, before the general use of vulcanite, artificial teeth were much more frequently constructed of gold plates with human teeth mounted upon them, and it was a fact of very common observation—one which I was able fully to verify—that the durability of this kind of work varied much in different individuals and under changing circumstances in the same individual. Every dentist recognized that their durability depended very largely upon the quality of the teeth and blocks employed; if these were of the most solid structure they lasted much longer than

if inherently weak. Everyone reognized also that their durability depended, secondly, on the health and personal habits of the wearer. In a mouth habitually neglected and where the frames were allowed to remain for long periods coated with decomposing debris, the dead teeth and ivory were speedily softened and destroyed; whilst on the other hand where the mouth and teeth were kept scrupulously clean the beginning of decay was proportionately less frequent and its progress in a like degree less rapid. A combination of bad health with neglect, giving rise to extreme vitiation, of the buccal secretions, was with certainty accompanied by destruction of the artificial teeth. In short it is amply proved, that disturbances of the general health exercise the same indirect influence upon ivory blocks worn in the mouth, as upon living teeth, and the effects are traceable onwards through the same agencies, namely, putrefaction and fermentation of organic matter attended by formation of acids and development of micro-organisms in the vicinity and on the surfaces of the teeth. This is what happens in the cases of pregnancy about which you write. It is only a minority of women whose teeth suffer during that period, and in these there is almost invaribly present dyspepsia with local conditions such as I have just referred to.

There has probably been more nonsense written on the subject of dental carires than on any other subject of the sort, and I have no doubt that the same kind of writing will go on in the United States, so long as dental societies and dental journals refrain from holding up pseudo-scientific pretenders to the ridicule they deserve. We feel a solidarity in this country with our professional brethren across the Atlantic, and we take deep interest in all that concerns the progress of the profession in the great Republic. But beyond that, I do not think that the production in America of sham scientific dental literature, whether in the form of papers or of text books and manuals for students will affect us injuriously. Our students are not likely to go astray in these matters. They are all obliged before commencing their special studies to pass an examination in general education, and having passed that examination they are not likely to pay much attention to authors, whose writings glaringly make manifest not only their ignorance of the meaning of the scientific terms which they glibly use, but their want of acquaintance with the rules of language and grammar, without which the simplest scientific proposition cannot be clearly expressed. It is partly to expose the

worthlessness of the productions of writers of this class that I composed the papers to which you so kindly refer; and I am quite satisfied to know that they have not been altogether without effect in checking an evil from which we on this side of the Atlantic have been by no means exempt.—SEWILL, *Dominion Dental Journal.*

INCONSISTENCY.—THE LICENSE QUESTION IN COURT.

This is found in the September number of several journals, and it will doubtless be read with much interest. A question will arise in many minds whether the United States Court would sustain this decision?

I am not in full symyathy with the large legislation that has so characterized the several State societies. New York has been the lead for many other States, and some (one, New Jersey) has tried to follow in its folly. We say folly, for we were in at the first inning of this society (New York) and set our face against the introduction of a degree, and surrendered our permanent membership because of it, and have taken occasion to jolt the car of the convenant at favorable times. We have had no little correspondence over this question, which might be interesting so far as it might be instructive in showing how it is viewed by many members of our calling. Where are the men that have the courage of their convictions? Those that say in private they have them.

In the August number of the *Cosmos*, an excellent article in the proceedings of the Odontological Society is found, "The Function of the Dental Society," and it is voted by this society an endorsement. This commits them to precepts of the paper. So far, so good.

Does not this society find itself in a position of inconsistency at once? We say, "Yes," in reference to the sustaining of this degree of "M.D.S.," which stands as a blotch on the fame of every worthy dentist. It is not necessary to go into a detail of history regarding the creation of this blunder, although we could give it in full.

As soon as Dr. Meriam proclaimed against the patent question, and showed that it was inconsistent with a liberal profession, good

men immediately commenced to shake themselves. They showed a disposition to try and be good boys first, so that they might be angels bye-and-bye. I ask, can we be called a liberal profession and let such a monstosity as the "M.D.S.," remain an enemy to all our dental schools? The *Cosmos*, true to the interests of a liberal profession, showed the courage of its convictions when it cried against the New Jersey legislature falling into the same pit; this by an outspoken editorial. The times of ignorance are passing, and can no longer be winked at. Our calling will come into line with all that is progressive, yet it has a good deal of deadwood to throw off, which is the necessary product of all development.

I will publish a fact which is known only to a few. I published an annonymous article in the *Dental Register*, a few years since, on purpose to see if I could draw a fire, knowing as I did some of the private views of the *prominent* members of the New York society. Only one peeped. He replied by a scurrilous article, saying the author was "Only an old sorehead!" One very prominent member had given me his emphatic feelings, characterized the creating of this degree as a *great mistake;* and said he should try to bear his energy (and he is a large man) against it at the next annual meeting. He did it by staying away, and many wondered why he was absent. As he committed himself in the presence of six other dentists of fair fame, the truth of it does not rest on our veracity, so we can bear it if it is questioned. As we do not carry a degree of any kind it cannot be charged of us that we have any personal grounds for trying to probe this old sore once more. We do it only for the good and farther advancement of a liberal profession. —Mills, *Ohio Journal of Dental Science.*

THE USE OF SPRINGS IN THE RETENTION OF ARTIFICIAL DENTURE.

Can we afford to dispense altogether with the use of springs for the retention of artificial dentures? From observations which one hears promisciously dropped now and again, we might be tempted to answer thoughtlessly in the affirmative. A well-known American dentist, who was visiting this country, told a brother practitioner that in the whole of his professional experience he did not think he had ever made *three sets of teeth with springs.* Such a statement is to us astounding. Again, only the other day a student asked

whether it were possible to find any accurate instructions for the arrangement of swivels, as in the book on mechanical dentistry which he had read, the subject had been dismissed with scant ceremony—or at least with but a meagre notice—as being *obsolete.* If any one cared to find out whether this system of retaining artificial dentures had died a natural death, a simple enquiry at one of our dental depôts would soon dissipate the notion. Some of our best mechanics still use springs, and until some adequate substitute be found, they will probably continue to do so in certain classes of cases. That it is desirable to do away with such uncomfortable adjuncts as far as possible goes without saying, and the fact that modern practitioners do not use them to the extent that their forefathers did, speaks to the improvements that have gradually forged their way into our methods of procedure; but whether we shall be able to bid good-bye to our old friends is problematic.

Now there are classes of cases where our ingenuity has to fall back upon the use of springs, and where we cannot afford to affect contempt for their assistance. The first class includes endentulous mouths, almost as flat as the palm of one's hand, which absolutely refuse to be charmed with "plaster impressions," "suction," "Fulsome ridges," and other wiles of mechanical art. Someone whispers faulty manipulation. This may be true of a good many cases, but have we not met with others where the assistance of springs has been our sheet and only anchor? The second class is not at all uncommon, and consists of cases where the patient cannot endure a large suction plate. We know that in many instances this can be overcome by a little patience, but there still remain a large number where toleration absolutely refuses to step in; and the presistant retching and discomfort of the patient either compels you to assist him out of his trouble with a small plate and springs, or—what amounts to the same thing—he seeks the services of someone else who has more respect for his patient's comfort than for his own prejudices. The last class is by no means a small one; it is that of patients who suffer mentally; this may simply be nervousness or absolute lack of intelligence. Many public speakers of a nervous disposition, who otherwise would be able to retain a set of teeth with comparative ease, find themselves unable to bowl out their impassioned oratory through an apparatus which is dependent on the unknown quantity of a power which their dentist has mysteriously described as "suction." Want of faith. Quite so; but you

cannot make people swallow faith in "suction" in the same manner as they bolt their aperient pills. Again, in those of enfeebled intellect, either from old age or other causes, the value of springs has proved inestimable. You cannot argue with these people ; what you have to do is to place a denture in the mouth which has the physical power of remaining in its proper position without any assistance from the patient in the form of confidence, which unfortunately they are unable to provide.

There is no part of mechanical dentistry which requires more accuracy and intelligence than the proper adjustment of springs. If we can do without them all the better for us and our patients ; but we should at all times be on the alert to discover those cases where their assistance is indicated as conducive to the comfort of the patient ; and having made up our minds as to the necessity of calling in their aid, it behooves us to apply those mechanical laws which govern their use, so as to secure the maximum of efficiency with the minimum of discomfort.—*Dental Record.*

SPECALIZE, BUT DON'T GROW NARROW.

To be a specialist in some department of microscopial science is almost necessary at the present time and will become still more essential with the advance sure to take place in the future. To be recognized as an authority in some department, by reason of the extent of one's information and original research, must be pleasant, however retiring the man may be, and however distrustful of his own ability. But the specialist has a tendency to guard against, that of becoming narrow and bigoted.

In the cultivation of a single field to the entire exclusion of all others, he may gradually fail to see beauty or interest in the field of his neighbor just over the fence. * * * The histologist may look askance at the pathologist, and the pathologist may pass by on the other side when he sees the student of microscopical optics approaching.

Much of this is apparent only, and is assumed as a part of that love of fun inherent in all Americans, and many similar remarks are simply the expressions of that kindliness which one microscopist always has for another, the kindliness that finds vent in a little sport at the other's expense, the thrust of a sharp edged witticism that is parried with a joke, and makes the friendship firmer. Yet, while this is true, there is doubtless a tendency for one specialist to

decry the work and object of another. It may be repressed ; among strangers it usually is repressed, but the feeling exists and seems unavoidable. The probable cause is ignorance. The ignorant are always intolerant. No one is so zealous as the young convert, and no one so belligerant as the ignoramus. It is good to be a microscoppical specialist. It is necessary. It cannot be avoided if the worker desires to do any original work. But in his own chosen field, which he may enclose within a high wall, if he wish, the specialist should somewhere erect a tower, so that when he thinks he has discovered the collar button of an archangel, he may ascend and glance into the domain of his neighbor to see what parts of the archangelic jewelry he may have found. It is possible that a little corner of the button may be broken off, and the neighbor may have discovered it, and may be willing to pass it over the fence with a smile and a compliment, if he is politetly asked, and the archangel's collar button be shown him graciously. A blessing will beget its kind.—EDITORIAL, *The Microscope.*

APPLES FOR BRAIN WORKERS.—Apples contain a larger amount of phosphorus, or brain food, than any other fruit or vegetable, and on this account they are very important to sedentary men, who work their brains rather than their muscles. They also contain the acids which are needed every day, especially for sedentary men, the action of whose liver is sluggish, to eliminate effete matter, which, if retained in the system, produces inaction of the brain, and, indeed, of the whole system, causing jaundice, sleepiness, scurvy, and troublesome diseases of the skin.—*Food.*

THE RED LINE ALONG THE GUMS.—Taking into consideration all the facts, I am forced to the conclusions :

That while the original observer of the red line in phthisical patients was correct in observation, he was incorrect in his deductions therefrom. The line itself is explicable on other and more reasonable grounds. A simple coincidence was mistaken for an associated condition.

That the line is not a diagnostic sign of phthisis at all, but of a disease of the gums.

That unfortunately one cannot diagnose a case of phthisis by an examination of the gums.

That aside from tubercularrization, lead poisoning and scurvy a changed gum line, in the present state of our knowledge, is not diagnostic of phthisis, nor of ony other systemic disease.

That as a disease of the gums, the red line may be a local disease from neglect of the teeth, which may find a genuine predisposition in general connective-tissue relaxation.

That the red lines along the gums, which can probably be found in any disease, gives rise to sufficient debility to cause a loss of the general tissne tone, if sustained long enough to allow of a deposition of dental *dêbris* between the gum edges and the teeth.

That in cases of hæmoptysis, where neither cardiac nor pulmonray lesions are discoverable by physical exploration, the gums should be examined.

That the exact value of the red line along the gums as a diagnostic sign of phthisis is naught.

That the red line is significant of disease of the gums, due to improper care of the teeth, excessive accummulation of tartar, or to general systemic tone-relaxation, of which the red line is simply a local manifestation.—SNADER, *in Hahn. Monthly.*

IS ATMOSPHERIC PRESSURE A MYTH?

The statement that two surfaces brought into *absolute* contact at every point will be held together with a force of fifteen pounds to the square inch, is accepted as an established fact.

This is due to atmospheric pressure or the weight of a column of air one inch square. This pressure varies with the depth of the column ; at the level of the sea it is fifteen pounds to the square inch, as we rise from the level it decreases in regular proportion to the height ascended. In this way, by aid of the barometer, the æronaut measures his distance from the earth when sailing among the clouds.

The only difficulty in availing ourselves of the full force of this principle in sustaining artificial dentures, or for other purposes, is found in not perfectly excluding the air from between the surfaces in contact.

A piece of dry leather cannot be pressed on the surface of a stone so closely as to exclude the air, but when the leather is wet

and softened, and just enough moisture is left to fill the pores and exclude the air, a stone of considerable weight may be lifted by a string attached to the center of the leather.

It may be asked how do we know that it is atmospheric pressure and not the adhesiveness of the water that maintains this contact between the leather and the stone. To one who is in doubt, we would suggest this experiment.

Hang the stone and leather, as joined, in the receiver of an air pump, exhaust the air as perfectly as possible, if the stone remains attached to the leather, it will prove that Dr. Land is right, but if the stone falls when the air pressure is removed the proof is absolute that atmospheric pressure is the force that produces the effect.

The dentist well knows that from various causes, unnecessary to enumerate here, he does not secure and maintain a perfect fit to the mouth, and various devices have been resorted to in order to compensate for this inaccuracy.

Air-chambers or vacuum-plates, as designed by Dr. C. H. Land and others, are merely substitutes for perfectly fitting plates. Still acting on this belief that atmospheric pressure is the force we must rely upon, and knowing that if the air can be perfectly excluded from even a small area the plate will be retained, the air chamber, so called, is formed, and patients do learn to more or less perfectly exhaust the air from it, and it is not uncommon to find plates almost wholly depending upon this for support when there has been considerable absorption of the maxillary ridge.

That moderately deep mouths with somewhat prominent ridges retain the plates better than the extremely flat ones is true, as the force to remove them is directly downward and against the sustaining pressure. In very flat mouths there is but little to prevent a sliding or lateral motion which would be effected much easier.

If we had a great weight to move we should find it much easier to slide it over a wet surface than to lift it.

Dr. Land remarks that the tissues of the mouth are drawn into the vacuum so that it soon becomes useless. This is true and in connection with this fact there are two things to be considered; first, that it is the pressure of the air that forces the tissues into the chamber, thereby proving that a vacuum has been established, and second, that by the time the tissues are forced into the vacuum the

plate has settled to the mouth and there is a better fit over the whole surface and the vacuum is no longer needed. This will not occur unless sufficient time has been allowed for absorption before the impression is taken.

When we are able to make perfectly fitting plates, vucuum chambers will not be necessary and I think we will still have to rely upon atmospheric pressure rather than the adhesiveness of saliva.—NEMO, *Dental Review.*

TO CURE A BLACK EYE.—There is nothing to compare with the tincture or a strong infusion of capsicum annum mixed with an equal bulk of mucilage of gum arabic, and with the addition of a few drops of glycerine. This should be painted all over the surface with a camel's-hair pencil and allowed to dry on, a second or third coating being applied as soon as the first is dry. If done as soon as the injury is inflicted, this treatment will invaribly prevent the blackening of the bruised tissue. The same remedy has no equal in rheumatic stiff neck.—*St. Louis Polyclinic.*

A NEW OPTICAL COMBINATION BY ZEISS.

In the last number (November) of the *Journal de Micrographie*, Dr. H. Van Heurck describes a remarkable new optical combination recently made by Zeiss after the mathematical formulæ of Professor Abbe. In August last the preliminary calculations were completed, and the construction of the apparatus was begun, the finishing touches having been applied so recently as the latter part of September.

The objective is an apochromatic one-tenth. Its Numerical Aperture is 1.63, and its construction such that the whole of this enormus angle can be utilized. To accomplish this, however, certain conditions are imposed.

1st. The cover glass should have a refractive index of at least 1.6.

2d. The object should be immersed in a medium with a refractive index of *at least* 1.6.

3d. To utilize the entire aperture for oblique light, that is, to obtain from the objective all that it is capable of doing in the way of resolution, the slide should be of flint and have a refractive index of at least 1.6.

All these demands have been complied with by MM. Zeiss, who have also constructed an eye-piece which corrects the last trace of chromatic aberration, and a condenser with the upper lens of flint, and by which is obtained that ultra-obliquity of light which the objective will receive.

The advantages of the whole arrangement surpass every anticipation. With oblique light the entire valve of *Amphipleura* is resolved into beads, as sharply defined as is the resolution of *Pleurosigma* with the best objectives, yet these beads are much closer together than was supposed from the former incomplete resolutions, repeated measurements showing that *Amphipleura* has 3600 transverse, and *five thousand* longitudinal striæ to the millimetre. It is therefore not surprising that the difficulty in demonstrating the beads has previously been so great.

It is only for the resolution of these pearls that the objective demands oblique light. All other difficult tests, *Vanheurckia crassinervis* Breb. (*Frnstulia Saxonica*), *Surirella gemma*, and even the tranverse striæ of *Amphipleura*, are resolved by central (axial) illumination. An examination without the eye-piece shows eleven spectra, the five intermediate ones not having been previously seen.

The few bacteria which have been observed have exhibited such details that it is probable that many bacteriological studies must be repeated.

Photographs of *Pleurosigma augulatum* taken with the new objective, show that its beads are not rounded but angular, and that there are details between them. These details are exceedingly curious and absolutely new ; there is a possibility, however, that they may be illusory. The best objectives have always resolved *Pleurosigma augulatum* into hexagons, but these, it was contended, are in reality rounded, their angular aspect being the result of of an optical illusion, the hexagons appearing because the beads were separated at intervals arranged according to three systems of lines, which intersected at an an angle of 60°.

At present only three of these marvellous objectives are in existence. Two, one corrected for the continental short tube, the other for the English or long body, are in the possession of Dr. Van Heurck ; the third has just been delivered to Dr. Koch, of Berlin, from whom the most valuable bacteriological observations may be expected. The price of the combination is ten thousand francs, or about two thousand dollars.

The results obtained from this new apparatus are a merited reward for the long labors in theoretical microscopy of the illustrious Abbe who, for fifteen years, has so successfully served the instrument in many ways, and with indefatigable patience, and who has now realized all that theory demands.

Dr. Carl Zeiss and his son Dr. Roderich Zeiss, who have so ably assisted their learned fellow-laborer, likewise merit every commendation. The three together have done more for microscopy in the last fifteen years than was done by others in the whole preceeding half-century.—*The Microscope.*

Dosage.—For children the following rule (Young's) will be found the most convenient. Add 12 to the age, and divide by the age, to get the denominator of the fraction, the numerator of which is 1. Thus, for a child two years old, $\frac{2 \div 12}{2} = 7$ and the dose is one-seventh of that for an adult. Of powerful narcotics scarcely more than one-half of this proportion should be used. Of mild cathartics, two or even three times the proportion may be employed.

For Hypodermic Injection, the dose should be three-fourths of that used by the mouth; by rectum five-fourths of the same.

SUCCEDANEOUS TEETH.

In describing the physiological and anatomical relations of the first and second series of teeth in the human subject at the Odontological Society of Chicago, at the October meeting, I applied the word "succedaneous" to the twenty permanent anterior teeth, because they succeed the twenty deciduous teeth of childhood, and to distinguish them in their relations to the deciduous series from the twelve permanent molars that have no predecessors. *The word succedaneous has no reference to the form of the teeth, but to the relation they bear to the deciduous series in time and space.* We would not say a succedaneous molar, for there is no such molar. The teeth that succeed the deciduous molars are bicuspids. On the other hand, permanent central or lateral incisors or canines would be correct; but permanent bicuspids would not be correct, as there are no deciduous bicuspids to call for such distinction, yet the bicuspids belong to the succedaneous teeth.

When a deciduous tooth is removed by the physiological process of exuviation, the succeeding tooth is not disturbed in its development; but if a deciduous tooth is removed by the pathological process of exfoliation, the succeeding tooth may suffer in consequence, hence I was very explicit in drawing the distinction between exfoliation and exuviation in my address before the society, for I used these words in preference to the much abused word absorption, which would be meaningless in this connection. If a speaker in a dental society should have occasion to use these terms he will use them as I have or they will be unintelligible.—PATRICK, *Southern Dental Journal.*

THE antiseptic value of a drug is best expressed by its range of effective work This range of value is found in the difference between the saturated solution, or that concentration that may be found injurious to the tissues, and the greatest dilution that inhibits the development of micro-organisms. Those essential oils that are not too irritating have an extension of range in their use in emulsion, or in substance. Also many drugs have, in greater dilution than that which actually inhibits, a range of restraint that is useful.—BLACK.

CONDUCTORS' DEPARTMENT.

STATE ENGINEER BOGART'S LETTER.

In a letter to this journal on the American Dental Association (page 163, October issue), "T. J." writes as follows: "The subject (Dr. Talbot's) was a profound one, and there should have been a synopsis made in advance and furnished to the members, and this should be done with all papers when possible. By the adoption of this law the discussions will be worthy of the name. It is idle to expect a man can do himself or the subject justice with no time for reflection, much less study." Acting on this suggestion, and knowing something by hearsay of the American Society of Civil Engineers—a body at once unique as to membership numerically, the character and intelligence of that membership, the possession of a

permanent home, and the liberal management of its handsome property and income—and desiring something official in regard to the presentation of papers at its monthly and other meetings, we applied to Secretary Bogart (through a mutual friend, Mr. Rafter, a member of the society), for the desired information, and have the satisfaction of laying before our readers a letter of unusual interest on a subject of vital importance to every dental society having scientific pretentions to the presentation and intelligent discussion of the chief thing for which it has any right to exist. We commend it to our readers, every one of whom, let us hope, is a dental society man and interested in at least one such organization.

MICRO-ORGANISMS TOO MUCH FOR OUR TRANSLATOR.

O Henle, Henle, this is *too* much! It must be characterized as a base attempt at heartless imposition upon the too confiding credulity of an unprotected female. Was not that fable of yours about glands under the edge of the gum sufficiently shocking (and it isn't true, for I can't find any) to a refined sensibility, without this horrible assertion that we have flourishing aquariums and manageries and fernéries in our mouths? Must we regard our dentures then, as picket fences, so to speak, around our private personal individual zoological gardens? I *refuse* to believe it—and Henle, I take occasion to add, right here, that if *such* were the flora and fauna of *your* buccal cavity, I no longer regret that I never had the pleasure of your acquaintance, and I *can't* believe, Henle, that you habitually brought into requisition your—ahem!—tooth brush, with that frequency and thoroughness which a strictly fastidious sense of the fitness of things demands.

FOUR SOCIETIES MEET.

At Elmira, October 29th, 30th and 31st, the 5th, 6th, 7th and 8th societies held a union meeting, which was very largely attended, not only by the members themselves, but guests from other parts of this and the adjoining State of Pennsylvania. In fact, the attendance

from the western half of the latter State was not only large but representative, every man of them of reputation as dentists and dental society men, Drs. Beck and Templeton heading the list.

The papers were many, interesting and profitable, and provoked discussion in which nearly all present took part. The clinics were up to the standard, and the exhibits of instruments, appliances and materials as large, varied and fine as on former occasions.

The banquet brought together men of medicine, law, theology, journalism and other callings, and those in attendance enjoyed a treat in the ripe and ready wit of the several speakers. The toastmaster, Dr. Darby, took occasion in introducing each speaker to touch off one or more of his little peculiarities; but when the speaker turned on the toastmaster, the laugh was on the other side, to the amusement of his fellow members and associates.

Dr. Jewell, as chairman of the business committee, and Dr. Darby, of the committee of arrangements, did their work thoroughly and well, and with the co-operation of others of the 6th society scored a grand success.

The next union meeting will be held at Rochester, the last Tuesday in October, 1890.

"INCONSISTENCY."

On another page we reproduce from the *Ohio Journal* an article bearing the above heading, in the course of which the writer carries the idea that he has something to say that the dental profession generally, and in New York State particularly, ought to know in regard to the "'M. D. S.,' which stands as a blotch on the fame of every worthy dentist." He assures the reader that he could give it in full; and for the life of us we fail to see why the reader should be deprived of this valuable information. Some of those who were "in," as the writer says he was, "at the first inning of this society (New York)," are dead, others are not likely to be with us many years to come, and it is no more than right that this "old sore," as he styles it, on the New York body dental should be probed to the bottom—opened up to every one who would see—opened up now, and while those alive are not only willing, but anxious to take a turn

at the job, and a hand in the fight. It will not do to peep here and there, assuring the reader that one knows if he would only tell. He must make specific charges, and be prepared to stand by them. If the author of the article in question will do this, the journal publishing the discussion will find itself supplying its readers with entertainment rich and racy to the last degree. By all means, let us have it.

WHAT DOES HE MEAN?

The editor (or one of 'em) of the *Western* says to the editor of the *Cosmos*—"we suggest Line, of the ODONTOGRAPHIC, or Catching, of the *Southern*. They'll fight."

We've been sizing up Editor Catching's picture in *Items of Interest*, and if we get his proportions correctly, we'll not fight. We're not built on that model; and yet, if he'll knock a chip from our shoulder, we'll—Run. "Tail-holt or nothing" is the motto on our coat of arms.

'SASS OR 'SAW.

A Kansas feller with a vest pocket appointment-book says in the current *Dental Advertiser* that he can't see the joke. Nor we; but now we know from whence. This is the same man who forbids incantations in fishing parties that he elects himself to engineer, and then when members' backs are turned spits on his bait and hooks the fish, kettle and all. We'll have no more to do with him.

FIRST DISTRICT ANNIVERSARY.

The 21st anniversary of this society, local in name but national in character, was held the 14th, 15th and 16th, in the Masonic Temple, New York, Dr. Northrup in the chair. The programme called for prayer by Rev. Dr. Backus, an address of welcome by Dr. Northrup, a response by Dr. Foster, president of the American Dental Association, papers by Drs. Crouse, Talbot, Darby (E. T.), Kirk and Allen (Geo. S.). The attendance was large, and included representatives from points in the extreme South (Georgia and Alabama), and of course, Chicago and St. Louis, West.

Two half days were devoted to clinics at the New York College of Dentistry. Dr. Case, of Jackson, Mich., demonstrated the making of the Angle regulating implements and their applications. Dr. Gish, of the same place, demonstrated the use of electricity in pyorrhœa, also controlling the current from incandescent light circuits through the exhibitor's ideal rheostat. Dr. Campbell, of London, exhibited his pivotal engine and model laboratory. Dr. E. Parmley Brown baked and made cases of porcelain bridge-work, and through the kindness of a lady patient, showed three pieces of this beautiful work in the upper jaw. Dr. Harlan demonstrated the action of coagulants on albumen. Others to the number of thirty or more exhibited instruments, appliances, and specimens of artistic dentistry, and demonstrated their uses in the operating room, laboratory and oral cavity. The successful management of the meeting fell to Dr. Walker, of the executive committee, Dr. Jackson, of the committee on clinics, and Dr. Crowley, of the passenger committee.

GERMAN (HENLE) AS SHE IS LITERALLY TRANSLATE.

—"Each papilla sits with her base at the bottom of the sacklet firm, and towers with her peaks in the 13th week, already to the opening of the sacklet above, as one in near-standing long-through-cuts of the jaw sees, where the tooth-papillæ, through the same treading vessel-twigs, out-drawn are."

"At each tooth-baglet comes a twig of the arteria dentalis. He spreads himself to the part exterior at the same, and anastomoses with branches that out of the tooth-flesh arrive; out from the net depart boughs through the wall of the tooth-baglet, as far as its inside outer-surface. The head-branches of the arteria dentalis go at the tooth-pulps and build in her a plexus. The enamel-skin is vessel-less. Also, the outer layer of the tooth-baglet becomes all by degrees steadfaster, poorer at vessels, and builds herself at the periostem of the alveolus out, or melts together with him, and now lies in the shut-up."

"By the cut-teeth of the gnawers, the corner-teeth of many pachyderms, and the back-teeth of the again-chewers, who, how

already mentioned was, also after the hereforth breaking at grow go-on-with, leaves the enamel membrane not so sudden at the root off, but stretches herself in the tooth-hole within, ossifies ever to the out, and waxes from the inward forth tooth-sacklet, from of it the bottom upheaving, the tooth-bud, who in the meanwhile fitting close the form of the artful tooth-crown taken has, and at the back-teeth even so many spikes points out, as the ripe tooth."

Dr. Jameson, of Lyons, this state, for many years an active and highly esteemed member and officer of the Seventh Society, died a few days since of heart disease. Trouble comes to some men early and shadows them to the grave; but no murmer escapes the man capable of bearing a sorrow.

CORRESPONDENCE.

LETTER FROM STATE ENGINEER JOHN BOGART, ESQ.

AMERICAN SOCIETY OF CIVIL ENGINEERS,
127 EAST TWENTY-THIRD ST.

NEW YORK, December 3d, 1889.

Dr. J. Edw. Line, Rochester, N. Y.:

DEAR SIR:—I am asked by Mr. George W. Rafter, member of this Society, to tell you the method followed in the editing and presentation of papers before this Society, and I take pleasure in doing so.

The secretary of the Society is the editor of its publications. The committee on publications consists of three members of the Board of Directors, and this committee is appointed yearly; generally, however, the endeavor is made to have one or more members of the committee serve more than one term. The secretary of the Society, by correspondence and personal interviews, endeavors to secure papers of professional interest from persons who have the

information which it is considered desirable to present; and the presentation of papers is not limited to members of the Society, but all suitable papers are welcomed.

When a paper is presented it is examined by the secretary as editor, with reference to the desirability of its presentation and publication. In accordance with the law, all papers containing old matter, or matter readily found elsewhere, those plainly intended to advocate personal interests, and those not properly written must be amended, or they are not accepted. Some papers are accepted for reading before the Society, but they are not necessarily published in the transactions. At each stage in the consideration of the paper the editor can consult with the committee on publication, and he does so when any question, except those of ordinary routine, occurs; this is done in order that the official action may be complete and carefully considered.

When a paper is finally in shape for presentation, a time is fixed for its reading at a meeting of the Society, and if the author has presented it so that there is time to do so, it is set up and issued in advance form to such selected engineers as are thought by the author or editor to be apt to discuss the particular subject treated by the paper.

I send you herewith a copy of a paper in this advance form; you will notice the heading printed upon it. It is considered proper, as is there stated, that the author should have the opportunity for a final revision of the paper.

In the case of important papers a letter is sent out with the advance copies, particularly inviting discussion, and the day of the presentation of the paper is announced as much beforehand as circumstances will permit. At the meeting at which the paper is presented, written discussions which may have been received are also read, and the subject is discussed by the persons present who care to take part in the discussion. This discussion is taken down stenographically, and is sent to the persons so discussing for revision; finally all discussions are sent to the author of the paper, who has the right to finally close the discussion with such remarks as he may deem proper. The paper is then issued in one of the regular numbers of the Transactions, a copy of which I take pleasure in mailing you.

We give to the author of a paper twenty-five copies of his paper with the discussions upon it, without charge, and we also give him

as many more extra copies as he desires at the cost of printing and stitching, provided only that he orders the extra copies before the publication of the paper.

I send you a copy of a paper and discussions; this you will see is printed from the regular forms used for the regular Transactions. We formerly re-paged these extras, but we found that the retention of the paging of the Transactions was more satisfactory, as references to papers are made always to such paging. The cover which is upon these extra copies is an extra charge, amounting to about one cent for each cover.

With most papers the editing is a matter of no great difficulty, but as you may imagine, cases occur occasionally which require the exercise of much discretion, and in such cases the editor always formally and in writing refers the matter to the publication committee, giving the committee a full statement of the circumstances, including also any confidential matter that may affect the question; this is always done in writing, and is made a matter of record for the protection of the editor, and of the committee, as well as the author. Cases occur at times wherein authors speak improperly as to other engineers, and in a manner which we do not consider suitable for publication; in such cases the editor corresponds with all parties affected, and the paper is finally modified by the author in accordance with suggestions made by the committee or, it may be, is declined.

Should you desire further information, I will be glad to give it to you.

Very truly yours, JOHN BOGART,
Secretary Am. Soc. C. E.

CONCERNING THE DENTAL SECTION OF THE TENTH INTERNATIONAL MEDICAL CONGRESS.

In response to a call of the organizing committee (Professors Virchow, von Bergmann and Waldeyer) fifty delegates from the various universities and medical societies of Germany met in Heidelberg on the 17th of September, 1888, to take steps in the organization of the congress. At the meeting it was decided that the congress should be held in Berlin, beginning August 4th and closing August 10th, 1890.

An organizing committee consisting of Profs. Drs. Virchow, von Bergmann, Leyden and Waldeyer, was elected and a general secretary, Dr. Lassar, appointed.

Eighteen sections, including Dental Surgery, were organized, each with a special committee of nine members.

An international medico-scientific exhibition is to be connected with the congress. Statutes and programme were adopted, which will be given in as far as they particularly concern the dental section.

ART. II. "The congress consists of physicians (approbirten Aerzten) who have registered their names and obtained their membership cards. Other savants who are interested in the work of the congress may be admitted as extraordinary members."

The delegates did not see fit to change this article so as to include dental surgeons, but decided that the article should be so interpreted as to admit dentists to membership. Since the meeting at Heidelberg the question has been raised whether dentists resident in Germany, but not possessing the German dental approbation (degree) could be admitted to membership. Regarding this point the Chairman of the Committee of Organization decided that only those who possess the recognized degree of that country of which they are citizens may be admitted to membership.

A German citizen holding only an American or Swiss degree is, therefore, not entitled to membership, no more is an American or English citizen not possessing the degree of his own country; on the other hand, foreign citizens practicing in Germany are admitted without the German degree, provided they have the degree of their own country.

Members pay a fee of twenty marks and receive a copy of the transactions.

ART. III. "The object of the congress is exclusively scientific."

ART. X. "All lectures and communications in the general sittings, or in those of the sections, must be handed, in writing, to the Secretary before the close of the sitting. The editorial committee decides whether, or in what part, such communications shall be included in the published transactions."

ART XI. "The official languages of all sittings are German, English and French. Very short remarks may be made in other languages, provided some member is prepared to translate them into one of the official languages."

ART. XII. "Lectures are, as a rule, to be limited to twenty minutes; discussional remarks to ten minutes."

ART. XIV. "Students of medicine and other persons, gentlemen and ladies who are not physicians but are interested in the proceedings of any particular session, may be invited by the President of that session, or, on application, receive permission to attend as auditors. There are to be no Vice-Presidents associated with the congress; but each section is empowered to elect a limited number of Honorary Presidents, and a Secretary for each of the official languages."

The committee of the dental section is composed of as follows: Busch, Berlin, Chairman; Calais, Hamburg; Hesse, Leipzig; Fricke, Kiel; Holländer, Hulle; Miller, Berlin; Partsch, Breslau; Sauer, Berlin; Weil, Munich.

At a meeting of this committee held on the 16th October, 1889, it was decided that the hours from 9 to 12 A. M. should be devoted to practical demonstrations in the rooms of the dental institute, the demonstrations to consist of operations in filling, extraction, and in mechanical dentistry; in short, operations in all branches of operative and mechanical dentistry. Demonstrations in extraction and artificial work are to be under the direction of Prof. Busch; those in filling under that of Prof. Miller. The theoretical exercises are to be held from 2 to 5. They will consist of the usual essays or lectures, and the accompanying discussions; besides these, three subjects for general discussion are to be chosen, one to be introduced in the German language, (on bromide of ethyl, by Prof. Dr. Holländer,) one in the English, and one in the French language.

Those desiring to deliver lectures or read essays on particular subjects, are requested to send in, along with their announcement, a very short résumé of the contents of the same. Correspondence in German language to be directed to Prof. Dr. Busch, chairman, Dorotheen Str., 40, Berlin; in French language to Dr. Calais, Hohenbleichen 17, Hamburg; in English to Prof. Dr Miller, Voss Str. 32, Berlin. In America, Drs. Barrett and Taft. Great Britain, Mr. J. H. Mummery, M. R. C. S., &c., and Mr. W. Bowman Macleod, F. R. S. E., &c., have, on invitation by the committee, expressed their willingness to act in the capacity of honorary presidents.

A fuller report of the steps taken in the organization of the congress up to end of October, is given by Prof. Busch in Verhandlungen der deutschen odontologischen Gesellschaft, Heft 2.

Dr. R. R. Andrews has been made Honorable Secretary for America.

W. D. MILLER, Berlin.

INTERNATIONAL DENTAL CONGRESS, 1892.

At the nineteenth semi-annual meeting of the New Jersey State Dental Society, held at the office of Dr. S. C. G. Watkins, Montclair, N. J., Saturday, January 11th, the following resolution was adopted:

"Deeming it fitting, and the proper time for holding an International Dental Congress in the year 1892, the New Jersey State Dental Society has appointed a committee to act in co-operation with like committees from other dental societies throughout the United States. They would request your society to appoint a committee to meet with them at the Hoffman House, New York, on Tuesday afternoon, April 8th, to formulate plans for the holding of the First International Dental Congress."

The New Jersey Society trusts that this will meet with the approval of other societies, and that their respective executive committees will appoint delegates at once. The call is signed by the president, Dr. Watkins, and fellow officers, also eleven members.

PELLETS.

Dr. J. E. Cravens has gone to Paris as associate of Dr. E. A. Bogue.

"He that bloweth not his own horn, the same will not be tooted."

A majority of dentists' patients are said to be groan people.

To our Exchanges.—Mail direct to 39 State street.

The Boston Dental College is the subject of a two column notice, with illustrations, in the Boston *Herald* for December 28th.

Keep your rubber dam dark and damp.

"Organic and *an*organic, sir, when you speak of the acids. *In*organic is out."

In a note in the December *Southern*, Dr. Arrington recommends beeswax as the best material ever used for filling roots.

Dr. Brophy, of Chicago, is in California for his health. May he return with lots of it.

Dr. Rice says, in the *Practical Dentist*, that a piece of resin held against the engine belt will prevent slipping of the same.

According to Prof. Whelpley, slides and covers that have long been in use may be made as good as new by a few days immersion in equal parts of alcohol, oil of turpentine, coal oil and benzol.

Editor Welch's gallery of beauties grows apace. Dr. Cravens smiles on the readers of the November number, while Prof. Gorgas looks straight away in the number following.

Chicago dentists' subscription for the fair will not be wanted this time. Salt it down, brethren, and come to New York in '92 and have a good time.

The *International* accuses the *Cosmos* of perpetrating two jokes in the editorial columns, or rather "reperping" them, as they are spoken of as "stale."

Ohio's Seventh District Dental Society has its oar in, and to all appearances, for a long pull. The *Dental Register* for November is full of it.

Masonic Temple grand lodge room is a poor place for a dental meeting. In the first place, it is too large for any possible dental gathering, and worse still, the acoustics of the place are most wretched.

The Buffalo Dental Manufacturing Company's list of "Chemists' laboratory apparatus" is a very handy book to have by one. Forty-four pages, fully illustrated.

The Bausch & Lomb Optical Company have issued a new edition of their fully illustrated catalogue of microscopes, stands, objectives and other accessories.

Prof. S. B. Howell, of the Philadelphia Dental College, has resigned from the faculty of the University of Pennsylvania. Prof. E. D. Cope succeeds him.

According to Dr. Gramm (*Archives*), displacement by borax of small pieces of gold plate, solder, etc., while soldering, may be prevented by mixing in a little gum arabic.

What has become of the Taggert suspension engine, exhibited at Chicago last February? One is wanted down this way, unless a better has come to light since.

Editor Catching refuses to be held responsible for all errors appearing in the *Southern*. He can't read everything (we have his own word for it), likewise his printer. His correspondents are therefore cautioned to write as we do—copperplate.

Annual of the Universal Medical Sciences, 1888, for sale.—The above (a series of five volumes,) cost us in cold cash twenty good dollars. It is for sale, undisturbed in its original box, for $10.00 cash, likewise cold. Address this journal.

San Francisco has a Chinese physician, Li Po Tai, whose professional income is stated to be $6,000 per month. He has been established in that city for thirty years.—*Medical Record.* Again, the Chinese must go.

According to Prof. Griv, the eminent Italian physicist, the compound microscope ("consisting of several lenses, or a suitable combination of lenses or mirrors," as distinguished from an instrument "consisting of a single lens or mirror") was invented by Galileo in 1610.

Professor Behrend, an English medical authority, points out that in a practice of thirty years, largely among Jewish patients, he has not met a single case of phthisis in the members of that faith, their immunity from its attacks being undoubtedly due to the Hebrew method of examining and slaughtering cattle.

Dr. Bergtold, of Buffalo, begins a series of papers on elementary bacteriology in *The Microscope* soon. This periodical, by the way, is now edited by Dr. A. C. Stokes, of Trenton, N. J., a man whose standing in the scientific world gives character to anything in connection with which his name appears.

The Italian statistician, Signor Bodie, has published some figures showing that ten per cent of all infants in Europe die within the first month, twenty per cent before the end of the first year, and thirty-three per cent of the remainder during the first five years. Hardly seven children out of ten reach the completion of their sixth year.

For intelligent discussion of a non-dental subject by a dental society, the reader is referred to the *International* for December. Dr. Roberts "Study of Electricity" found an appreciative body in the Pennsylvania society, and the discussion, while by no means exhaustive, was extremely suggestive. Who says we are not a learned profession—or about to become one?

In the direction of reproducing the colors of nature themselves by photographic means, nothing has yet been accomplished beyond the plan of obtaining a set of negatives of a view representing the three primary colors—blue, yellow and red—with a fourth in black, to supply outlines and deficiencies, and combining these by superimposed printings so as to get an approximation to natural tints.—*The Photographer.*

Dr. Walker introduced a novelty at the November meeting of the First District Society, in the form of a phonogramic communication from Dr. Faught, of Philadelphia, entitled, "Some Notes on Methods of Practice," also discussions by Drs. Truman, Guilford and others. The machine was read to and talked at in Philadelphia and the contents ground out in New York. Talk about enterprise. "Our Walker" never fails to get there.

The Hayden Dental Society was organized and incorporated under the laws of Illinois, August 3rd, 1889. The object of the society is the professional and social improvement of its members. Meetings will be held in Chicago, the third Monday of each month (except July and August). The following are the officers: President, Louis Ottofy; Vice Pres., A. W. Freeman; Secretary, A. J. Oakey; Directors, J. W. Rogers, J. L. Ubellar, H. P. Smith.

The Johns Hopkins Hospital is found to be a not unmixed blessing to the medical profession of Baltimore. The *Maryland Medical Journal* says that, in the last six months, five thousand dispensary patients have been treated there, and that these consist largely of persons who used to go to a physician. Much the same kind of story is told by physicians of this city, regarding the Vanderbilt and the Presbyterian Dispensaries.—*Medical Record.*

Books, Pamphlets, Etc.

Address Before the Massachusetts Dental Society. By Dr. Dwight M. Clapp, of Boston.

An effort both able and eloquent.

Anales de la Sociedad Odontologica de la Habana.

The October and November issues have come, the first dental journal we have seen in Spanish since *El Progresso Dental*, in '84. It goes on our exchange list forthwith.

Guilford's "Orthodontia," and Evens' "Crown and Bridge-work" in our next.