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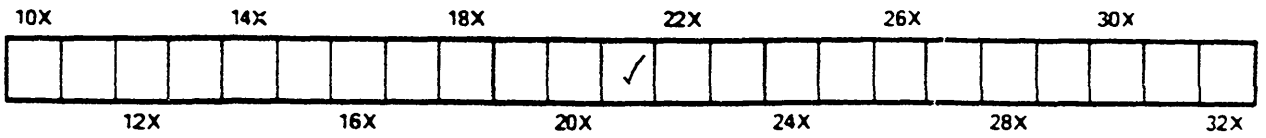

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ORIGINAL COMMUNICATIONS.

EDITORIAL NOTES ON PRACTICAL SUBJECTS.

BLACK RUBBER.

BY C. S. CHITTENDEN.

For the last five months I have been using quite extensively, black rubber as a base for artificial sets of teeth, in place of the red gum. I adopted it because, after one or two trials, I found it to be very much stronger than red, and can, therefore, be made only about one-half the thickness which it is necessary to make plates of the rubber now in common use. It is susceptible of as fine, if not a finer polish than the red gum, and when neatly manipulated, it makes a very beautiful denture.

The objection so often urged against red rubber, viz: that the coloring matter—the sulphuret of mercury—has a deleterious effect upon the mucous membrane of some mouths, if it has any foundation at all, in fact, which I very much doubt, is entirely overcome by using the black gum, as it contains nothing but the pure caoutchouc and the sulphur which causes it to harden by steam. It is cheaper, too, for there being no heavy mineral coloring matter in it, it takes a much larger quantity to make a pound. It hardens at a little higher heat than red gum.

ANÆSTHESIA, ITS EFFECTS ON THE BLOOD.

BY B. T. WHITNEY, M. D., D. D. S.,

Read before the 7th and 8th Districts Dental Society, Buffalo October 7th, 1869.

Mr. President and Gentlemen:—In looking over this subject I find it impossible to condense within reasonable limits of a paper to be read before this Society, all that I might say on anæsthesia. I shall therefore speak more particularly of the influence of the several anæsthetics on the blood, and through it on the general system; presuming that that of more immediate practical importance will be fully brought out in the discussion that will follow.

To properly explain or comprehend the physico-chemical phenomena of anæsthetics, it may be well, first, to very briefly look at the component parts and uses of the blood; how its life principle is sustained; its relation to the nerve centres; the composition and chemical properties of the anæsthetics in general use; their immediate effects on the blood, and through it on the system. In doing this I shall draw largely from the experiments of others, and condense some important portions to mere statistics.

The blood is composed of serum, fibrin, coloring matter, and a small proportion of saline compounds. The serum is composed of about nine parts water, nearly one part albumin, and the remainder of salts of potassa and soda. The fibrin is the soft solids, and is formed in minute nuclei, which are surrounded or encased with coloring matter, which prevents them from adhering to each other as they are carried forward in the circulation, and is vitalized by the absorption of oxygen from the air we breath, as it passes through the lungs. It is these nuclei that we shall have most to do with .The coloring matter is subject to some speculation, but nearly all experimenters decide it to be some of the chemical combinations of iron, and is brightened in color by the oxygen in the lungs, making arterial blood; and is darkened, as in the veins, by its loss, and the absorption of carbon and effete matter carried from the absorbents, to be cast off in the form of carbonic acid gas and vapor as it returns to the lungs. With this change of color the nuclei becomes vivified.

The quantity of blood in the human body is not positively known, nor can it be; but the average of estimates place it at about one-fifth or one-sixth of the whole weight of the body. Neither is the vel-

ocity of the blood any better understood. It is estimated, however, that there may be one ounce thrown forward at each contraction of the ventricle. Thus, if there are 30 pounds in the body weighing 150, it would take 480 pulsations to send it forward. Allowing 72 pulsations per minute, there pass through the lungs 72 ounces of blood. There are 23 inhalations in a minute, which would expose about 3 ounces of blood to the air at each breath. By this calculation it would require about 160 breathings, or between six and seven minutes to aerate all the blood.

What this propelling power is, is still unsettled in the minds of physiologists. Some claim it to be an electro-galvanic or nervous fluid, unconciously passing in a current. This theory is claimed to be sustained by the experiment of ligating or dividing the pneumogastric nerve, arresting the circulation of the blood as well as breathing, which may be restored by passing a current of galvanism through the severed parts. Others claim that it is the vivifying power of oxygen on the blood; while others with more show of reason, that it is from both, that there is a mutual dependence between nerve power and atmospheric stimulation. In the new born infant, there is no independent venous and arterial circulation set up until air is admitted into the lungs, when the blood is set in motion. In death the heart usually continues a feeble motion after the last breath, probably from the supply of oxygen retained in the blood. In suspended animation, our first effort is to get air into the lungs. As soon as this is accomplished the heart is put in motion, though it is an entirely involuntary action; unless we suppose that the air first acts on the nerve centres, and that they direct the heart to act. That the blood comes into the lungs *venous* and goes out *arterial* is a fixed fact, as is also that it gives off carbonic acid gas, and takes in oxygen. It is also demonstrated that oxygen is the cause of this change to vermillion in the color of the blood. It cannot be produced by any other substance. By no gaseous mixture, without free oxygen, can life be long sustained.

In every inspiration about half a cubic inch of oxygen is taken up, by about three ounces of blood (on the basis of the previous calculation). This would be nearly nine cubic feet per day, Atmospheric air is composed of about 20 parts of oxygen and 80 of azote or nitrogen. Thus, we consume each day about 45 cubic feet of air. The corpuscles alone absorb this oxygen, and the nuclei are vivified. *Aprori* it would follow that the blood is, in a large degree, dependent

on *oxygen* for its vitality, if not entirely for its stimulant effect on the heart in keeping up the circulation. It is demonstrated that, without oxygen the corpuscles become somewhat disintegrated, the nuclei leave their coloring sacks and run together, forming a fiber or clot. Should this coagulation take place even to a very limited extent as the blood passes into the delicate membrane or pulmonary capilliary system, or through the general capilliary system, it must arrest the circulation.

The experiments on the influence of gasses or vapors on the blood, out of the body, give us but little information as to their effect by inhalation. Sir H. Davy and others could perceive little or no difference in the time or character of the coagulation, by exposure of fresh drawn blood "to azote, nitrous gas, oxygen, *nitrous oxide*, carbonic acid, hydrogen, or atmospheric air." Further experiments go to prove that vapor of chloroform or ether have little or no effect. But the *time* is materially influenced by *temperature*. At 98 ° it takes place in two and a-half minutes, at 120 ° in one minute, while at 60 ° it takes five minutes, and at 40 ° twenty minutes. Certain substances, when *mixed* with the blood, do effect its coagulation. Some retard or prevent it, like sulphate or muriate of soda or ammonia, nitrate of pottassa &c., while others will promote it, like alum, sulphate of zinc or copper, and some of the other mineral and vegetable astringents. The spray of perchloride of iron carried into the lungs with the breath will arrest hemorage of that organ. The air is capable of taking up most of the gasses and vapors, and the blood readily absorbs them. The temperature of the atmosphere will greatly influence the quantity thus taken up and conveyed to the blood. For example, at 40 ° it will take up but six per cent of chloroform, while at 60 °, nearly twelve per cent. From this fact we will see that temperature will greatly influence the quantity of chloroform or ether that may be carried into the lungs in any given time.

Water at 60 ° will absorb but four per cent of oxygen, while it may take up its own bulk of *nitrous oxide*. The blood will also take up its own bulk of the same gas, but only a small per cent of oxygen. The serum and corpuscles equally absorb nitrous oxide, while oxygen has no affinity for the serum, is entirely absorbed by the corpuscles. Nitrous oxide is taken into the lungs, is retained in the blood, and is exhaled as nitrous oxide with an admixture of carbon, as is also chloroform and ether, while oxygen is entirely consumed.

It has been claimed by many scientists, and even by experimenters that nitrous oxide when breathed, had the power of hyperoxygenation of the blood; drawing their conclusions from the fact that it is composed of one part each of oxygen and nitrogen; while atmospheric air is of the proportion of one of oxygen to four of nitrogen; and losing sight of another important fact, that it is a *chemical combination,* forming a new compound instead of a simple mechanical mixture, and that the blood possesses no power to decompose it. Recent experiments by Dr. E. Andrews, of Chicago, go to show that an admixture of pure oxygen with nitrous oxide will give continued vitality to the blood, while it will not detract from the anæsthetic quality of the gas; and thus make a prolonged anæsthesia comparatively safe. He uses one volume of oxygen to three of nitrous oxide.

After an ordinary expiration the lungs still retain a large volume of air, variously estimated—most writers say about 120 cubic inches. Lindenar estimates that there are 2642 superficial square feet, and 6,000,000 of air cells in the lungs. Each inspiration takes in about thirty cubic inches. It then will take four respirations to change the whole volume of air in the lungs. As we respire twenty-three times in a minute, this change will take place about six times. From these calculations, and the immense surface of cellular tissue, we can judge of the rapidity with which all anæsthetics may be brought to act on the blood, though it is not claimed that all the oxygen in the blood is disposed of in any case; if so, death would instantly ensue.

Nitrous oxide—protoxide of nitrogen—is of equal parts of oxygen and nitrogen (N.O.), is produced by the decomposition of the salts of nitrate of ammonia by heat at about 400 °. Its specific gravity is nearly one and a-half. At zero, under pressure of 30 ° atmospheric (540 lbs.), it is condensed into a clear liquid, and at 125 ° below zero it is crystalized into a clear transparent body. The liquid would be a convenient form for keeping it for any length of time, or of transporting, as is recommended by Dr. Evans, of Paris. It is reduced thus about 400 times in bulk; a pint bottle will hold enough to make fifty gallons of gas. The bursting force on the bottle would be 750 pounds to the inch.

Nitrous oxide was first discovered by Sir H. Davy, in 1799, who also demonstrated its anæsthetic properties by inhalation. From that time it was only used as a matter of amusement, until 1843, when Dr. Horace Wells, of Hartford, conceived the idea, and demonstrated upon himself, that it might be of great benefit in mitigating

pain in surgical operations. Like all the other anæsthetics, it first acts as a stimulant, but when its administration is carried farther it induces narcotism. The livid hue of the countenance, lips, &c., almost leaden, often seen under its use, more decidedly so than by that of any of the other anæsthetics, is produced by the absence of oxygen, giving the dark color to the blood; as it is almost entirely cut off in the administration of the gas.

By careful measurement when there has been five or six gallons of nitrous oxide gas inhaled, there is only about three quarts retained in full anæsthesia.

Chloroform—Terchloride of Formyl—is usually produced from distillation of alcohol and chloride of lime in a closed retort. The vapor condensing is drawn off into water. It is easily made on a small scale. It consists of two atoms of carbon, one of hydrogen, and three of chlorine (C^2. H. Cl^3.); specific gravity 1.48; density of vapor 4.2; boils at 141 °; is uninflamable. As a therapeutical agent it is stimulant and narcotic. When inhaled in small quantities largely diluted with atmospheric air, it "increases the frequency and force of the heart's action." Carried into the system more rapidly, it depresses the circulation, by partially paralyzing the nerve fibres that are distributed to the blood vessels, and thus, by loss of the power of muscular contraction they become relaxed.

Chloroform does not immediately change the vermillion hue of arterial to that of venous blood, like nitrous oxide gas, or even as readily as ether; but by its long continuance this result will be produced, though in a less degree; in part from the large admixture of atmospheric air that it is always necessary to introduce into the lungs with it to sustain life. It should never be given more rapidly than from four to five per cent of the volume of the air breathed. If given more rapidly, or in larger proportion to the air, it is likely to produce disastrous results.

Ether is made from distillation of alcohol and sulphuric acid. Its chemical properties are, oxygen about 22, hydrogen 14, and carbon 64, in a hundred parts. It is very volatile, and when exposed to the air becomes impure by absorbing oxygen, gradually changing into acetic acid and water, showing the necessity of keeping it in well corked bottles; and when in use, as little exposed to the atmosphere as possible. If too long kept, and even occasionally opened, it will *sour*, and loose its original quality, becoming unfit for use. This fact should be borne in mind by all who use it. While it is shown that

ether contains oxygen in its composition, and chloroform does not, it does not follow that it can give any more nutriment or stimulant to the blood, as it is a *chemical* combination, much like that of nitrous oxide.

The vapor consists of two parts of bicarbonated hydrogen, and one part aqueous, and is about two and a-half times heavier than the air; while the ether itself is only about three quarters that of water. This fact should be remembered by all who may use it in the night time. The artificial light should always be held in a position above that of the ether, as its vapor is very inflamable, while that of chloroform, though still heavier is not. In administering ether as an anæsthetic, atmospheric air should be freely admitted, though experience goes to prove that it is not necessary to the same extent as with chloroform, which is more poisonous than ether.

We see, from the chemical properties of each of these three agents, so largely in use as anæsthetics, that there is either not one atom of oxygen, or where there is, it is united by a chemical combination instead of mechanical, or a simple mixture; and that the lungs possess no power of decomposing the compound; and consequently none of them can sustain the vitality of the blood. We see too, that when there is not the proper supply of oxygen, the blood loses its life sustaining power; and, moreover, may be so far devitalized as to cause a separation of its component parts, the nuclei leaving the colored globules and run together, forming fibrine, in fact to coagulate in the veins.

It is a well established fact that narcotism, whether produced by the agent in the stomach, or by inhalation, or by sub-cutaneous introduction, interferes with the proper oxygenation of the blood; and in proportion to the degree or length of time, is its altered condition. This is peculiarly illustrated in habitual opium eating, and in the excessive use of alcoholic drinks. It is also a well settled theory, and is sustained by facts, that any agent that may directly prevent the oxygenation of the blood, and not produce absolute asphyxia, will produce narcotism or anæsthesia. The question then arises whether this altered state of the blood is the direct cause of the suspension of consciousness, and the power of motion; whether it alone absolutely stultifies the action of the brain, as is claimed by most writers on this subject; or is the action of the agent directly on the nerve centres, "the poison mounting up to the brain," as is claimed by others? The more reasonable conclusion, and best sustained by physiology,

therapeutics and the microscope, is that it is from both these causes; first, depriving the blood of its stimulant, and thereby the nerve centres of the power of communicating with the various organs of the body, suspending the nerve force, or arresting the flow of nerve fluid, or if you please cutting off the supply of electro-galvanism from the mysterious battery. Thus the motor nerves become temporarily paralyzed, and after that the sensorial. This paralysis will be in degree proportionate to the character or extent of the poison in the blood, or rather the extent of its devitalization. The muscles of involuntary motion are the last to yield. The first effects on these are visible through the pneumogastric nerve, as seen by disturbing the stomach as well as the breathing; then upon the great sympathetic, which gives the power of involuntary motion to all the intercostal muscles in breathing. If anæsthesia is too profound, or the agent pushed too far, the branch of the eight pair, which supply the glottis, may also become paralized, when the muscles of the throat will become retracted, the tongue be drawn into the larynx, and strangulation follow; the respiratory muscles cease to act, and death ensues.

This is probably the more usual cause of death from anæsthetics, and should be carefully watched and guarded against; and if it occurs, not a moment's time should be lost in drawing the tongue forward. Death may occur from actual poison to the system in some constitutions; but post mortem examination reveals very little, if anything beyond an impoverished condition of the blood, except that a larger proportion of the agent used is found in the brain, while it contains less than its natural quantity of blood. The next larger proportion is found in the liver, while it contains more than its usual quantity of venous blood; and, in proportion to that of the body a lack of arterial blood.

Some persons succumb to anæsthetics more readily than others, probably from less vital force, or peculiar idiosyncracies that make them more sensible to their influences than others. These cases require a more careful use of the agent, and watchfulness as to its effect.

There are certain conditions of the system where anæsthetics should not be used. The first to be named is a diseased condition of the heart, especially where there are fatty deposits ,or fatty degeneration of the muscular tissue. Of the fatal cases, where post mortem has been held, nearly half have revealed this state of that organ.

They should not be used in cases of *delerium tremens*, nor with excessive drinkers, as the condition of the blood is already partially devitalized from the narcotic properties of alcohol. They should not be used in any poisoned condition of the blood; nor during a severe shock to the nervous system, as in case of severe accidents or frights, until reaction is fully established. Never in cases of mania, or determination of blood to the head; it is unsafe during hysteria.

PROCEEDINGS OF SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

Dr. Truman said that the success of this use of the oxychloride of zinc must necessarily overthrow the practice of twenty years; and he was not prepared, from anything he had seen or heard, to assert that the filling of roots was a failure. All know that the removal of the pulp is a success, just as far as amputation in surgery is a success, because it is the best thing to be done under certain circumstances. The subject had been treated vaguely by individuals, who asserted dogmatically, without producing facts in support. One asserts that there can be no failure; another admits some; while a third finds the failures to out-balance the successes. There must be a level of truth somewhere; but at this stage we can take nothing about it to be settled: it would require years of observation and experience to arrive at any positive conclusions. The theory of capping, which has been tried for years, was now an acknowledged failure. He had tried the oxychloride for two years faithfully, and believed in it. He had had failures, and thought every one must have them. Certain conditions admit of its use. He had never yet found a pulp dead from its use; but it was impossible to tell what the result might be; and he did not believe that ill success could always be charged to malpractice. It may be that there is something in its antiseptic properties which will preserve the appearance of the tooth after the pulp is dead; but no one can tell what is its mode of operation. These questions should all be studied out at home, and we should not come here to propound theories without an array of well-digested facts to sustain them. American dentists are very far in the rear in their theoretical knowledge; as far behind the Europeans in this department as the latter are behind the Americans in practical skill.

Dr. Searle said that he had had opportunity, during the year, of examining two teeth, filled in 1862 and 1863, of which records had been kept. In that of 1863, superior second bicuspid, the pulp bled, was capped with oxychloride, and filled with gold. In 1869 that filling had been removed; the pulp was found to be living and healthy This tooth was removed on account of neuralgia. In that of 1862, an inferior first molar, the tooth had ached; it was filled as before. The pain was intolerable for two or three hours, then ceased; there was no subsequent return of pain, nor any discoloration. This tooth had also been removed, and on opening it, the entire pulp was found to have dried up and disappeared; there was no fetor. In other cases inflammation had followed, generally in a very few days; where it goes on for a number of days without pain, he feels no apprehension, the tooth generally dying quietly, without discoloration.

Dr. Judd said the question to be discussed is not whether the practice is always successful, but, Is it judicious? We amputate limbs, and consider that practice judicious under some circumstances. Let us inquire of ourselves, Is it of any importance to preserve the dental pulp alive? Is a live tooth any better than a dead one? He believed, from experience and analogy, that a live pulp *is* better than a dead one! Philosophically considered, the nutritive processes go on at all times in teeth, in their normal condition, even in the enamel. Some think that there are no such changes; but it must be borne in mind that the enamel, dentine, and cementum, are made up of hard and soft substances; and no one will deny that soft tissues change. Take the case of a tooth, the pulp canal of which had been filled; it remained quiet for years, but the patient having an attack of measles an abscess formed: this showed the necessity of the pulp to preserve the tooth under unfavorable circumstances. He considered it of the first importance, then, to save pulps alive; in many cases they do live under the oxychloride, and likewise die, and so also with gold. Many times teeth, the pulps of which were never uncovered, die even when filled with gold. He was not prepared to say under which circumstances most dead pulps were to be found; it was certain they were to be found under both. It was always time enough to kill a pulp, but, once dead, it can never be brought to life again; it was, therefore, a judicions practice to preserve all, if possible, alive.

Pathology is a complicated and unknown subject; less is known of it than of any other in the broad domain of medicine. A few isolated facts and a vast number of theories are all that we have to

show of it. The very first step, etiology, puts us at fault; we know so little definitely of the causes of disease. He was unable to give a definition of what a cell is, though Dr. Atkinson undertook to explain it. The general idea of a cell is that it is a small body with a cell-wall, fluid contents, and a nucleus; that each cell lives by itself, and has an influence on its neighbors. It is the opinion of Virchow that each cell dominates a certain territory around it. If this defination of a cell is correct, the idea that it is the ultimate anatomical element is inadmissible. It has been settled by the observations of Agassiz and Beale that there are lower elements than cells capable of performing the functions of development. The ova of turtles were innumerable, and so small that they appeared, under a magnifying power of 17,000 diameters, to be mere homogeneous particles of germinal matter, yet they were capable of true growth. We must not then accord to the cell the honor of being the germinal particle.

The most generally accepted idea of the day, as to diseases, is that they are due to microscopic animals and plants, developed in living tissues. His attention had been especially called to this subject by a paper which accidentally came into his hands from Italy; in which the author claimed the discovery of the cholera plant, in the mucous membrane of the intestines of the deceased, which he believed to be the efficient cause of Asiatic cholera. Salsbury took up a similar doctrine. Polly gives much attention to the discovery of agents to destroy these growths,—sulphurous acid being found the most deadly to them. Dr. Truman takes the same view of the origin of the green stain on the teeth; we know that this destroys the texture of the tooth, while tartar protects the structure.

It was not unusual to find a condition of very high sensibility in a part of the dentine of a tooth, and very near it a tract, almost or quite free of sensibility; and the question had often recurred to his mind how to account for it. He had made a great many sections with the purpose of determining this point; in many cases tracts were found in which the dentinal tubes were entirely obliterated, the whole structure consisting of calcified matter as far as the tract extended. In one case two entire quarters of the section were found destitute of nerve tubules, while the other portion was plentifully supplied with them. This condition afforded the most satisfactory elucidation to his mind of the absence of sensibility in some portions of a tooth, and its presence in others, showing it to depend on the nerve filaments in the dentinal tube.

Dr. McDonnell. In all modes of treatment success is variable, because the conditions are variable. He had capped teeth by different methods, and on opening them, years after, had found the pulps dead, without having shown any outward signs of change. During the past year he had capped twenty exposed pulps in the method described by the previous speakers; one of these he knew to be dead. In making the application, he found that the degree of pain was regulated by the condition of the pulp; when freshly exposed, the pain was very slight, but it was greater and longer continued in accordance with the amount of congestion. While he was a great advocate for saving teeth, he did not think that anybody could be always successful; much must depend on the condition of the patient. If the exposed pulps were healthy, not one in fifty need be destroyed; it were better to adopt the oxychloride process, and then, even if they do die, there will probably be no pain nor discoloration of the teeth. Where, from the general diseased condition of the pulp, he considers a cure impossible, he removes it; but believes more suffering is generally caused in extirpation than in applying oxychloride.

Dr. Searle inquired whether the application of either creasote or oxychloride to the pulp was not similar in effect, and whether they are compatible with it.

Dr. Atkinson said that anything which contracts the tissues is an astringent, and this is the effect of creasote; it makes a solid mass of the coagulable portion of the pulp with which it comes in contact; the excess acting as a stimulent on the capillaries until its power is exhausted. Exactly the same thing occurs with the hydrochlorate (not oxychloride) of zinc; they are similar in effect, and their mode of action is the same. Any agent which effects coagulation deprives the tissue of the power of forming globules of pus.

Dr. Buckingham, When the albumen is coagulated, will it ever become soluble again?

Dr. Atkinson. Yes and no,—dependent on the extent of the coagulation. The territory in which nutrient action takes place is always a collagenic or mucous mass, whether that be in the general juices of the flesh, or the sarcode, or in the anatomical elements denominated cell, where function is more differently elaborated. We only know a tissue by its anatomical elements, and this difference is that which constitutes the character of the cells. In a general way, teeth may be said to be osseous tissues; but that is too crude a defini-

tion to be of service to the histologist, physiologist, or pathologist. There are three forms of hard dental tissue, known by the character of their cells, viz.: enamel, dentine, and cementum, and they are but differences of degree of calcification, under the dominion of typal presence. The last of these is so nearly like the bone cell as to be readily mistaken for it upon superficial examination. The formation of cells is always uniform in each kind. There is no physical distinction between a cell-wall and its contents; it appears to be a homogeneous mass,—and there is no cell with fluid contents.

Dr. Judd repeated that he had seen but one instance in which two full quarters of a horizontal section were made of calcified tracts, in which the tubules were entirely obliterated, and this was a very uncommon condition, though small tracts of the same character were commonly found. Dr. Atkinson thinks that the dentinal fibres are mere extensions of nervous matter; I believe that within the tubules are true nerve filaments. The first layer of cells forming the exterior portion of the pulp, called "germinal matter" by Beale, penetrate the tubules, forming the soft fibre of Tomes. It must be borne in mind that Beale's investigations, to which we have referred, were made long after those of Tomes, and with vastly higher powers of observation. Beale saw that the terminal point of the nerve fibre, as described by his predecessors, was really not a terminal point, but only the point where it breaks up into an infinite number of fibrils in the germinal matter of the pulp. Now, there is room in the dentinal tubules for whole plexuses of these minute fibrils, and it is reasonable to suppose that they enter the tubules in common with the germinal matter—the tubules measuring $\frac{1}{10000}$ of an inch, while these minute nerve filaments are but the $\frac{1}{100\,000}$. Further than this, Beale has enunciated the doctrine that there are no terminations to the nerve fibrils, but that, like the electric force, their circuit is continuous, so that there is no break in their attachment to the nervous centres. It is a principle of the Baconian philosophy that known facts are superior to theories; and he accepted the facts developed by the advance of scientific investigation as a far more satisfactory elucidation of the question of sensibility in dentine than any of the fanciful theories which have been proposed.

Dr. McQuillen said that, regarding those present as representative men, understanding scientific principles, and familiar with elementary knowledge, he should not address them as students just entering upon the consideration of such matters; but, paying a decent

respect to the intelligence and acquirements of his auditory, would present what he had to offer as to those qualified to have views and opinions of their own. He differed, in some respects, from the opinions advanced by Dr. Judd in relation to the character of the dentinal fibrils. Tomes directed attention to the fact that the dentinal tubules are occupied by fibrillæ, and Beale concurred in that view; while the former was disposed to regard them as nerve fibres, neither had *asserted* them to be such. Beale, indeed, has spoken of them as *germinal matter* from which the *formed material*, or completed tissue, is made. Dr. McQuillen has seen these fibres in examining pulps, but is disposed to think they are fluid rather than solid during life, and that their solidity under the microscope is due to a change after the removal of the tooth, like the change in the blood by coagulation. We have liquor sanguinis present in the pulp, and therefore the analogy might hold. He advanced this view suggestively, as it is impossible to demonstrate the fluidity or solidity of the contents of the tubules during life, because the structure can only be examined post-mortem. Ten years ago, in making an examination of the pulps of the incisors of the calf, he had found no well-marked connection between the pulp and the walls of the cavity in which it was lodged, except at the end of the root, where the organic basis of the dentine had been formed, with a very slight deposit of the inorganic constitutents. On making a longitudinal section of the tooth, the pulp could be drawn out of the cavity without any force being exerted. Indeed, the weight of the pulp was sufficient to dislodge it when the divided tooth was held in such a position as to favor it. The connection at the end of the root, however, was invariably so firm as to require considerable force to sever it. Within the past two months, in making some injections of calve's teeth, he had obtained similiar results to those just described, and it induced him now, as formerly, to question, if the dentinal fibrillæ, which he had observed projecting from these pulps, were really extensions of the pulps, how the latter could so readily part from the walls of the pulp cavity, where it would be right to infer they were so firmly secured. Gulliver could not have been more firmly fastened to the ground when each hair of his head was tied by the Lilliputians, than a pulp would be to the walls of a pulp cavity if solid fibrillæ passed directly from it into each tubule. In stating these views, he merely offered them for what they were worth, and with a full recognition of the fact that one has no right, except inferentially, to draw

deductions from observations on animals and apply them to man. He would, therefore, direct attention to the ease with which the pulps of human teeth can be removed with a barbed probe; an incomprehensible operation, if the supposed connection really existed. Let any one attempt to remove the periosteum from sound bone where direct connexion exists, and find the character of the adhesion.

But we are met with the inquiry, Can any other than nerve substance transmit impressions through the tooth? He could see no reason why it might not. The air transmits sound, by waves of vibration, and if one end of a long stick be placed near the ear, and the other end be scratched by a pin, the sound would be transmitted along the stick to the ear; and sensations, in a similiar manner, might be transmitted through the tooth to an impressible pulp,

As to the advisability of using oxychloride of zinc, he believed in trying whether a thing was good or bad. He had tried this preparation on exposed pulps in a number of cases—in two instances in particular, which he had watched. After a month, the teeth were in a comfortable condition, and possessed evidences of vitality in color, sensation, etc. What the future result would be, time alone could reveal.

Dr. Truman said that when Tomes made his first statement in regard to nerve fibres, ten years ago, investigations had not been carried to their present degree. The method he had pursued was extremely imperfect. Beale indorses Tomes' view, but calls the tubular contents germinal matter, and proves his position by the experiment with carmine. Since Beale, Boll of Germany has written upon the same subject, in which he takes the same position as to the nerve fibres, and proves it by experiments on the rodents. In this country similiar experiments had been made. He was not prepared to admit the correctness of Dr. McQuillen's position. The best method of observing these fibrils is to prepare a section of a fresh tooth, and treat it with hydrochloric acid; this will remove the animal matter, and bring out the fibres on the slide by thousands. As they present the peculiar appearance of nerve fibres, he was satisfied that they were such.

Dr. Buckingham. Is it necessary that a nerve fibre should be touched to cause sensation? It is not necessary. He favored the idea that the action in the cells is similiar to the action in the galvanic battery,—the wires representing the nerves. There is great similiarity between chemical and physiological action. Where does

the nerve fibre terminate? There is no necessity of its going to each cell, but only in its neighbourhood; and the impression may be conveyed to any part, whether in a fluid or solid state.

Dr. Shadoan said that, in case of exposure, and the pulp membrane being wounded, his practice is very much like that of those who had spoken before him, with this difference,—he applies creasote or carbolic acid until the hemorrhage has entirely ceased, then dries out the cavity thoroughly, and with a blunt-pointed instrument, of suitable size and shape, applies a single drop of collodion to the point of exposure, allowing the ether to evaporate; then, on applying the oxychloride of zinc, there is perfect protection to the nerve.

If the nerve is exposed, and not wounded, the application of the collodion will form an admirable protection from the immediate contact of the oxychloride. He found that, where this precaution was used, the pain is seldom appreciable, and often there is none at all. There is something in the manner of applying the paste. He found that the softer it is, the more pain and less dense the mass when hard; and the harder the paste, so it is plastic enough for use, the harder it will become. There is no better way to apply it than by having all things ready to manipulate, and having an instrument wound with a little cotton, dip it in a very thin solution of the fluid, and mop or wipe out the surface of the cavity, and apply the paste; then gently tap the tooth, and the paste will settle nicely and uniformly to the bottom of the cavity. If the paste proves rather soft after applying it, the excess of fluid may be taken up very readily by pressing some spunk or bibulous paper upon the surface. Oxychloride of zinc is valuable in filling the pulp chambers of teeth were the roots have been filled. It makes a firm foundation for the filling, and arrests thermal shocks, which are sometimes troublesome where the gold is continuous from the crown to the apex of the root.

DENTAL CHEMISTRY.

Dr. Buckingham said, in the absence of any report from the Committee on Dental Chemistry, he had been requested to make some remarks on the subject. There had been little progress in dental chemistry during the past year. and he would, therefore, confine himself to a statement of the direction of inquiry among investigators in the department of chemical science. He considered it to be a subject of most serious regret that this science, which lay at the foundation of all others, was so universally neglected by the community.

The ignorance upon this subject was most deplorable. How many students or learned men could tell the constituents of the air they breathe, the water they drink, or the bread they eat! Not one in five hundred of them could tell how many elements there are; so that professors are obliged to teach the A B C of the science, instead of finding students ready to be instructed in the higher branches. As in reading, it is necessary, first, to master the letters and their capabilities of combination, so it is in chemistry. The elements, sixty-five to seventy in number, with their equivalents and atomic weights, are the alphabet of the science from which all chemical combinations arise; the properties of the individual element being lost in the combination, just as in words the essential part is not found in the separate letters, but in the thought suggested by the whole.

The investigations of the present are directed, not to matter so much as to the forces which control matter. The great question is whether there is one force or many. Whether heat, electricity, motion, etc., are several forces or phases of one force. Motion produces sound, which is conveyed to the ear—hence, hearing; a faster motion produces heat; another motion produces light, the varieties of color being due to the different degrees of rapidity of the motion. These views have not been demonstrated, but the current of opinion is in favor of their correctness. The whole universe is in continual motion; harmonious motion is necessary to nutrition and health, and the disturbance of that harmony produces pain; thus extreme heat or cold produces the same effect. While the elements cannot be changed, their combinations are illimitable; and living bodies are continually nourished by appropriating from these combinations, in the form of food, that which they require, passing off the refuse in lower states of combination. The speaker dwelt at some length on the important part chemistry performs in the physiology of life and concluded by animadverting upon the skeptical tendencies of many modern scientific investigators, such as Darwin, Spencer, and others, whose disposition seemed to be to set up some great natural force as the origin of all life and motion, whereas he believed all life-force to be subordinate to spirit-force, proceeding from the Almighty Creator.

Dr. Judd said it was true more attention was being paid to the affections of matter than to matter itself. Although matter may be ignored in the study of the forces, it is nevertheless indispensible to their operation. It is impossible to have any notion of motion apart from matter. He proceeded to state the views of Tyndale and Grove

on this subject, with the latter of whom he expressed his agreement.

Dr. Buckingham. We cannot understand the existence of a force without matter; neither can we conceive of motion without something to move. Hence scientific men invented the idea of an ether, which should be the medium of conveying the idea of motion. The consideration of the origin of forces occasions the continual recurrence of the question, Are there many forces, or is there but one acting in different ways? When matter was made, the laws controlling it were made, and they must continue to the end of time. Man has no conception of sensation apart from matter, nor of the manner in which he reasons.

Dr. McQuillen congratulated the Association on the fact, that although the Committee on Physiology had failed to make a report, the one on Chemistry supplied the deficiency by the introduction of such important questions as the Correlation of Forces and the Origin of Species. In the discussion of such subjects, they should be examined in the calm, dispassionate manner in which other purely scientific themes would be considered. Above all, it should be recognized that the right to seek after the truth, even though it should lead to a conflict with long-cherished opinions, is the highest prerogative of man. As Herbert Spencer has justly said,* "Early ideas are not usually true ideas. Undeveloped intellect, be it that of an individual or that of the race, forms conclusions which require to be revised and re-revised, before they reach a tolerable correspondence with realities. Were it otherwise, there would be no discovery, no increase of intelligence. What we call the progress of knowledge is the bringing of thoughts into harmony with things, and it implies that the first thoughts are either wholly out of harmony with things, or in very incomplete harmony with them.

"If illustrations be needed, the history of every science furnishes them. The primitive notions of mankind as to the structure of the heavens were wrong; and the notions which replaced them were successively less wrong. The original belief respecting the form of the earth was wrong; and this wrong belief survived through the first civilizations. The earliest ideas that have come down to us concerning the nature of the elements were wrong; and only in quite recent times has the composition of matter in its various forms been better understood. The interpretation of mechanical facts, of mete-

* Although not quoted *verbatim* in the discussion, in justice to the subject and to Mr Spencer, his exact language is presented in the report.—J. H. McQ.

orological facts, of physiological facts, were at first wrong. In all these cases men set out with beliefs, which, if not absolutely false, contained but small amounts of truth, disguised by immense amounts of error.

"Hence the hypothesis that living beings resulted from special creations, being a primitive hypothesis, is probably an untrue hypothesis. If the interpretations of nature given by aboriginal men were erroneous in other directions, they were most likely erroneous in this direction. It would be strange if, while these aboriginal men failed to reach the truth in so many cases where it is apparently conspicuous, they yet reached the truth in cases where it is comparatively hidden."

That mystery of mysteries, the origin of species, is occupying the undivided attention of some of the keenest and clearest intelects in the world. Darwin, in particular, a devoted student of nature, after years of labor spent in accumulating an immense mass of facts, has drawn certain inferences, which are entitled to a candid, careful examination before being rejected as unfounded and worthless. A significant fact, but not by any means a surprising one, is that most of those who oppose or denounce his views, have never read his works, and therefore knew nothing of the facts and arguments presented in them. Thus is it ever with innovators and innovations. In the language of Professor Agassiz, "Whenever a new and startling fact is brought to light in science, people first say, 'It is not true,' then that 'it is contrary to religion;' and lastly, that everybody knew it before.'"

The time is too limited to present even a faint synopsis of the Evolution theory, but it may not be amiss to say, in a few words, that Darwin has not attempted to solve the question of the origination of living or organic beings, but, supposing their creation to have taken place at first in the lowest forms, he accounts for the origin of species through the perpetuation and modification of the original types. First, by the possession of a peculiar property, which he calls Atavism, from *Atavus*, ancestor, living beings inherit the character of those from whom they arise. Second, there is also manifested a tendency to variability, due to the influence of the surrounding conditions of existence; and an alteration having occured in certain beings, it would be transmitted to their descendants. In the lapse of geological ages, the combined operation of these tendencies to the transmission of hereditary properties, and of occasional variability, due to the

changing conditions of existence, combined with the struggle for existence between individuals of different species (in which those possessing the greatest facilities for obtaining food, or resisting external destructive agencies, would survive and multiply, while those less fortunate would gradually die out), Darwin believes may account for the infinite variety of species extinct and present.

In presenting these views, I do not wish to be understood as asserting, beyond a question of doubt, that they are true; but that, after spending a number of years in examining the facts and arguments offered, the conclusions arrived at appear to me reasonable and logical inferences. It is sincerely to be hoped that those present may become thoroughly familiar with the writings of Herbert Spencer, Darwin, Huxley, and Lyell, particularly before denouncing or rejecting the views advanced by them as unfounded and worthless. In this restless, inquiring age it is useless to attempt to silence the outspoken words of earnest investigators by the mere dogmas of the past. On the contrary, we should hold ourselves ready to examine and receive new truths, and to abandon erroneous opinions, when convinced of their fallacy. In this connection, I am free to admit that the sharply-defined boundaries between inorganic and organic matter, and the vegetable and animal kingdoms, contended for in the past, have lost much of their significance to my mind, when viewed by the light of recent investigations and reflection.

The constant interchange between inorganic and organic matter, the dependence of the vegetable upon the mineral, and of the animal upon the vegetable, as a factor of organic matter; and the return of the elements entering into the composition of the vegetable and the animal to the source from whence they came, to be similarly used again and again, for all time to come, by other beings, tended to lessen the gap between the inorganic and organic, the vegetable and the animal, and leads to the recognition of the fact that "Nature is a unity in diversity of phenomena; a harmony blending together all created things, however dissimilar in form and attributes; one great whole animated by the breath of life."

Dr. Buckingham said that, according to the materialistic doctrine, all animals were developed by continuous progression, from the primary cell through all the lower genera and species up to man, and they look for the development of a being of a still higher order. All things, according to them, were derived from combination, without the intervention of any supreme power; as if there were nothing

superior to the types or letters composing any printed matter. Even as the letters are of themselves expressionless, dependent entirely upon the thought breathed into their combinations, so the forms of nature are dependent upon the supreme mind for their principle of life. The tissues have been counterfeited in all respects, except that vitality cannot be imparted to them. The materialists make no calculation upon a future existence; all their theories are limited to the development of the highest order of natural existence; beyond this they know nothing and admit nothing.

Dr. McQuillen said that Herbert Spencer has divided his "First Principles" into the unknowable and the laws of the knowable; under the first, defining the province, limits, and relations of religion and science; and under the second unfolding those fundamental principles that have been arrived at within the sphere of the knowable; which are true of orders of phenomena, and constitute the foundation of all philosophy; and maintaining the law of evolution to be universal in its operations.

In the discussion of all scientific subjects, and particularly those under consideration, it would be well to recognize this distinction, and not confound the unknowable with the knowable, but to confine attention to the latter alone. I cannot, however, in justice to myself and others, permit the imputation of the denial of a Supreme Being and of a future existence to pass unnoticed, as it is a gratuitous and unfounded assumption. The theory of the origin of species by variation or evolution does not imply the denial of a Creator; on the contrary, it attributes everything to the operation of immutable and unchangeable laws; nothing to the work of chance. The testimony presented by the rocks affords substantial evidence that there has been a gradual and progessive evolution or development from the lower to the higher forms of life. Thus, in the Silurian, the lowest of the Palæozic rocks, the remains of invertebrates alone are found; following these, vertebrates (fishes) first appear in the Devonian; then come, in varying intervals of time, reptiles, birds, mammals, and, last of all, man.

The contemplation of such a humble origin in the past naturally leads to the anticipation of a still higher and nobler development in the future. Is there anything humiliating in the recognition of the fact that the life of man is dependent upon the continued destruction and consumption of plants and animals which enter into and become part and parcel of his organism? It has been estimated that a man,

weighing one hundred and fifty pounds, in the course of a year consumes a ton and a half of inorganic and organic matter,—in the air he breathes, the water he drinks, and the vegetables and animals he feeds upon,—and yet, at the end of the year, he weighs the same. What has become of all this matter which, like a continuous stream, has flowed through him, and maintained his form, apparently unchanged? It has returned to the source from whence it came, to be again used through all time. The inorganic matter of to-day may become organic matter to-morrow, to be again reduced, perchance, to inorganic matter on the following day. Man dies daily, and lives by dying. If the matter upon which his entire system depends is thus daily returned to nature, it naturally follows that in the final dissolution of the body, its component parts must be resolved into the elements to enter into new combinations.

To those who cannot deny these truths, but may cry out Materialism! in response to such statements, I would say that I never hear that sublime Epistle of Paul to the Corinthians, which is used on the most solemn occasions, connected with the dissolution of earthly ties, without being impressed with the learning and far-reaching philosophy of the great apostle, who there teaches, what many of his professed followers are so slow to learn, concerning the resurrection, that it is not the natural body, which is corruptible, but a spiritual and incorruptible body which is raised,—"So also is the resurrection of the dead. It is sown in corruption it is raised in incorruption." "It is sown a natural body; it is raised a spiritual body."

Dr. Atkinson said it is well enough to define species, but it has not yet been done; when that has been attended to, it will be time enough to define the origin of species. Chemistry is the lowest manifestation of organic force, and the expression of the physiology and pathology of the mineral kingdom. Atheism is insanity; under the Divine government it is not possible that a being possessed of human intelligence can be an atheist. Nothing can be appropriated without being disruptured from its former position. The whole idea of assimilation is indicative of the destructive and constructive processes, without which the system cannot be sustained. Each form must be destroyed as to its identity before it can be appropriated, and each process has a chemical, mechanical, and dynamic aspect, without a knowledge of which its understanding is incomplete, and the process of nutrition an enigma to us.—*Dental Cosmos.*

(To be continued.)

SELECTED ARTICLES.

COMPOUND CAP RESTORATION.

An operation was performed in this city during the months of May and June, 1869, by C. E. Blake, assisted by me, which is new in dentistry, and a description of which will be of interest to those in pursuit of dental science.

The gentleman upon whom the operation was performed, had been wearing a superior denture of artificial teeth, and having worn the remaining inferior teeth very much away, nearly to the margin of the gums, the four first inferior molars and second right bicuspid having been removed several years previously, the remaining portions of the dens sapientiæ had been forced very much forward.

May 13th. Applied the spray of sul. ether to the left dens sapientæ, and when sufficiently benumbed, cut into the nerve cavity, which was but a slight distance, and extirpated the nerve with small barbed broaches, designed for the operation, the sensation being very slight. Owing to business engagements, the case remained under attention.

May 20. After preparing and cutting threads with a screw tap, inserted two screws of pure gold three-eighths of an inch in length, and one eighth of an inch in diameter. As the posterior root extended back, the back screw had to be fitted in first, and curved, to bring the upper ends of the two parallel, where the threads of the screws had been removed, and the two adjusted, filling up the threads and remaining space with Roberts' Os-artificial. The amount required was very little, as the screws nearly filled the orifice.

After the operation came a plate of pure gold, in thickness about twenty-nine by gauge, and one-sixteenth of an inch larger than the grinding surface of the tooth. Two openings were made in close proximity. The grinding surface of the tooth had worn down a little concave and uneven; the gold plate was therefore put on and tapped down with instruments and mallet, to fit the surface perfectly by annealing it up, and a hard plate for service, composed of platina and gold, one-eighth of an inch in thickness and nearly the size of the tooth, fitted to the first plate, with the opening deeply countersunk around the ends of the screws. They were then taken off, and the two plates soldered together. There was then placed on the under surface of the thin plate, and of the same size, sixteen layers

of gold foil, so as to make the adaptation impervious to the fluids of the mouth. The sharp corners of the tooth were then slightly taken off, in order to make a better fit, and to avoid any small fracture of the corners in the adaptation.

Everything now being ready and the usual precaution made to keep it dry, the compound plate or cap was put on in its place, and the upper ends of the gold screws were riveted down with the serrated pointed pluggers, and by the use of the mallet; and the remaining part of the counter-sunk cavity was filled with gold foil and sponge gold all solid and tight. The extended margin of the pure gold plate, together with the foil underneath, were then tapped down around the corner of the tooth. The perfect manner in which the plate of pure gold was tapped over and around the margin of the tooth, leaves no doubt of its security. About eight hours were consumed in the last operation.

May 24th. The corresponding molar on the right side was taken in hand, and the nerve pulp extirpated.

May 28th. A successful operation was performed similar to the first. Subsequently, three bicuspids, and one canine were treated and tapped in the same manner, with the exception that but one screw was inserted in each fang—some of which, gold foil was plugged around the screws in the fang to secure a perfect fastening.

On completion of these operations as above described, there was not any uneasiness or pain experienced by the patient, except in the first bicuspid, on the right side, which had been treated for alveolar abscess eight years previously, and was quite sensitive and painful during the operation, but yielded readily by the application of an astringent wash, and in a few days was restored to its former tone of health.

The crowns of several of these teeth, some eight months previously, had been built up solid by the use of the mallet, with adhesive gold; but after a few months' use it was discovered that they were rapidly wearing away, caused by the grinding force and hard surface of the artificial teeth coming in contact with the pure gold. This suggested the operation of capping with hard metal as the most permanent manner of prolonging their use.

The above operations being new in the practice of dentisty, and having taken an interest in their performance, I take the liberty to give them the name of Compound Cap Restoration.—*Pacific Med. & Surg. Journal.*

CASE OF DEAD MISPLACED WISDOM-TOOTH OF LOWER JAW.

May 9th.—I visited A. R.—, æt 65, who has had for some years a swelling of the left side of his face, accompanied, at times, by severe pain.

During the winter of 1864 the left side of his face was frozen; two weeks afterwards he felt severe pain on the same side of the lower jaw, for which, by the advice of a Physician, he had the molar teeth on the corresponding side of the upper jaw extracted but without relief. The lower molars on this side had been removed several years previously. During the following summer he did not suffer; in the winter of 1865 the pain recurred and was then accompanied by swelling of the part. He has suffered every winter since then, and for the last eight months so continuously, that he has not been able to work. The swelling which had been gradually increasing for two years, was opened nearly three months ago, by a Physician and a considerable quantity of fetid pus evacuated, with immediate relief to the pain, which had been lulled previously by repeated blisters. Since then the pain has recurred several times with its usual severity; the swelling is now less than three months ago. There is a prominent tumour over the left ramus reaching upwards from the angle to the zygoma, forwards to the inferior angle of the malar bone and backwards to the mastoid process of the temporal bone; the lobe of the ear is pushed backwards. The tumour is very firm. A large portion of this tumour is formed by induration and thickening of the soft parts but there is undoubtedly hypertrophy of the bone; the skin over the anterior portion of the tumour moves freely, posteriorly it is bound down and marked immediately above the angle of the jaw by two scars. Nothing abnormal is detected in the mouth except the absence of the molar teeth on this side. He cannot separate the incisors of the upper and lower jaw more than a quarter of an inch. Necrosis was suspected; it was concluded to make an exploratory incision.

May 24th.—For four days he suffered agonizing pain in the tumour which burst yesterday, giving exit to a small quantity of pus. A probe was passed into the sinus but bare bone was not felt. Blister ordered.

June 24th.—He has been suffering more or less since last note; he is thin and looks haggard from want of sleep; pulse 56; bowels

costive; urine normal; he has a reducible scrotal hernia of right side for which he wears a truss. Ordered a dose of castor oil.

June 25th.—After the patient had been brought under the influence of chloroform an incision was made down to the bone, along the posterior border of the ramus from the articulation to the angle; this was afterwards extended anteriorly to the notch for the facial artery. The soft parts were then separated from the bone, when it was observed that the surface of the ramus presented no unusual appearance and that tumour was of the soft parts. On examination it was found that what had been considered merely indurated tissue was a hard fibrous-like tumour well defined, superficially but firmly attached to the ramus in its whole extent (from which it had been separated), and to the zygoma. From this tumour the superficial parts were carefully dissected without opening into the mouth and its remaining attachments to the bones separated. The facial and one or two small arteries which had been cut were torsioned. At one place only, viz.: over the anterior border of the tumour, were any fleshy fibres of the masseter observed. On careful examination of the surface of the ramus, a small opening or cloaca, which merely admitted a probe, was detected; after this had been enlarged by the bone forceps, the probe was passed anteriorly and loose bare bone felt. The opening thus made was again enlarged and a small cavity or cyst, situated a little anterior to the angle laid open, in which lay horizontally a wisdom-tooth with its crown directed backwards, the tooth the fang of which is partially cariesed, was removed; the edges of the wound were then brought together by silver sutures.

Only six drachms of chloroform were used, though the patient had been kept fully under its influence for an hour. The anæsthetic was administered by Dr. A. Rosebrugh. of Toronto, according to his method.

On the 28th about an ounce of fetid and sero-purulent matter was pressed out of the original sinus. By the 29th his pulse which had been 80 on the 27th, had fallen to 60. On July the 1st the stitches were removed, about one half inch of the wound has united by immediate union, the rest by primary adhesion.

July 3rd.—There is no discharge from the sinus. He has been going about the house for four or five days and has not felt any pain in the part since the 30th of June; his appetite is excellent and he now sleeps for six or eight hours continuously; for one year pre-

viously to the operation he never slept more than two or three hours at a time except when under the influence of opium.

Sept, 14th.—Patient has been working steadily for the last six weeks and has not suffered in the slightest; the paralysis of the left side of face, resulting from the division of the portio duro, is not so marked as it was two months ago.

This case is interesting in two respects, viz.: that the misplaced wisdom-tooth did not give the patient any inconvenience till its death, which in all probability, was caused by the frost bite, and that long continued irritation, altered the character of muscular tissue to that of fibrous.

I take this opportunity of thanking Drs. Macdonald, A. Rosebrugh, Mullin and Reid, for their presence and assistance at the operation. —*Canada Medical Journal.*

CORRESPONDENCE.

BOWMANVILLE, Dec. 1st 1869.

Mr. Editor,—Would you be kind enough to inform the readers of the C. J. D. S. how it is that the Dentists of Toronto have not as yet taken any action in forming a society, which will take in all practising dentists east of Toronto as far as Cobourg. I am sorry to see so many dentists as there are in Toronto at present, allowing societies to be formed all around them, and they take no action in the matter. Are we to be left out in the cold? If so it is high time we know it. I do hope and trust before your next issue, that the Dentists of Toronto will have come together and formed themselves into a society that will long live to do good service.

I remain,

Yours very truly,

T. J. JONES.

NAPANEE, Dec. 2nd 1869.

Mr. Editor,—It may be of interest to the profession generally, to know, through your valuable Journal, whether any steps have been taken to amend the Act Respecting Dentistry, for this Province, during the present Session of the Legislative Assembly. I think as it now exists it is a blank on two very important points. First, as to the penalty mentioned in the Act, the law may be violated and

unless the violator be worth more than that allowed him by the exemption what can be done? Second as to the application of the fine. To what shall it be applied? There is no provision in the act for it. There is a non-Licentiate practicing Dentistry in our "very teeth," as it were, and though possessing all the evidence required and the will to prosecute, he defies us and the law. Will you instruct us how to act in the matter? Must we and the public be imposed upon because of the weakness of the law?

Yours truly,

S. T. CLEMENTS.

EDITORIAL.

THE QUEBEC LICENCE.

By the 30th of next March, every dentist in the Province of Quebec, is required by law, to be in possession of the license to practice; and any dentist continuing to practice after that date, without holding such license, whether he has been in practice twenty years or twenty days, will be liable to summary conviction, a fine of $100 and costs, and if necessity arises, distress of goods, or imprisonment. It is well, in the beginning, to remember that the Dental Act of Incorporation is as positively a law, and as much intended to be enforced, as any other Act, special or otherwise, on the statute book.

We do not intend to discuss the question, whether or not the profession should be incorporated. That has been discussed to death, and is still a matter of opinion, just as much as whether or not a murderer should be hung, or whether or not there should be any legislation for anything. However, the feeling in favor of dental legislation is fast becoming wide spread, even among our republican neighbours where they boast of the genius of their free institutions; and the results everywhere so far, have proved of immense advantage to the profession and the general public.

To those actually quacks, or disposed to be, any law restricting liberty to charlatanism, is just as opprorbious as the law against larceny to a thief. The time has gone by forever when we may expect to reason or persuade such parties into change of conduct; though, we believe there is more hope of a Jack Shephard than a Crawcour, any day. The theory of gentle persuasion, and mild, lovable logic, is all sentimental moon-shine with such men, and just as likely to ac-

complish the desired end as the efforts of the impostor Mohamet to move the mountain. We believe in severe measures for criminals out of jail as well as convicts inside, and have little sympathy with the principle of elevating or converting arrant dental quacks by any other means than that of legislative rigour judiciously and firmly applied. Too cunning to meet us face to face in our Associations, they are sure to be brought to terms by just such means as are now within the jurisdiction of the Board of Examiners of Ontario and Quebec. The objects of dental legislation must surely commend them to every intelligent citizen who believes that if it is proper to protect society from imposition in matters of trade and business, of which they know something, and can use their own judgment, it is even more proper and necessary, in matters of which they are ignorant. There are few intelligent persons who are not aware of human disfigurement and in some cases destruction of life, possible by dental quackery, working as its professors do on the human body, and daily using deadly poisons such as arsenic, morphia &c., and having full liberty to administer dangerous anæsthetics, a few inhalations of which to one of unsound constitution, have in many cases caused immediate death. Is the protection of one's pocket of more account in the eyes of the law, than health, and life itself?

A couple of papers in Montreal, the editors of which are something like two dogs howling at the moon, one begins and the other takes up the strain, recently undertook to censure the Quebec Board of Examiners and condemn the principle of dental incorporation *in toto*. Upon inquiry we found that a notorious quack had pulled the wires, and had actually made them both believe black to be white. Such dodges were tried in Ontario, and with every other resource the Ontario quacks could muster, but the phalanx of earnest men who fought for legislation there, bore down all before them; and the malcontents had a fate something like that of the Black Mousquetaire, who

> "Who went down with a groan and a frown,
> And a hole in his small clothes the size of a crown."

The Ontario malcontents were ten times more numerous than those in Quebec. Not a respectable dentist sympathizes or sides with either. The moral is clear.

While we are sure that the Quebec Board will use their powers judiciously, and endeavour to meet the respective merits and circumstances of applicants for license, we are also sure there will be no

two interpretations or applications of the law, and that quackery will not be left a leg to stand on. W. G. B.

THE EFFICIENCY OF THE ONTARIO DENTAL LAW.

We have received a large number of letters from dentists in the different parts of the Province, in regard to the working of the Dental Law, nearly all of which contain grievous complaints about its inefficiency. We publish one in this number from Mr. S. T. Clements, of Napanee, which is a fair sample.

Some ask why the Board does not protect them from those who are practicing without license, some say the law is a humbug and should be repealed, as they receive no benefit from it, and some ask why no action has been taken to have it amended. We wish to give all the information in our power to our correspondents, but, as we have not time to reply to each separately, we will do the best we can by giving our opinion of the law and its working through the columns of the Journal.

As we have said before, we consider the Ontario Act far superior to any law regulating the practice of dentistry in existence. The Acts in England and the different States are not to be compared with it in efficiency. It certainly is not perfect, and will require to be amended in some respects after a few years. But, gentlemen, let us carry this law out *faithfully* as it now stands till we see in what respects it can be improved before we again ask the Legislature to come to our relief. There are good and wholesome laws on the statute book against murder and robbery, which are constantly being broken, and we think that it is just as unreasonable for any one to ask to have them amended because people murder and rob, as it is to ask to have the Dental Act changed because some practice in viola- of its provisions. It provides a way for the fining of all who practice without a proper certificate from the Board, and we have the authority of the police magistrate of this city for saying that all fines are like taxes, and can be collected if the person fined have *any property* whatever. Surely he must be a very pauper of a dentist who has not twenty dollars worth of instruments.

We do not think that the Board ought to be expected to look after delinquents, any more than any other twelve dentists of the Province, as they are no better protected than the others, and the Act

empowers others to prosecute as well as them. We know the prosecution of a neighboring dentist is not a pleasant thing to do, and we fancy that one reason why so many urge the Board to protect them, is that they do not wish to act in the matter themselves. We do not see how the law can be improved in this respect. But these are not the only complaints which have been made to us. There is another class of dentists which we think are, it possible, more culpable than those practicing without a license. We refer to those who go about from place to place, and from house to house, soliciting patronage. We hear that there are quite a number of this class.

Section 13 of the Act empowers the Board to make such needful rules and regulations "as may be necessary for the proper and better guidance, government and regulation of said Board and College, and said Profession of Dentistry." In accordance with this provision, the Board passed the 8th By-Law which reads as follows, viz : "This board shall have power to cancel the lisence of any person who shall wilfully violate any portion of the Act Respecting Dentistry or any of the By-Laws, rules, and regulations of the Board, on proof being furnished of such violation," and Rule 4, for the guidance of Licentiates, "Dentists cannot have more than two offices, independent of their regular established office, and they must be at places visited at regularly stated periods."

The rule allowing Licentiates to have two offices besides their established place of business, was made so as to enable those Dentists, living in small villages, where the population is too small to support a dentist comfortably, to visit two others at regular and stated times, but certainly, no one will contend that it can be made to apply to Dentists running into market towns with their instruments under their arms and soliciting business, or getting others to solicit it for them, and then dodging into the nearest shop to do it, without even the pretence of keeping an office. Such conduct would not be tolerated for a moment in members of the Medical Professions.

We hear that proof is being collected against several, who are said to be practicing in open violation of the above By-Law and Rule, and if one-half that is reported against them can be proven, we do not see how the Board can help cancelling their Licenses. If Dentisty is ever to be elevated to the standard contemplated by the Act, it is necessary that every Licentiate should see to it carefully that all its provisions as well as the By-laws and rules of the Board are faithfully carried out.

When, if ever, every Dentist "does his duty," we shall see our loved Profession brought up to that point to which we have most of us been striving to bring it for the last three years, to that point to which our American cousins, when reading our acts, by-laws, and rules, think it has been brought. As a stimulus to us all, and as giving the idea which has been formed of our movements so far, we append a portion of a letter which we received a few days ago from a Dentist who left this city about twenty years since and settled in Grand Rapids, Michigan :

"It delights me much to see the upward and onward progress the dentists of Canada are making. We have tried in this State for four years, to get a law passed to regulate the practice of Dentistry, and to protect the people from damage by dental quackery but cannot succeed yet. I think of emigrating to the Dominion."

C. S. C.

THE QUEBEC DENTAL LICENSE.—Through the kindness of the Secretary of the Quebec Dental Board, we have received a copy of the License granted to those who pass the examinations in that Province. It is very neatly got up copper-plate, printed on parchment, and quite puts the Ontario License in the shade.

THE Medical Gazette says that the New York Dental College has triumphed over all its difficulties and was opened for the winter on the 15th ult.

The next session of the Board will commence on Tuesday the 18th of January, at Toronto.

NEARLY SWALLOWED HER TEETH.—A middle-aged lady in Detroit was suddenly seized with a vertigo and fell to the sidewalk. A physician found that she was being strangled in some manner. Investigation revealed the cause in the shape of a set of false teeth that had dropped from their position as the head of the lady thumped on the sidewalk, and in her gaspings for breath had been drawn into the throat so far that she was with difficulty relieved.