MEDICAL SCIENCE

ISSUED MONTHLY — VIDEO MELIORA PROBOQUE — TORONTO, APRIL, 1888

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MEDICAL SCIENCE

VIDEO MELIORA PROBOQUE

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ORIGINAL ARTICLES.

REPORT OF COMMITTEE NO 5 ON WATER SUPPLIES AND THEIR POLLUTION.

PRESENTED BY DR. E. GRIFFIN, BRANTFORD, BEFORE THE ANNUAL MEETING OF THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS OF ONTARIO.

THE subject of water supplies and their pollution in this province is so wide, and the limits of a paper suitable to offer here are so narrow, that it is not proposed to attempt more in this paper than to offer some general observations on the subject of public water supplies, and perhaps to consider a little more particularly the question of private supplies of drinking water from wells, especially among the rural population.

The natural advantages of the Province of Ontario in regard to water supplies, like her natural advantages in so many other respects, are unsurpassed, if indeed they are equalled, by those of any other country of equal magnitude. The Province is nearly surrounded by great lakes and rivers containing volumes of fresh water, so vast that no possible pollution can apparently affect them. The inland country is studded by numerous smaller lakes and intersected everywhere by many rivers and streams. An ample and uniform rainfall assures an abundant and constant supply from the myriads of wells from which practically the great mass of people, excepting those in a few cities, obtain their whole supply of water for drinking and cooking. The question of securing an ample supply is therefore not often attended with any difficulty. The difficult question is to obtain it free from pollution.

The special prominence given to this question at the present time is due partly to the increased pollution of water supplies, owing to the growth of cities and towns, and partly to the recent more general diffusion of sanitary knowledge among the people, especially in regard to the manifold dangers of drinking contaminated water.

At the present time some eight or ten cities and towns in Ontario are provided with public waterworks intended to supply their citizens with water for all purposes, and many others are anxiously considering the merits and demerits of different methods of establishing works.

The principal sources of supply available for public waterworks are:—

1st. The great lakes and rivers, as Lake Ontario and the St. Lawrence. 2nd. The large inland rivers. 3rd. Small streams often connected with little lakes or ponds fed in part by springs, but chiefly collecting surface water. 4th. Subterranean or living springs. 5th. Driven wells.

For those cities situated on the great lakes and rivers where the volume of water is so vast that impurities become inappreciable, the supply is not only convenient, but also perfectly good, if taken up sufficiently remote from the point of discharge of any considerable amount of sewage.

The larger inland rivers, such as the Grand river, afford during the greater part of the year a supply of good water; during the periods of heavy rains and thaws, however, the water becomes muddy and more or less polluted by surface washings. This evil may be much lessened by ample reservoirs, settling basins and filtering beds; but the more serious danger of contamination by the drainage of towns above still remains and is likely to become constantly greater in the future. Great objections to such a source of supply must continue to exist until some more satisfactory system of filtration than is usually adopted can be applied.

It is claimed that the Hyatt filtration system or

nature's method is competent to effect perfect filtration, and this system is reported to be in successful operation in a number of the smaller cities in the United States. It has not, however, received the sanction of the most eminent sanitary and hydraulic engineers. Whatever may be the merits of this particular system it does seem reasonable to hope that in this age of giant inventors, some heaven-born genius may arise to bless mankind by the discovery of a perfect system of artificial filtration equal to that which is constantly effected by nature.

The third source of water supply from small streams commonly connected with lakelets or ponds, fed to some extent by springs, but chiefly collecting surface water of more or less considerable areas of land is substantially that used by the celebrated Croton Water Works, of New York, which collects its great supply from an area of 336 square miles of rainfall by the aid of immense reservoirs, settling basins, etc. The same system has been recommended for Toronto by Mr. McAlpine, of New York, but the recommendations apparently have not been received with much favour. A tender for works to supply the city of Brantford with water from this source of supply has recently been received though not adopted. It was proposed to use the D'Aubigney Creek, which is fed by a number of springs, and collects the rainfall of a valley several miles in extent. The water was to be stored in a pond of some 30 or 40 acres made by throwing an embankment about twelve feet high across the valley. There are serious objections to this source of supply. Irrespective of the offensive drainage of many farm premises, it is well known that the rainfall on growing soil and running into semi-stagnant ponds, is very favourable to vegetable and animal tainting. Water plants spring up and feed hosts of animalculæ, rendering the water unfit to drink. A green and offensive vegetation forms on the surface of such ponds, even when fed by the purest springs. Rich soils, such as those of the D'Aubigney valley, abound in organic matter, rotten vegetable fibres and the putrifying products of the animal and vegetable kingdom. In the opinion of Dr. Hassall such soils as a source of impurity rank next to sewage itself.

The fourth source of water supply I have mentioned is the subterraneous or so called living springs. The city or town so situated as to be able to obtain a sufficient supply of good water direct from a spring or springs is very fortunate. The great city of London, deriving its supplies mainly from the Thames, is casting longing eyes towards the Welsh Mountains, the source of many rivers, with the desire to secure something approaching in character such a supply. Some continental cities are so fortunate as to have such supplies, and the immunity of such cities from attack in cholera epidemics has attracted much notice in Ontario. London, the less, has thus far been so fortunate as to obtain a sufficient supply from a series of springs. In Guelph it is stated that the supply from this source has proved insufficient and has had to be supplemented by water of a doubtful character pumped from the river Speed, a sluggish stream convenient to the pumping station.

The town of Paris obtains its supply from a single excellent spring giving an abundant supply of excellent water for public and private uses. This enterprising little town of some 3,000 inhabitants deserves the highest praise for establishing, at a cost of $50,000, a perfect system of public water works.

Finally, there is the system of driven wells which is now in successful operation in very many cities in the United States. For this driven well or gang well system to be successful, it is essential that there should be a water bearing stratum sufficiently extensive and inexhaustible to afford a sufficient supply, and so situated, especially if its depth from the surface is not great, as to exclude reasonable fear of surface or other contamination.

In St. Thomas, Dr. Tweedale reports that an expenditure of $600 has been made in unsuccessful tests as to the practicability of obtaining water there by this system. In Brantford a similar expenditure has been incurred, with the result of proving that an unlimited supply can be had, and tenders have been received for establishing works on this plan. If on full investigation there shall remain no doubt as to immunity from danger of comtamination in the future, this system, somewhat modified, will probably be adopted.

It is believed that the supply of water in the extensive water bearing stratum of sand at Holmedale, about a mile above the city, is in some degree maintained by the rainfall of that locality, but probably chiefly by filtration from the Grand river

through hundreds of yards of sand and fine gravel. Assuming this to be so, the advantages of natural filtration will be secured without the expense of inefficient artificial filter beds, or of extensive reservoirs or settling basins.

The plan proposed for Brantford amounts practically to a series of gang wells, about fifty being required for each million gallons per diem. As the wells will be only about 16 feet deep each one will be dug down to the clay stratum upon which a little reservoir will be formed, and from this a tile pipe about 6 inches in diameter will rise to the surface. The water pipe will be introduced within this and connect above with the gang pipes and the pumping machinery. A small reservoir, amounting practically to an extensive well or filtering gallery, and fed from the same sources as the gang wells, will be established near the works, and maintained for possible use in emergencies.

Ordinarily the water will be delivered direct from the bottoms of the wells to the consumers, and will have a temperature of about 56 degrees Fahrenheit in the hottest weather, sufficiently cool for drinking without the use of ice.

The public water supply question which we have briefly glanced at is one of the most profound interest and importance to every city and town in this Province; but the question of the drinking water supply of the rural population is one of even greater magnitude and consequence. About one-fifth of the population of Ontario, say 450,000 people, live in the cities and towns and about four-fifths, or 1,800,000, in the rural or country districts, and depend now as they always will depend, almost wholly on well water for drinking and cooking purposes. As the large majority of this Province rely on this source of supply it is fortunate that on the whole the supply is equal and commonly superior in quality for drinking purposes to that available for use in cities.

The water of a deep and isolated well is substantially equivalent to pure spring water. Such a water should contain little or no organic matter, and may be perfectly free from any trace of such under the microscope. Such a water when as usual free from an undue amount of mineral ingredients, is an ideal water for drinking purposes; it is nevertheless really available for a great majority of the 1,800,000 rural inhabitants of Ontario.

It would thus seem that the rural population ought to be well supplied with good, pure drinking water. Unhappily, however, the fact is that the rural population are not as a rule supplied with pure drinking water. On the contrary, that used by the great majority is impure and unwholesome, for at least a very large majority it is undoubtedly bad, and for a great number of these, for a large portion of the time, it is absolutely so offensive as to cause its use, unless boiled, to be as much as possible avoided.

The contamination of wells in cities and towns is a matter well understood, and the necessity of abandoning these in populous places is fully realized. But it is certain that no sufficient attention has been directed to the great subject of the pollution of the drinking water of the rural population. The living springs at farm houses, where such exist, are nearly always open holes receiving the springs, also dirt, dead leaves and foul surface water; the sides are covered with vegetation; they are exposed to the approach of farm animals and always accessible to dogs which often deposit the seeds of tape-worm. The wells are either open or imperfectly covered, and readily admit foul surface water; earth worms work their way into them through the surface soil; toads seeking water in dry weather creep under the imperfect covers and drop into the wells, the fragments of their dead remains being often visible in the water pails. The discharge of house slops and the droppings of fowls and cattle contaminate the adjacent soil. The wells are also often polluted by the drainage of barnyards, hog pens, privies, and occasionally even of slaughter-houses. Generally the water is only sufficiently polluted to impair the health of those using it freely. Occasionally from some of the above named causes it is so much polluted and for such long periods as to contaminate the whole blood of those habitually using it. Here is sufficient cause why occasionally an isolated family, apparently exposed to no contagious disease, may be smitten by a deadly fever, or perhaps all but swept out of existence by a putrid diphtheria.

The relation of impure drinking water to typhoid fever, diphtheria, and some other diseases, is beginning to be understood; but the essential importance of pure water as to maintaining a high standard of bodily health in the community is not much considered. If more than 75 per cent. of the human blood is simply water, it ought to be obvious to the lowest intelligence, that an ample supply of

pure water in some form is essential to the possession of pure blood. That the rural population realizes the value of pure blood as essential to good health is shown by the avidity with which a large part of it will swallow some patent blood purifier containing 25 per cent. of strong alcohol, in addition to other more mysterious poisons, in the hope of cleansing it, a hope about as reasonable as to expect to purify milk contaminated with sewage by the addition of bad whiskey.

It would be well if they could be got to understand not only that polluted water may cause a variety of diseases, but conversely that pure water is a great medicine, a great purifier of the blood and preventer of disease, possessing more curative power even over the notorious Bright's disease, than any patent safe cure that will ever be concocted.

A thorough diffusion of knowledge on these matters, and especially as to the best methods within reach of the rural populations for preventing the pollution of their wells and springs, ought to result in an incalculable amount of good.

In regard to the establishment of wells, the location should be determined after considering the run of the underground currents, the position of barnyards and outbuildings, and the place of discharge for house slops, etc. It will often be desirable and necessary, particularly when the wells are comparatively shallow, that they should be placed at very considerable distances from the dwelling, into which the water may be conducted by a pipe running below the line of frost. When practicable, the driven well is to be preferred. When wells are dug they should be completely refilled, except for a few feet at the bottom, a pipe carefully puddled around with clay extending up to the surface. When the wells are over 25 feet in depth, these pipes made of vitrified tile should be of sufficient diameter to admit of the introduction of a suitable pumping box. Many wells so constructed are in use in this Province, and thousands of them are to be found in the Western States. The water supplied by wells so located and constructed will usually be fresh, pure and sparkling, and practically identical with that of living springs.

At the present time our Dominion and Provincial Governments are vieing with each other in laudable efforts to do something useful for the farmers. Here is an opportunity which should not be over-looked. Ministers of Agriculture, agricultural colleges, experimental farms, etc., are useful. One of the prime objects of them all, however, is to teach the farmer how to raise more bread, and on this subject he is tolerably well informed already. Besides, man cannot live by bread alone, its essential complement is water. These in fact are the two great necessaries of life and the one should be as good and as plentiful as the other. No subject which occupies the attention of the Provincial Government can be of more magnitude and consequence to the whole population, whether rural or urban, than the subject of water supplies and their pollution. The difficulties of individual localities in solving the complicated problems involved are very great. The dangers of fatal errors being made are great. It is extremely important that the best scientific and practical information possible to be had, which is commonly beyond the reach of those requiring it, should be obtained, and that the information should be widely diffused and made available to all. These are some of the reasons why the Government should take the responsibility in the matter and should place the Provincial Board of Health in a position effectively to deal with the whole subject for the benefit of the whole Province.

METHODS OF DEALING WITH CITY SEWAGE.

READ BEFORE THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS BY P. H. DRAYTON, ESQ., CHAIRMAN LOCAL BOARD, TORONTO.

Mr. Chairman and Gentlemen:

THE paper which has been assigned to me, viz: "Methods of Dealing with City Sewage," is one which at the outset I must confess my inability to deal with. The only reason that I can conceive that the subject has been relegated to me is that it is meant as a compliment to the Toronto Local Board of Health generally, by giving it a certain prominence through its Chairman. With this preamble, it will be evident to many of you that what I may have to say on the subject will necessarily be of an amateur type. In commencing, I think I may fairly consider, first of all, the elementary necessaries with regard to city sewage, for we may take it for granted that however efficient may be the means for the disposal of the sewage, unless due precautions are taken for the conveyance of the same to the place of disposal, the good result to the population will be but small.

I would therefore commence at the house from whence the sewage comes. Here we have to deal with two points: first, the internal regulations, viz., the plumbing appliances, and secondly, the private drain from the house carrying the sewage into the main drain. With regard to the first we have to consider the best form of closet, and the best means of intercepting the flow of sewer gas into the house. With regard to the closet, one of the simplest, cleanest, and most efficient seems to me to be the self-acting hopper. To enter into the details of plumbing and ventilation would require a paper to itself, written by an expert, but in this connection I may say that we have here a plumbing by-law, which I hope in time to see properly enforced—which deals fully with the weight of the pipes to be used, the style of closet, the method of ventilation, and the placing of the inside drain. At the present time we have two inspectors whose duty it is to see these regulations properly carried out.

I think that all drains within the limits of the walls of a house should be so placed as to be capable of being easily examined without any excavation or damage to the structure. This could be done, I venture to suggest, by in all cases using a sufficiently heavy soil pipe which should extend a specified distance into the outside private drain. With regard to the outside drain, I am inclined to believe that its defective construction, and connection with the soil pipe, is the cause of a great deal of sickness. Too often it is found that actually no connection has been made at all, the result being the formation of a cess-pool just outside the walls of the house, and as a consequent result, infiltration of sewage matter under the house itself, with results to the health of the occupants which can easily be imagined.

Another source of trouble with respect to the private outside drains which I have referred to, is the careless manner in which the drain pipes are laid: the joints are but too frequently imperfectly formed, and consequently infiltration of sewage takes place. I have quite recently learned of a case where the owner of the premises, to his astonishment, discovered that the outlet end of the drain was actually at a higher level than the point of connection with the soil pipe. Imagine the result. Then again, in light sandy soil there is considerable danger of the support giving way, causing a break in the drain. This should, in some way or other, be obviated. I would suggest that in all municipalities where such drains are used, that no private outside drain be allowed to be covered in until the same has been inspected by a competent officer, and a certificate given to the effect that it is in proper condition to be used for the purpose for which it has been laid down. Having thus briefly dealt with the question of sewage within private limits, we have to consider how best to deal with the accumulated mass. And first of all, to deal with the sewers themselves, it goes without saying that every possible precaution be used in the laying of them, both with regard to the material forming the sewer, whether pipe or brick drain, proper levels and proper ventilation. With regard to the latter, it has always seemed to me that our large factory chimneys should in some way be made use of as ventilating shafts for the main sewers, and thereby relieve the traps placed between the public sewer and the private house from a considerable pressure of sewer gas; and in this connection I may mention what I know to be a fact, that at the upper ends of some of our long sewers in Toronto, the pressure of gas has at times been found to be enormous. Let us now assume, for the purposes of this paper, that our plumbing arrangements, our private outside drains, and the connecting sewers, are all that they should be, where are we to deposit, and what are we to do with, the general mass of water carried sewage? In the first place I think the general consensus of opinion is in favor of one or more large off-take sewers; but the next point or the question of where these should be discharged, and what to do with the discharge, appears to be a vexed question. I am totally opposed to the method which obtains in Toronto, of emptying the whole sewage of the city into an adjacent watershed, no matter whether it be into lake water as here, or into running water, as in other places. In my humble opinion, such a course must necessarily be fraught with danger. We have, if I understand it correctly, three other modes of dealing with sewage matter, viz., irrigation, precipitation, and filtration. The question is, which of these is the most feasible and the best adapted to remove danger to the public health. To consider these various means as they should be considered, would be far beyond the scope of this simple paper. I will only say, that in my opinion,

as far as I have been able to judge, from the various authorities, the system I should advocate would be that of irrigation. It appears to me the cheapest, the most easily worked, and taken all together, the most remunerative. Holding this idea, I would like to see the system adopted in Toronto. We have here, as you are doubtless aware, what may be styled a gigantic cesspool for our water front. Something has to be done in the very near future to remedy this evil. For this purpose it is necessary, first, to build one or more large off-take sewers, to convey the sewage matter to tanks, from whence it could be pumped up to the light soil in the neighborhood of Scarboro' Heights, where an extensive sewage farm might be formed. On this point I hope to hear some practical suggestions made by members of the Association, and which I trust will be of such value as to help our city authorities and the citizens generally, to vote intelligently on any scheme that may be submitted to them.

THE ELECTROLYTIC TREATMENT OF UTERINE FIBROIDS AND HYPERTROPHIES.

BY A. M. ROSEBRUGH, M.D., SURGEON TO THE TORONTO EYE AND EAR DISPENSARY.

The Apparatus. — The electrolysis of uterine fibroids was suggested in 1867 simultaneously by Dr. Julius Aulthaus, of London, and by Dr. Robert Newman, of New York. In 1878 Dr. Cutter, of Boston, reported fifty cases treated by means of electrolytic needles passed through the abdominal walls. In 1882 Dr. Apostoli, of Paris, a pupil of Tripier, made a new departure in the use of electricity in gynæcology. Previous to this Aulthaus, Cutter and others had proved that some good could be done, but the current used was "insufficient, uncertain and unmeasured," and the operation was painful, empirical and dangerous. By Apostoli's method currents of a strength formerly impossible can be used, its exact strength can be measured and the application can be made without pain. Cutter and others used the electric current external to the uterine cavity, whereas Apostoli makes the application always intra-uterine.

The object of the electrolytic treatment is first the relief of the urgent symptoms, and, secondly, the diminution of the size of the tumor. This is accomplished by repeated galvano-cauterisations of the mucous membrane of the uterine cavity and by the inter-polar effect of the strong galvanic current. The current is concentrated at one pole by means of the uncovered uterine electrode and is dispersed at the other pole by means of a large abdominal electrode.

Apostoli uses very strong currents—from 100 to 500 milliampères—while Dr. Martin, of Chicago, who has had large experience in uterine electrolysis, uses comparatively weak currents—50 to 100 milliampères. When there is hemorrhage or leucorrhœa the uterine electrode is connected with the positive pole of the battery, in other cases it is connected with the negative pole. The positive pole controls excessive secretion, while the negative pole produces more decided electrolytic and *dénutritif* effects. A bare sound or electrode is used for making the application to and concentrating it upon the endometrium, while a very large and specially constructed electrode is used for dispersing the current upon the abdominal walls.

This treatment has been found most efficacious in cases of uterine fibroids and uterine hypertrophies, but it is also used in cases of pelvic hyperplasias as well as for the relief of neuralgia of the ovaries.

In the present article I propose to treat the subject from an electrical standpoint only.

The apparatus required is as follows:—1. A good battery. 2. A milliampère-meter. 3. A rheostat. 4. Artificial resistance coil. 5. A large abdominal electrode. 6. Specially constructed intra-uterine electrodes.

The Battery.—The choice of a battery will be determined not alone by efficiency but by convenience as well. When the battery is exclusively for office use the choice is between a portable battery with small cells or a stationary or a cabinet battery with large cells, whereas when the battery is both for office and for outside practice the portable battery only can be used. Previous to the introduction of the telephone transmitter battery, stationary batteries were made up of cells similar to those used for telegraph purposes, as the "Daniel," "Calland," "Crow-foot," &c., all modifications of the "gravity battery." These battery-cells are now discarded as they are more troublesome than the telephone battery cells, and moreover the internal resistance is very high, which reduces the strength of the current. The internal resistance of the ordinary telegraph battery-cell is not less than about 4 ohms, and as the electromotive force is only one

volt per cell, this gives the maximum strength of the cell (the volt divided by the resistance) as ¼ ampère or 250 milliampères. This is when the poles of the cell are joined by a thick copper wire. And I may add, in passing, that this strength of 250 milliampères can not be exceeded, no matter how many cells are joined in tandem, that is, in series. In the case of the telephone battery-cell, the case is very different. The electromotive of the individual cell is 1½ volts and the internal resistance is less than one ohm; this will give a strength of over one Ampère per cell, or say 1,500 milliampères—the external resistance—that is when the external resistance is very low. Battery cells are joined in series when there is external resistance

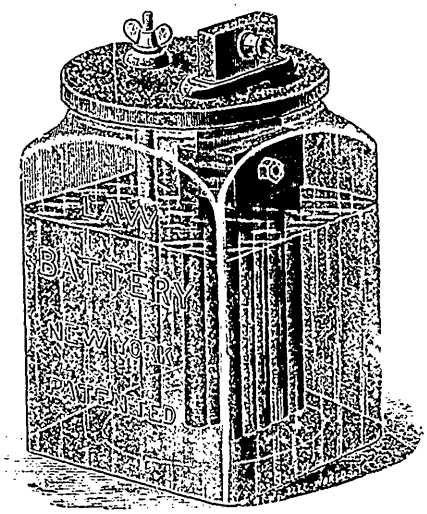

Fig. 1. The "Law Prism" open Circuit Battery Cell.

to be overcome; the higher the resistance the larger the number of cells necessary; but when the external resistance is very low, as, for instance, the thick wire of the primary circuit of a faradic coil, one cell with low internal resistance is as efficient as 10 or 100 cells. Hence the Ampère strength of the telephone battery-cell is about six times that of the telegraph battery. In telegraph signalling the efficiency of a battery is directly proportional to the electromotive force, and in electrolysis the efficiency is also directly proportional to the electromotive force, but it is also inversely proportional to the internal resistance. Thus, in telegraphy, 20 telephone cells would be as efficient as 30 telegraph cells, and in electrolysis a battery of 20 telephone cells would be as efficient as four batteries of 30 cells each (joined abreast or parallel) of the telegraph battery. The telephone battery cell in general use is a modification of the Leclanché cell, described in the February number of MEDICAL SCIENCE. The one that I prefer is called the "Law prism." It is sealed to prevent evaporation, and the internal resistance is very low, about 3/5 of an ohm.

Unfortunately there is a serious drawback to the use of the Leclanché battery cells, namely, they become polarized in a very few minutes when the poles are closed through low resistance; hence it is necessary to keep a number of cells in reserve to replace those that are polarized. Thus, in uterine electrolysis, while 25 or 30 cells will give a sufficiently strong current for four or five minutes, 50 or 60 cells would be required to maintain that strength eight or ten minutes. When a *current selector* is used the cells are added to the circuit, one by one as they are required, and by means of a supplemental *current selector* the polarized cells may be eliminated. When, however, a rheostat is used the entire number of cells is placed in direct circuit at the outset, and the strength of the current is regulated by said rheostat. These cells are placed on shelves either in a closet or in the cellar, and wires leading therefrom are conducted to the operating room. When a commutator is used, a 60-cell battery would require a cable containing 61 wires leading to the operating room, but when a rheostat is used but two wires are required, namely, one from the positive and one from the negative pole of the battery.

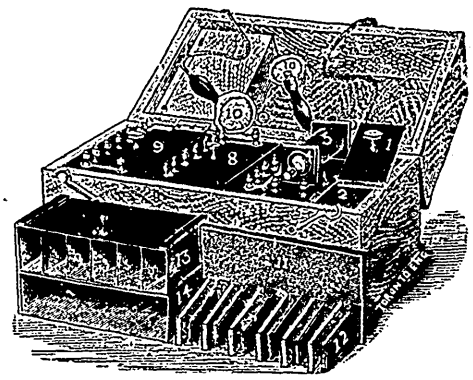

Fig. 2. The Author's Improved McIntosh Battery. The elements at rest.

Among the portable voltaic batteries I use either the chloride of silver or the chloride of ammonium

battery (modified Leclanché) for ordinary electrotherapeutic applications, and I use a modification of the McIntosh battery for electrolytic purposes.

About five years ago I introduced certain improvements in the construction of the McIntosh battery, which improvements have since been adopted by the manufacturers, and which, in my estimation, make it the model plunge battery. It is simple, convenient, and does not readily get out of order. The horizontal plate to which the elements are attached is padded on the under side to form a hydrostat plate (11, Fig. 2,) one-half of which is used to cover the cells (13), when the battery is not in action, while the elements (12), attached to the remaining half, are suspended in a drip-cup (14) by the side of said acid cells. The hydrostat-plate is pressed down upon the cells, keeping them water-tight by means of bearings or springs attached to the lid of the case when the latter is closed.

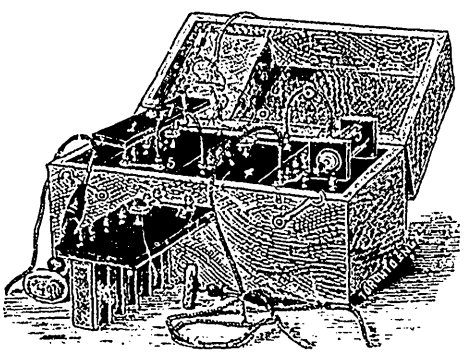

Fig. 3. The elements immersed. 6, 7. Adjustable connections between 1st and 2nd and between 2nd and 3rd series of plates.

Thus when the box is closed and locked the acid cells are automatically sealed, and when the box is open the battery is ready for use. The battery-case is elongated to the right to the extent of half the width of a hydrostat plate, so as to provide a space for overlapping to that extent. When the elements of the first series (1 to 6) are immersed, space is left for the overlapping of the plate of the second series, which, in turn, makes way for the third, and so on. The connection between the last element of one series with the first element of the next is made by means of an adjustable spring or rod. Hence by these modifications the elements may be displaced to the right and back again to the left without loss of time and without being rotated, which was impossible with the original McIntosh battery, and, moreover, any one of the zinc or carbon plates may be easily removed, repaired or replaced without the help of an electrician. To sum up, this battery has the following advantages: It is cleanly, simple in construction, simple in management, and saves time. For electrolysis every cell of the battery should have an internal resistance of not more than one ohm. A battery cell having an internal resistance of less than one ohm will operate the vibrator in the primary circuit of a faradic coil, and this constitutes a very good test for the efficiency of battery cells when required for electrolytic purposes. The internal resistance of the single cells of the McIntosh battery with a freshly prepared battery-fluid, (chromic acid or bichromate of potash and sulphuric acid), is about one-half an ohm, and the cell will keep the automatic interrupter of the faradic coil vibrating for several hours before it becomes polarized, whereas a Leclanché cell will become polarized in less than ten minutes.

The internal resistance of the portable chloride of silver and the portable chloride of ammonium cells is as high as 8 or 10 ohms. This high resistance renders them inadmissible for the electrolysis of uterine or other fibroid tumors.

2. *The Milli-Ampère Meter.* — This modification of the galvanometer was described in MEDICAL SCIENCE for December. By the deflection of the needle the presence of the current is detected, its direction indicated and its strength measured. The attempt to estimate the strength of the current by the number of cells in circuit would only lead to deception. Apostoli says that the galvanometer can no more be dispensed with in uterine electrolysis than can the scales be dispensed with in chemistry or pharmacy. The horizontal milliampère

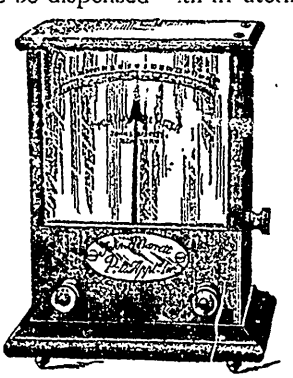

Fig. 4. The Barritt or "Elektron" Milliampère-Meter.

meter is claimed to be the most accurate, but the vertical ones are the most convenient. They are graduated to indicate from 250 to 500 milliampères. The vertical ones are manufactured by *The Elektron Manufacturing Company*, and the horizontal ones by Waite & Bartlett, of New York. The adjustment is very delicate, and they require to be handled with great care. Before being put to practical use they should either be compared with a standard instrument or they should be tested by a practical electrician.

The Rheostat.—This apparatus was also described and illustrated in the December number of MEDICAL SCIENCE. Since then I have tried a dry rheostat manufactured by *The Elektron Manufacturing Company* of New York, but I do not find it as satisfactory as the apparatus already described, namely, the Bailey rheostat. The Bailey rheostat is a modification of the water-rheostat by which we can increase and diminish the strength of the current from any number of battery cells at pleasure. This saves the patient from a shock, and very strong currents can be administered without pain.

The Artificial Resistance.—For the purpose of testing the battery and apparatus before making an electrolytic operation, I use artificial resistance, having approximately the same resistance as that of the tumor to be treated. In uterine electrolysis the resistance of the circuit varies from 50 to 200 ohms. Taking 200 ohms as the maximum resistance, I give my resistance coil a resistance of 200 ohms. If the battery will give the desired number of milliampères through this maximum resistance it may be depended upon to give a stronger current through less resistance. Thus, if we wish to pass 100 milliampères of current through a fibroid and we find by using the resistance coil that this strength of current can be obtained from 18-battery cells, this number of cells can be depended upon to give the desired strength of current, when it is known that the resistance of the circuit through said fibroid will probably be found to be considerably less than 200 ohms. I might state here in passing that the resistance of the ordinary hand-telephone is about 100 ohms, and that this instrument may be substituted for the artificial resistance, bearing in mind, however, that the 100 ohms resistance of the telephone may be only one-half the resistance of the circuit when the current is passed through the uterine fibroid.

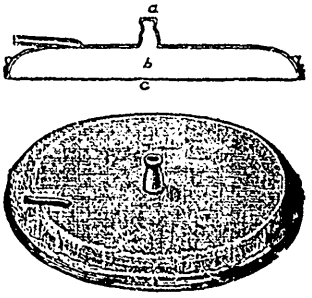

Fig. 4. The Abdominal Electrode (Martin.)
(*a*) Orifice for filling; (*b*) Space for fluid; (*c*) Animal membrane.

5. *The Abdominal Electrode.*—The Electrolytic treatment of uterine fibroids by means of strong currents is rendered not only possible but actually painless by the use of a very large abdominal electrode. This electrode was described in MEDICAL SCIENCE for December. It is about 8 inches in diameter, and the saucer-like metal part is covered with drum-head membrane. The space between the metal and the membrane is filled with either warm water or warm salt and water. Apostoli uses an electrode made of potters' or sculptors' clay, while Dr. Martin, of Chicago, uses an animal membrane electrode. The latter is more easily managed and is more cleanly withal. In a case of Dr. A. Jukes Johnson, in which I used the Martin electrodes with 13 cells of the battery just described, we got a current of 90 milliampères. This reduced the resistance of the circuit to about 130 ohms. In a case of Dr. Atherton's in which the Apostoli electrode was used we got a current of 100 milliampères with 17 cells. This made the resistance of the circuit about 155 ohms. And in a case of Dr. Allen Baines', in association with Dr. Temple, with 18 cells and the Martin electrodes, we got a current strength of 80 milliampères.

(To be Continued.)

EDITORIAL.

THE GENERAL PRACTITIONER AND EYE DISEASES.

UNDER this caption, adopted for the lack of a more exact title, we propose to discuss briefly several points which have frequently occurred to us as being of great importance, whether regarded from the purely medical standpoint or as regards the general and increasing prevalence of a class of ailments than which nothing can be more important in its effects on the individual members of our communities, either as bearing upon their personal comfort and happiness or their usefulness as members of society. Oculists have not ceased within recent years to point out that amongst the educated classes and the children of public schools, whether in the larger cities of this continent or in the older countries of Europe, there is seen from year to year an increasing prevalence of myopia, a form of imperfect eyesight, due, it is asserted to undue application to book studies, and to a certain character of type, such for instance, as the German letters. This in itself might perhaps be considered of comparatively temporary importance; but when it is remembered that on all sides we are learning from authorities, whose observations have been most extended, and from the statistics of government asylums for the insane, that nervous diseases of all sorts are increasing from year to year, we cannot fail to view with alarm the potent influences which are at work tending to create in future generations a definite type of eyesight due to the unfortunate fact that diseases of the nervous system have in a peculiar sense a tendency to become hereditary.

In the present number of MEDICAL SCIENCE will be found an article in which this particular fact is unequivocally asserted. From the classes of the graded schools, as for instance of New York city, we are given the results of observations going to show that the increase of myopics is in an invariable ratio to the number of years in which a pupil has attended school. Thus there were found by Prout and Mathewson, among 549 college students, 59% myopics in the introductory class; 40% in the freshman class; and 56% in the junior class.

Similar statistics have been given us from Germany and elsewhere. As stated by Donders, "This defect in vision is met with much more frequently amongst the inhabitants of towns than of villages, amongst men devoted to study than amongst laborers. Again, it is very common in any nation where education is very extensive."

"But, while this is true inasmuch," says Meyer, "as many persons study throughout their latest life without becoming myopic . . . we must suppose a special predisposition to the development of myopia. This being the case, the development of myopia and its ulterior course depend on the manner of life of those who are hereditarily subjects to it. If during youth, especially at the period of puberty, the individual does not use his eyes on any fatiguing work, if he only reads or writes under good hygienic conditions, the myopia may not be of any great amount." According to Donders, after a careful examination of 2,500 myopic eyes, it has been ascertained that the antero-posterior diameter may be increased to 33 m.m., the normal being from 22 to 25 millimetres. How permanent such abnormal conditions are likely to become through heredity, cannot be better illustrated than by the remarkable experiment, the results of which were witnessed by the writer, performed in the physiological laboratory of Brown-Séquard. Brown-Séquard pithed the optic centre in a pregnant guinea-pig, which subsequently had a litter of some half-dozen. These, within a few weeks after birth, showed in every instance, a progressive amblyopia, or blindness. The eye, at birth apparently well-formed, not only ceased to develop normally, but became visibly diseased, atrophy and the destruction of vision tending to completeness. The hereditary character of the hypermetropic eye and other aberrations from the normal type are equally well known. If we add to these the many instances where neuroses occur through many causes, as for instance disturbed menstruation, we may begin in some degree to realize how important becomes a branch of Medicine, hitherto very largely, we think, a *terra incognita* to the general practitioner. The reasons for this are apparent. Our medical schools have hitherto paid but small attention to the subject, neglected

through a lack of appreciation or through a lack of knowledge of the importance of the subject. Another reason is to be found in the exact character of ophthalmology. In no department of Medicine, we take it, is the necessity for a previous scientific training more apparent than in this. Some knowledge of optics is a *sine quâ non* to a comprehension of its facts; minute anatomy becomes a necessity. A cross-section of the retina may well be described as the *ne plus ultra* of organization. The very difficulties in the attainment of a preliminary knowledge make the information necessary to the practice of ophthalmology largely impossible. It may be true that the general practitioner may be able to treat with success, the ordinary conjunctival and corneal troubles; but even this he attempts with fear and trembling. Hypermetropia, myopia, and their allied conditions are commonly unnoticed or disregarded until they have become permanent. Optic neuritis, and retinitis are to him unknown quantities. That we have specialists devoting themselves to the subject can be no answer to our argument that extended instruction should be given and a positive knowledge required of those who are to receive the license to practice Medicine. The general practitioner may not have once in a year a capital surgical operation, but he certainly will have a dozen cases of congenital or induced eye troubles, which demand immediate and intelligent attention if permanent injury to those afflicted and their posterity are not to result. If there be any one thing which is most likely to give those, who now-a-days in so many departments are calling themselves specialists, prescriptive rights to the title and to arrogate to themselves a professional superiority owing to the fact that they may know one thing well, it is this general neglect of some of those at first sight minor departments, but which, in this case of eye diseases, at any rate, have an importance which has been too long either ignored or unvalued. Amongst the many advantages which may be expected to attach to a University Faculty of Medicine is the utilization of the department of Physics for giving medical students a course in optics; and we shall not have written in vain, if we have called the attention of those whose province it is to regulate the teaching of Medicine to a subject which has relations so wide-reaching and important. We trust that their myopia is not *progressive*, and that they are not of those "who, having eyes, see not."

PHYSICIAN, SCIENTIST AND LITTERATEUR.

"Two single gentlemen roll'd into one."

SEVERAL years ago appeared the work by W. Sloane Kennedy, of Old Cambridge, which, as he says in the preface, is not technically a biography, "but is designed to serve as a treasury of information concerning the ancestry, childhood, college life, professional and literary career, and social surroundings of him of whom it treats, as well as to furnish a careful critical study of his works." We need hardly say that the life treated of is that of Oliver Wendell Holmes. From time to time, indeed frequently, have his *vers d'occasion*, or poems of anniversaries, and memorial verses, appeared in our medical journals, but we take it that the profession at large are not in possession of a knowledge of Holmes *en pleine vie*, a personage so unusual and interesting that we may thank Mr. Kennedy for a work which gives us the facts of Holmes' many-sided character and life, even though it may possess defects necessarily incident to an *ante factum* obituary. The work is by no means as remarkable as the subject it treats of, and yet it has its materials arranged admirably for giving us a real insight into the life treated of. Much food for reflection is afforded us by its perusal, and perhaps the first and most striking point in the whole life is the evidence everywhere set forth, that Holmes, as might be expected, is a product of circumstances and conditions which were unique in their occurrence and possibility in America at that time. Holmes as a product, if unique because unusual and rare, is a further evidence of how barren are the possibilities of life in newly settled countries to produce a really cultivated class of men, either in science, literature or the arts. That the Boston School should so dominate American literary and scientific life is due to the fact that any other was in the real sense of the term non-existent. It does not detract in any way from the real status of Holmes, in any of the fields of work in which he has displayed his energies, to say that Holmes, as we know him, would have been an impossibility in England. It is Holmes as the *littérateur* and poet, rather than as the scientist, that we know, and we realize that "The Autocrat" of the *Atlantic Monthly* will always be our favorite rather than the writer of a treatise on "The Contagiousness of Puerperal Fever," or of "Currents

and Counter Currents." The eloquent denunciation of "Homeopathy and its kindred Delusions," is an illustration, however, of the direct, scientific method, and the fact that Holmes was in so large a degree a writer for magazines, in no way lessens his merit as a clear scientific thinker and writer. We think it the second notable point as evidenced by both the subjects chosen by him and their treatment, that a great part of the power exercised by him as a writer, even on ordinary literary topics, has been due to the fact that from the beginning his mental habit has been an exact one, acquired through the methods of scientific study cultivated and the clinical experiences obtained through practice. A third point of interest referred to frequently in this biography of Holmes, is the evidence gathered from almost every page of his life of the persistency of hereditary tendencies. We learn that his maternal ancestors were Dutch on the Wendell side and English on the other, while his paternal antecedents were English. Both lines had become completely naturalized, and Holmes, for better or for worse, must be considered by birth and largely by education, an American product. Along the Wendell line, we have it pointed out that his caution and business thrift might naturally be expected. Dr. Oliver, whose daughter married a Wendell, may fairly be considered to have transmitted a medical tendency, to which we must add the judicial inheritance through a grandfather, Judge Wendell, (who married a lady of the famous name of Quincy). Along the Holmes line we have amongst the direct ancestors, a lawyer, a soldier-physician, and the author's father, a clergyman, "whose blood seems to carry the scholarly and personal virtues with it to their descendants, oftentimes for successive generations."

When to this the intellectual home-life, and joyous college days, so frequently alluded to by Holmes, are added, we have, as we might naturally expect, a development of a character so rounded in many respects, as to give us delight in its very contemplation.

What we find in all his writings as a constant accompaniement of the *humour*, more keen and finished in its expression than Hood's, is the intense vitality of the man. He has lived intensely, and has taught us to know that life's winter has its flowers even as the spring and the summer. From the day he drove to Andover to school till the autumn morning on which he delivered his last lecture as Parkman Professor of Anatomy, at Harvard, life was full for him. Says Kennedy, "In person, Holmes is a little under the medium height . . . he is quick and nervous in his movements, and conveys in speaking, the impression of energy and intense vitality . . . when he warms up to his subject in conversation he is a very rapid, vivacious speaker."

But we have indicated in outline the characteristics of a man who has often been pointed to as an ideal, and with reason, which every physician may profit by studying. All must, to live worthily, have an ideal; and none surely can say that for the physician the mere routine of practice and book-keeping is sufficient. His work, in large measure, precludes him from being a public man, hence the daily newspaper cannot, or ought not, to be his only pabulum. How many are the needs for a true enjoyment of life to the rural physician deprived in large measure of literary companionship! If he does not read, mentally he becomes vacuous, and the petty annoyances of his profession weigh upon him, warping his judgment and destroying his *bonhomie*.

The physician of to-day is in some measure a partaker of the fashions of the day; and we take it that if in business methods he is the superior of a generation now fading away, with regard to the development of those many qualities which lend force, breadth and dignity to the profession, he is too often greatly their inferior. Why should it not be a physician, who can be at once so pungently sarcastic as, when speaking of the *neo*-type of American chryso-aristocrat he says:

> "A gentleman of leisure
> Less fleshed than feathered · bagged you ll find him such;
> His virtue silence, his employment pleasure;
> Not bad to look at, and not good for much;"

and write with such lofty sentiment as:

> "If word of mine another's gloom has brightened,
> Through my dumb lips the heaven-sent message came;
> If hand of mine another's task has lightened,
> It felt the guidance that it dare not claim."

INDEX OF PROGRESS

SURGERY.

Œsophagotomy for the Removal of an Ingested Foreign Body.

Dr. W. C. Frew, of Coshocton, O., performed the above operation on an inmate of the county gaol for the removal of a piece of glass, over a square inch in area, and about one-tenth of an inch in thickness. The success attending the operation, the circumstances surrounding the case, and the complications that arose requiring prompt and heroic treatment, make this case more than ordinarily interesting and instructive.

A burglar by occupation, he had been incarcerated for some offence which would probably consign him to the penitentiary, hence the gaol physician suspected him of malingering. It was found, however, in attempting to introduce the probang, that the head could not be thrown sufficiently backwards to allow of the introduction of the instrument on account of the rigidity of the muscles of the neck, caused by the intense pain that motion occasioned.

Painting the throat with cocaine afforded no asistance when the A. C. E. was adininistered, but it was found he could not be sufficiently anæsthetized with this mixture to produce relaxation of these muscles. Also the parts were so extremely sensitive that the anæsthetic did not prevent paroxysms of gagging.

On the following day (Wednesday), Dr. Frew succeeded in locating the piece of glass. In his report of the case, in the March number of the *Annals of Surgery*, he says:—

I made a probe consisting of a very flexible steel shank, to one end of which a polished oval steel bulb about half an inch in diameter was attached, while to the other was fixed a small tin cylinder to serve as a handle and act as a sounder. With this instrument, and with the patient profoundly under the influence of pure chloroform, the glass was found at a point about one inch above the upper end of the sternum.

During the administration of the chloroform, the patient suddenly stopped breathing. Dr. Dent then informed me that the heart had ceased beating. We had so much trouble with the patient on account of his struggling that I had remarked to my assistants some time before that I believed that he could be resuscitated, if dead, by running something down his throat, so that when death was apparent I was not alarmed, but seized the opportunity to pass the probe into the œsophagus and down to the foreign body. Sure enough it had the desired effect, for no sooner had the end of the probe reached the œsophagus than he began to struggle as before.

On Thursday, at 2 p.m., assisted by Drs. Dent and Carr, I performed œsophagotomy and removed the glass without difficulty. My incision extended from one inch above the sterno-clavicular articulation on the left side to the upper border of the thyroid cartilage. The upper edge of the glass was found on a line with the lower angle of my incision. A sharp point which projected from the glass had penetrated the whole thickness of the œsophagus, and it was probably this which caused such intense pain on swallowing or on attempting to throw the head backwards.

The superior thyroid artery was divided in the upper part of the wound and ligatured with catgut. While working with the handle of the scalpel in attempting to expose the spicule of glass which I could feel projecting through the œsophagus, the inferior thyroid artery was divided, I suppose, by being pressed against the sharp edge of the glass. It was taken up and ligatured with catgut. But little blood was lost during the operation.

The continuous suture with catgut was used in closing up the œsophageal wound, and the interrupted silk suture for the external wound.

During the first twenty-four hours there was considerable nausea with some vomiting. He was nourished wholly by enemas of milk given every four hours. The pulse did not go above 100 and the temperature was below 100° F.

At 3 o'clock on Saturday morning we were called and found that he had vomited about one half pint of dark grumous blood. At first we were of the opinion that it was blood which had remained in the stomach since the operation, but he soon threw up more which was of a brighter color, and as his pulse ran up to 120°, and as he became very pale and much prostrated, we concluded that the hæmorrhage was still going on. The external

wound had healed by first intention, but we reluctantly tore it open down to the œsophagus. On careful examination no bleeding vessel could be found; the hæmorrhage had evidently ceased spontaneously, but the inferior thyroid which had been divided near the wound in the œsophagus was found and ligatured with silk. The wound was again closed with sutures.

At 6 a.m. Saturday the pulse was 132, temperature 100·4 F. Whiskey was added to the enemas of milk. He vomited a little blood twice during the day, but was in better condition in the evening than in the morning, his pulse having fallen to 100 and his temperature to 98°F.

He passed a comfortable night, and on Sunday morning his pulse and temperature remained the same as on the evening before. The injections of milk and whiskey were continued. In the forenoon he took several swallows of tea mixed with cream, a portion of which escaped through the wound.

About noon a profuse hæmorrhage from the wound occurred. Dr. Dent again administered chloroform, and I again opened the wound. The hæmorrhage was so profuse that it was very difficult to find its source. By seizing the tissues both above and below the point from which the hæmorrhage came with Tait's scissor-forceps and drawing them partly out of the wound, I discovered the bleeding vessel, seized it with the common artery forceps, and ligatured it securely with silk. The wound was then left open.

At this time the patient was exceedingly weak, his pulse being 150 and scarcely perceptible. He had taken no nourishment by the stomach for one week, had been anæsthetized five times during that week, had suffered much pain and had lost a great deal of blood. We decided to practice transfusion to save him if possible. We quickly procured a piece of rubber tubing, to one end of which we attached a funnel and to the other a large aspirator needle. I exposed the radial vein just above the wrist (those higher up could not be seen), introduced the needle into it, the tube and needle having been filled, and into the funnel, held four feet above the level of the arm, Dr. Dent poured a pint and a half of warm water containing 75 grains of chloride of sodium, 37½ grains of carbonate of sodium.

A decided increase in volume of the pulse was immediately perceptible, and the profound depression soon began to disappear. Four hours after the transfusion the pulse was 120, moderately full and strong, and the patient expressed himself as feeling stronger.

Enemata of milk were continued, but at no time since they were begun did they seem to afford him much nourishment, as he did not retain them long. During the whole time, even when the injections were suspended, he had frequent desire to go to stool. When allowed to get up he would sit and strain as long as the nurse would permit.

On Monday his pulse was 110, temperature normal, tongue dry. Had had a restless night. Was given small doses of calomel and morphine, which produced quiet sleep, and on Tuesday caused the bowels to move several times. The discharges consisted of a dark, reddish, grumous material, which was doubtless chiefly blood which had passed through the intestinal canal. The pulse now ranged from 120 to 130 and the temperature from 97° to 98° F. The patient was now required to take a half glass of milk every three hours. The act of swallowing was accompanied by a great deal of pain, and a portion of the milk escaped from the external wound, so that the patient, although hungry and thirsty, almost rebelled against our orders. There seemed also to be a paralytic condition of the pharyngeal muscles, for a portion of the milk was expelled through the nose. This latter complication existed for but one day.

On Wednesday, the seventh day after the operation, the patient took milk freely, and ate ice cream. Probably one-fourth of what he swallowed escaped through the wound in the neck.

From this time on, recovery progressed without any interruption. About one month from the date of the operation the wound had entirely healed. The prisoner gained flesh and strength rapidly, and is now in much better condition than he was before he swallowed the glass, for one week ago he escaped gaol in broad daylight, distanced all of his pursuers, and has since escaped capture.

The recorded cases of œsophagotomy, according to Ashurst, number 65 with 52 recoveries. Poulet says that œsophagotomy for the removal of foreign bodies has been practiced about 40 times, but does not give the results. Aitkin, according to J. Kelly Barton, of Dublin, in an article in the *Annals of Surgery*, Vol. vi., No. i., July 1887,

page 22, has collected 36 cases with 27 recoveries.

I would suggest that, in this operation, the cervical vertebræ be used as a guide instead of the trachea, which is necessarily drawn to one side by an assistant. After the skin and superficial fascia are divided, the vertebræ can be distinctly felt through the remaining tissues, and when their latero-anterior surfaces are exposed, the œsophagus is very readily found.

Nasal Intubation.

In a paper read before the Section in Laryngology and Rhinology of the New York Academy of Medicine, December 27, 1887, Dr. D. H. Goodwillie introduced a method of nasal intubation as a valuable aid in the treatment of intranasal disease; a method he has used for some years.

The *New York Medical Journal* gives the following: "My first efforts began by the use of pure rubber-gum tubing of different sizes and strength, and made applicable to each case by such impromptu means as I had at command. These experiments, after being carried on for some time, were so encouraging that I had the tubes made in soft rubber and platinum, or aluminium, from models that have proved by experience to be of practical application. These improved tubes, properly made, have given me such good results that I merely call your attention to them for your consideration.

These tubes are oval in shape, and of the same size, with the exception of the anterior end, that is shaped so as to fit the vestibule of the nostril, and by that they are retained in place.

They are made of different sizes, ¼ to ½ inch in diameter, and in length from 2½ to 3½ inches, but may readily be cut to any desired length.

The metal tubes can be changed in their calibre by passing through them a core of the desired shape. The anterior end may be soft rubber, as it is more comfortable by its flexibility in the vestibule of the nose.

The small rubber tubes are made use of at the beginning of the treatment, and changed to larger ones until there is normal space, or the deformity has been corrected. Then the metal tubes may be used if so desired, as they allow freer respiration through them. The tube is put into the nostril by raising the end of the nose and gently passing it into the inferior meatus, then releasing the end of the nose and passing the anterior end into the vestibule. They cannot be seen externally, and so can be worn and treatment carried on without any unsightly appearance, or even knowledge of their presence.

They can be readily removed by the patient for cleansing, and returned to the nostril. Some of my patients have worn them constantly for months without discomfort, and always with benefit.

I will simply refer to some of the nasal diseases in which they have been made use of, viz.:

1. Intranasal hæmorrhage.
2. Fractures of the nose, internal and external.
3. Deviations of the cartilaginous and bony septum after the necessary surgical operation of section or removal of exostosis.
4. After the removal of hypertrophic turbinated tissues or polypi, whether by the cautery or snare.
5. Hypertrophies of the soft tissues without an operation, when worn for a sufficient time to produce absorption.

A New Achievement in Surgery.

An editorial in the *American Practitioner and News* comments as follows:—

Since the day when McDowell conceived and successfully performed the first ovariotomy, the progress of surgery may be said to have been one triumphal march. The surgeon's hand has been made acquainted with almost every cavity of the body, tracing disease to its secret hiding-places in the most delicate vital organs, where the surgeon's knife and other appliances have been potent to remove it, arrest it, or mitigate its ravages. The abdomen, the pelvis, the thorax, and the cranium have repeatedly been the fields of well won victories, and now, through successful work in the spinal canal, is added yet another trophy to the conquest.

In the *British Medical Journal* of the 28th ult. is an account of the removal of a tumor from the spinal cord by Mr. Victor Horsley. The patient, an adult male, had complained for some three years of severe pain in the upper part of the chest, the point of greatest intensity being just below and to the inner side of the angle of the left scapula. Below the level of this point there was an absolute loss of sensation and motion in the body and limbs. The upper limit of the anæsthesia was in the region supplied by the left fifth intercostal nerve. On the right side though less accurately defined, the anæsthesia did not reach a higher level. The symptoms

pointed definitely to a tumor of the cord at this point, and seemed to give due sanction to an attempt at its removal. Mr. Horsley laid bare and cut away the laminæ of the fifth and fourth dorsal vertebræ, but did not bring the tumor into view till he had removed the laminæ of the third dorsal as well. The growth proved to be a small oval myxoma, compressing and making a deep impression on the the left side of the cord below the third vertebra. It was removed without difficulty, under antiseptic precautions, and the wound healed, with a trifling rise of temperature, by first intention, except a point at the upper part which was kept open for drainage, and through which cerebro-spinal fluid exuded in small quantities for a short time. The pain continued for three or four weeks, after which it slowly and intermittently subsided. At this time (seven months after the operation) there is no pain, while motion and sensation in the lower limbs are almost completely restored. The operation, with its happy issue, bears brilliant testimony to the skill and courage of the able surgeon who performed it, and marks a memorable day in the history of his aggressive art.

Cases of Urethral Stricture Treated by Electrolysis.

From the *Boston Medical Journal* we quote the following cases of stricture treated by electrolysis, the method employed being essentially that advised by Dr. Newman, of New York, and Mr. Clark, of St. Bartholomew's Hospital, London. The caliber of the stricture having been measured, a bulb-electrode one or two sizes larger is passed down to it and connected with the negative pole of a galvanic battery. The positive pole is attached to a broad metallic electrode, covered with wet absorbent cotton (or a sponge electrode), which is held against the abdomen or elsewhere. The strength of the current used should be from three to five milliampères. In the cases reported it was four milliampères: a little less in the last case. The electrode will generally pass through the stricture within half an hour, only the gentlest pressure, if any, being exerted. The operation is painless. Very little after-treatment is indicated. In these cases ten grains of quinine were given after each operation, and the patients were advised to keep quiet for a day or two. After an interval of a week or more, not less, the urethra is examined to ascertain the result of the operation.

CASE 1. G. T., twenty-eight years old, was first treated for stricture two years ago. His urethra is very sensitive, and he has several times had chills after the passage of sounds.

Strictures of a caliber of 19 (French scale) were found at ½ inch and at 2 inches from the meatus, and one of 16 at 3½ inches. The first stricture was treated by electrolysis May 7th. Electrode No. 20 was placed against the stricture, and with a current of 4 milliampères it passed through in 20 minutes. Within 12 hours the patient had a severe chill, with fever and vomiting, and was quite ill for several days. He returned to the Dispensary in about a month, but the result of the operation could not be accurately ascertained, as he had meanwhile been treated by gradual dilatation at the City Hospital. This treatment was continued.

CASE 2. J. H., fifty-three years old, had strictures admitting 17 at 1½ and 1¾ inches. May 24th electrode 18 passed both strictures in 10 minutes. Although there was no chill, the operation was followed by *malaise* lasting a week, with considerable local irritation and a copious discharge. The strictures were found to have contracted to 14, and the treatment was abandoned.

CASE 3. E. J., thirty-nine years old, had his first gonorrhea eighteen years ago, and symptoms of stricture fifteen years ago. He came to the dispensary with a chronic discharge, and when examined was found to have strictures as follows: at ¾ inch 22, at 1½ inches 18, at 2¼ inches 14. July 28th the middle stricture (18) was electrolyzed and electrode No. 20 passed through in 15 minutes. The operation caused no constitutional symptoms whatever, but some local irritation with increased discharge and painful micturition, on account of which examination was delayed and the patient was lost sight of until September 22nd, when the stricture operated upon and the one posterior to it were found to be the same size as before, while the anterior stricture had contracted. He had no treatment meanwhile. Two days later electrode 17 was passed through the narrowest stricture (14) in 20 minutes. This was followed by no constitutional symptoms and by less local disturbance than before. One week later (October 1st) bougie *à boule* 18 was passed easily through all the strictures. The urethra was very sensitive. October 8th a bulbous

bougie, No. 19, was passed, meeting with some resistance at each stricture. Electrode No. 20 passed all three strictures in half an hour. October 20th the strictures were defined by bougie *à boule* 21, 22 passing with slight difficulty. Another operation was begun, but when, in about 15 minutes, electrode No. 25 had become engaged in the first stricture, the patient suddenly became faint, and nothing further was attempted. He has not since been seen.

CASE 4. J. C., twenty-eight years old, began to have symptoms of stricture four years ago, and complete retention two years ago. On examination he was found to have a series of strictures, gradually diminishing in size from 25 at 1¾ inches to 11 at 3¾ inches and at 5 inches. August 23rd electrode No. 15 was passed to the first of the two narrowest strictures (11), but failed to pass in 20 minutes. This operation was followed by no constitutional symptoms, but by increased discharge, difficult and painful micturition, and a great deal of swelling and induration about the seat of the stricture. The size of the stricture was apparently unchanged. It was deemed advisable to discontinue this treatment, and gradual dilatation was substituted. A smaller electrode would probably have been better in this case, but was not at hand.

MEDICINE.

The Neuropathic Diathesis or the Diathesis of the Degenerate.

Perhaps no subject has either greater interest or broader bearings than that which has been taken as the title of a recent paper in *The Journal of Mental Science*. It has recently been brought into prominence by the brutal act resulting in the death of officer Rutledge doing duty as guard at the Central Prison, Toronto. Neil, the murderer, has suffered death for his crime and society has avenged itself, or perhaps it were better to say has thought that it has performed its duty in protecting itself, by having the extreme penalty of the law carried out as a warning to evil-doers, or rather to those with a tendency to do evil. But the matter has not ended here. While we cannot agree that the theory of non-responsibility can for one moment be accepted as a sufficient reason why executive clemency should have stepped in to commute the sentence of death, yet once more we have the problem thrust upon us, both from the social and medical side, of how these terrible evidences of the existence of moral evil, conjointly with physical degeneracy, are to be lessened or eradicated from a nation whose official insane have reached the frightful total of 1 in 620 of the population. In an article in our February number we referred to the pleasing statistics indicating the tendency of genius and special gifts to become hereditary, and noted the examples given us by Galton of the *Roscoes*, the *Darwins* and the *Hills*. Dr. Revington, in the paper referred to at the commencement of this article says, "When we view the purpose and the progress of the animal world from the scientific standpoint, we find that life is a cycle, beginning in an ovum and coming round to an ovum again, and the history of the human race, the failures and triumphs of nations, the loves and hates, the baseness and nobility of individuals, often take the mere by-play of ovum-bearing organisms. . . . . Moreover, we make man in our own image, after our own likeness, and endow him with the characteristics we have inherited from our ancestors, and with those we have created for good or evil in our life. One of the oldest books teaches us that the sins of the fathers will be visited upon the children to the third and fourth generations, and we might go further and say that physiological sins will penalize the race for many generations, and even lead to its utter extinction, unless counteracted by the strong antidotes of physiological morality, perfect hygienic conditions and judicious marriage with untainted breeds. This great law of Heredity seems to me to be the corollary of the general law that the life of the individual organism is the recapitulation of its ancestral history. As in the hourly changes of early intra-uterine life we reproduce some characteristics of our Piscine, Batrachian or Avian ancestors, so in the more protracted stages of later intra-uterine life and of independent existence we reproduce the physical and mental features of our human progenitors. And the features of the parents produce more effect than those of our grand-parents, and so on in lessening degree till the influence of the primordial parent is lost in the accumulation of the influences of more recent ancestors. And as we endeavor to advance to our higher developments—

> Move upward, working out the beast,
> And let the ape and tiger die,

we find that it is the more recent influences of the race which are most difficult to eradicate."

Referring to hereditary tendencies, Revington says: "I heard a man say that for eight and twenty years the soul within him had to stand like an unsleeping sentinel guarding his appetite for strong drink. To be a man under such circumstances, not to mention a saint, is as fine a piece of grace as can well be seen. Old Dr. Mason used to say 'that as much grace as would make John a saint would barely keep Peter from knocking a man down.'"

Referring to a number of the illustrations given by Jonathan Hutchinson, who has formulated the principle of heredity in the general diathesis, he says: "If we follow the argument to its legitimate conclusion we must conclude that the numberless idiosyncrasies as to drugs or foods, the liability to take the contagion of the specific fevers, or to suffer from erysipelas on the smallest provocation, are all examples of diathesis, developed, intensified and specialized, diathesis brought to a point, in which all trace of the original causation has been lost. For the explanation of many of the above facts we must appeal to the nervous system, as it alone seems capable of satisfying all the demands of our ignorance . . . If the heredity of coarse physical characteristics—the Bourbon lip, the Napoleonic nose or supernumerary digits be marked, how terribly potent must be the influence of ancestral taints upon the delicate and intricate organization of the human brain—the acme of the evolution of the vertebrate nervous system. . . . We all feel the tyranny of our organization, we sometimes like what our education would teach us to abhor, and we cannot admire what we know to be admirable, and we can thus realize the mental organization of the neurotic, we understand, that we will inevitably develop in certain grooves. Although we may effect much by judicious education we had better begin earlier and prevent what we cannot cure. . . . The study of the neurotic individual who never transgresses the boundary line of certifiable insanity, has been much neglected and much may yet be learnt here Here is the illustration given: A. B., a remote history of insanity in the family, an immediate history also, a paternal aunt is insane, and a brother suffers from *petit mal*; father and mother of normal equilibrium. A. B. is of slight build, with delicate irregular features, brilliant eyes, and a sharp, restless manner, and with an extraordinary aptitude for unusual acquirements. . . . He is hypersensitive, is not muscular, and does not feed on flesh . . . There are many functional and organic diseases of the nervous system which appear to be the result of an ancestral taint, and which interchange in the life-history of the individual or of the race, and we may roughly divide the various affections thus related into the following groups." Here follow eight groups—from group 1: "Forms of neurotic manifestations the heredity of which is well marked but which are not apt to develop unless the individual liabilities are increased. Under it are included irritable, excitable and eccentric temperaments, to group 7: "strong inheritance manifesting itself in infancy, and mental death from birth, or rather the absence (as idiocy) of any intellectual life."

Passing on, Dr. Revington speaks of *acquired* neuroses, or what Jaccoud would call *induced*, and sums up some of the so-called apparent modifications of neuroses. Regarding the induced neurosis, which we trust to see developed in the continuation of this valuable monograph, it is quite clear that for us as physicians the influence which social customs, educational methods, individual habits and economic conditions have in inducing neuroses, must continue to possess an absorbing interest in proportion as we are gaining more exact knowledge of all mental phenomena and neurotic conditions. To illustrate the importance of this from the purely therapeutic standpoint, we are told that "the alcoholic man may, under slight causation, injury to the head, or shock, or worry, develop a sharp attack of insanity, or may break down completely as a general paralytic." In the case where we are called upon to treat the children of such we place ourselves in the position of having to deal with what has become a hereditary neurosis. Such a child inclines to become an imbecile or epileptic, or, later in life, may develop some other definite nerve disorder. Therapeutically we are dealing with alcoholism, it may be in tainted tissues of the child or the imperfectly developed tissues of the young man. But it will very naturally recur to any one to consider what are the influences of home, of education and occupation on such a predisposition in a child? Can we with a child so handicapped fail to realize the conditions under which, as far as we know, with any degree of likelihood, such an individual is likely to grow out of or wear out the neurotic tendency,

as expressed by Revington. To such as these Dr. Clouston, the great Edinburgh alienist, would preach "the gospel of fresh air and fatness." But should it appear to the physician that this is outside the ordinary perimeter of his circle, and should he enquire as to the work left for him to do, we would urge that in the present position of medical science it seems absolutely necessary that we realize that our ordinary facilities for the effective treatment of such are very limited. Whatever is practicable in treatment, as taught us by the neurologist, the alienist and the hygienist, we must make our own as individual physicians. Shall we not look rather to such, to gymnastics and the gymnasium, for the secret of success in this truly philanthropic and national work than to our past beliefs and practices in the treatment of a class of conditions apparently increasing as Canadian life is developing in the never-ending turmoil and competition incident to the rapid evolution of society?

THERAPEUTICS.

Electro-Therapeutics.

The Law cell, which is an improvement on the Leclanché cell, is manufactured by the Law Telephone Company. This is the most reliable cell for constant battery. The simplicity of its construction is seen by the cut.

Instead of a perishable negative element as mentioned above in the Leclanché cell they have a simple carbon plate made in such a form as to generate the most force. The cover prevents evaporation which is a fruitful source of annoyance and inconvenience with the ordinary Leclanché. Its strength is about 1.5 volts. The exciting fluid is a solution of ammonium chloride. The directions for setting up the battery are as follows:—Place the salt in the jar and then pour in water up to the bottom of the word *law*, stir until the *whole* of the salt is dissolved, being careful not to slop the sides of the cell; now put in the elements and give a half turn of the lid which seals it. Place the cells in order whenever you require them and attach the carbon of each to the zinc of the next by short copper wires No. 18. The terminal zinc and carbon at each end of the series will represent the negative and positive poles respectively.

In portable batteries we have first small Leclanché cells which are sealed and arranged in cases for convenience in carrying. All that was said regarding the large Leclanché answers here.

The zinc carbon battery which has been so long in use, is, as far as strength goes, superior to any other form and is also very convenient, that form of it devised by Dr. Rosebrugh being the best. It is shown below.

The plates are already arranged in pairs for intensity. The exciting fluid is a solution made by taking saturated solution of potassium bichromate 6 parts, and strong sulphuric acid 1 part, mixing and allowing to cool before being used. Much better than this, however, is the solution of chromic acid itself. The acid in crystals may be obtained from Mr. Potter. In using the chromic acid solution there is no polarisation by deposition of chrome alum settling on the carbon as there is with the bichromate solution. To use the battery after filling the cells with fluid, the plates are placed in the fluid by lifting them out of the hydrostat and moving them to the left into the cells the last set to the right projecting over the side.

The negative cord is attached to the left anterior corner, the positive is attached to any desired number of cells by inserting it in the connection corresponding to the number desired. Where more than six cells are required the terminal connections of the two sets are joined by a connecting wire supplied with the battery.

It is much better to interpose a rheostat and use all the cells at the same time.

Nitro-glycerine in Epilepsy.

Osler, in the *Journal of Nervous and Mental Diseases* for January, 1888, reports his use of nitro-glycerine for epilepsy, as follows:—

I have notes of nineteen cases in which the nitro-glycerine was tried for periods ranging from six weeks to six months. In thirteen of these cases there were severe epileptic seizures, six were instances of *petit mal* with occasional convulsions. Briefly stated, in nine cases there was improvement, as shown in the reduction of the frequency of the attacks. Of these, six were cases of major epilepsy; and three, instances of *petit mal*. The benefit was usually manifested within a week or ten days. Thus case 16, a man aged twenty-seven, had had fits for ten years; and when seen, April 5th, had as many as two or three a day. He had taken potassium

bromide largely, and at one time with great benefit. Antifebrin was given in gr. viij, two or three times a day, but seemed to be without any influence. On June 1st, nitro-glycerine was given, *m*v of the one per cent. solution, three times a day. Within a week the attacks were greatly lessened, and in the second week after beginning he had only two attacks. He continued to take it all through the summer, getting up to *m*viij doses, t. i. d. He does not think that anything he has ever taken reduced the fits so much. On November 11th, he stated that he had stopped it for a month; the attacks have recurred less frequently, and he has been able to be at work.

In some of the cases in which the betterment was most striking at first, the remedy seemed to lose its influence, and after a month or two had to be abandoned. I cannot say that in any one of the nine cases the improvement has been more than temporary. In two of the cases of *petit mal* the attacks were greatly reduced, and one patient remained free for two months, but I learn by letter that the attacks have returned. Altogether my experience has not been very encouraging. We may say that in a limited number of cases, when the bromides have failed or are beginning to lose efficacy, nitro-glycerine may be used with advantage. I have also used the nitrite of sodium in a few cases with indifferent success.

Further Testimony to the value of Creasote in Phthisis.

Von Brunn, in the *Berliner klinische Wochenschrift* of February 20, 1888, reports that in the past eight years he has treated 1,700 cases of pulmonary phthisis with creasote, with good results. His cases were not only the ambulatory patients in whom there was no marked rise of temperature, but also cases in which tuberculosis was making active progress. The best results were obtained in acute cases in which the temperature became nearly stationary after a period of fever, and in which the lesion was generally catarrhal and unilateral. Regarding dosage, von Brunn considers it an error to give less than six or seven minims of creasote daily; he has not exceeded seven minims daily, and considers it essential to continue this treatment for at least several months. He believes with Sommerbrodt that the more creasote which can be borne the better. The creasote wine originally prescribed by Bouchard was found to be the best form for administration:—

Creasote	13 parts.
Tr. gentian	30 parts.
Spts. vini rect . . .	250 parts.
Vin. Tokaya, or Malaga.	ad. 1000 parts.—M

Sig.—Teaspoonful well diluted with water three times daily.

The Treatment of Lead Colic by Rectal Injections of Ether.

Torre, in the *Bulletin Général de Thérapeutique* of February 15, 1888, reports that he has given ether per rectum for the spasms of lead colic with good results. He employed a flask containing about a drachm and a half of ether, to which was attached a rubber tube of convenient length and terminated by the canula of an irrigator. The injection of fifteen to twenty minims of ether was often sufficient to mitigate a severe spasm when enemata of castor oil and soapsuds were given to relieve constipation.

Volumetric System in Materia Medica.

By W. B. Nesbitt, before Canadian Institute.

In bringing the following paper before you I am conscious of its many imperfections, and am aware that the system proposed is not perfect, yet I hope you will bear with me, and that in the discussion, which it is to be hoped it will be its merits to engender, such hints and criticisims may be received as will enable me to place the system on a still more practical basis.

The first thing that meets the student of Materia Medica is the almost illimitable number of drugs and preparations, whose number is only comparable with the likewise illimitable and varied doses. It is this heterogeneous system of dosage that I would try to place on a more satisfactory basis. We will just glance at a few of the preparations and their doses. Commencing with the inorganic salts, this is what we find:—

Potassic Carbonate	10—30	grs.
" Bicarbonate	10—40	"
Liquor Potassæ	15—60	"
Potassic Permanganate	1—2	"
" Iodide	2—10	"
" Tartras acid	20—60	"
Potassic Bromide	5—30	"
" Citras	20—60	"
" Acetas	10—60	"
" Chloras	10—30	"
" Sulphurate	3— 8	"
" Nitras	10—30	"
" Sulphas	15—60	"

I have chosen the salts of potash simply because they come first in the book most used by students, *i. e.* Mitchell Bruce's Materia Medica. All these preparations, when prescribed by the physician, are first triturated in the mortar for such as are in the form of crystals, and then dissolved in water, water being almost invariably the medium for holding the different drugs in solution, sometimes as in the case of quinine, a little sul. huric acid being added to assist the dissolving.

Now, if these drugs were kept in solution by physicians and pharmacists, and the strength of *each* so graduated that the dose of *all* would be the same, you have the principle of the system. For instance, we will take two or three of the above mentioned salts,

Potassic Carbonas 10—30 grs.
" Permang 1— 2 "
" Iodide 2—10

and keep these on our shelves already dissolved, and we will have the dose for all 1 ʒ. In order to do this we will make up say 40 ozs. of each solution. In 40 ozs. there are 320 drms., therefore, in 40 ozs. of solution, to have the maximum dose of

Potassic Carbonas in one drm. there must be 320 × 30 or 9600 grs.
Potassic Permang in one drm. there must be 320 × 2 or 640 grs.
Potassic Iodide in one drm. there must be 320 × 10 or 3200 grs.

Now we see by the above, that in 320 ʒs. of the pot. Carb. solution we have 9600 grs., or in 1 ʒ of solution we have $\frac{9600}{320} = 30$ grs.: in the pot permang., in 320 ozs. we have 640 grs. *i. e.* in 1 ʒ we have $\frac{640}{320}$ or 2 grs. which is the requisite dose in each

Leaving the inorganic we next come to the organic portion of Materia Medica, this, like organic chemistry, has a little more system in it, for we find here the majority of the tinctures have a dose of from 1—2 drms. Still we have such discrepancies as

Tinct. opii 5—40 m.
" Camp. Co. 15—60 m.
Fluid Ext Pilocarpine 10—60 m.
Tinct Tolutana 15—30 m,
Tincture opii ammoniatæ ½—1 drm. m.
Liquor morphine Hydrochloratis 10—60 m.
Tinct. Philocarpine 5—20 m.
Tinct. Lobeliæ 10—30 m.

Also there are the various infusions, decoctions, wines, elixirs and every manner of fluid preparation, with doses varied for each class and the doses for any class varying among themselves.

What possessed the originators of our Pharmacopeia to have the doses so varied, when they might just as well and easily have had them the same, is to me incomprehensible. The same system and principle will serve here as in the previous instance, by adjusting the amount of the substances taken it would be very easy to have the dose for all ½—1 ʒ.

In this plan there would also be much less liability to poisoning. The *modus operandi* of a poison case is as follows: A druggist receives a prescription which calls for Quinia Sulph. xxx grs.; now, Sulphate of Quinine, as well as the salts of many other alkaloids, have a great resemblance to each other in external appearance, so much so, that the druggist just looking at the contents can easily mistake Morphine for Quinine. He gives xxx grs. of Morphine by mistake for Quinine, the man dies; the stomach is sent to Dr. Ellis, and the druggist appears at the next assizes to answer to the charge of manslaughter. Now, had these been in volumetric solution, with dose for each 1 ʒ, the physician would have written Quinine Sulph. 6 ʒs. and then, as the dose for morphine would have been exactly the same, a poisonous quantity would not have been administered.

The above are the principal features of the system, but what would, I think, still further improve it, would be the introduction of metric system of measures. The dose for all being the same, there would not be the danger of misplacing decimal points as in the metric system as now applied, Taking for the standard dose 1 to 2 cubic centimetres and having our bottles made in sizes of 100 and 200 C.C.'s, there would be much greater facility of reckoning than at present.

By having a uniform dosage system, not only would much unnecessary work for the student be abolished and enable him to devote more of his time to the much more essential study of therapeutics, but for therapeutic purposes we would have a most complete sicientific system, as the standard dose ¼—1 ʒ or 1—2 C.C.'s as the case may be, would be the therapeutic unit, as 1 ʒ of tinct. aconite would produce the maximum therapeutic effect of the drug, and so likewise the 1 ʒ of tinct. opii the 1 ʒ of tinct. digitalis, etc., *ad infinitum*. In the name of the army of students of the future, we press the claims of this system for adoption.

BACTERIOLOGY

On the Lungs as a Filter.

BY M. BOUCHARD, (TRANSLATED AND PRESENTED TO THE PROVINCIAL BOARD OF HEALTH BY DR. CASSIDY, A MEMBER OF THE COMMITTEE ON VENTILATION.)

Mr. Chairman and Gentlemen:

The Committee on Ventilation wish to bring to your notice a translation from the French of a paper, which contains some very interesting information on matters relating to the respiratory function, as well as to the history of the development of infectious diseases. The paper was read by M. Bouchard before the Academy of Sciences, Paris, France, December 5th, 1887, and is a report of certain bacteriological work done by Messrs. J. Strauss and H. Dubreuilk.

"Lister first made the observation that air introduced into the pleural cavity as the result of a simple fracture of the ribs produces effects quite different from, and much less serious than those which result from a pneumothorax, following a penetrating wound of the chest. This fact, he adds, was a mystery to me, until, thanks to the germ theory, I understood that one of the offices of the bronchi is to filter the air which enters the lungs, and thus prevent particles of dust, which are inhaled from entering the air-cells.

Lister's explanation was experimentally confirmed by Tyndall, who showed that expired air is, to use his own expression, " optically pure ;" that is to say, that when it is traversed by a beam of light in a darkened room it does not show a luminous track. Expired air is therefore free from every particle held in suspension, which is capable of diffusing light.*

We have undertaken to verify by bacteriological methods, the fact in physics, which has been described by Tyndall. We used flasks, each of which was provided with two tubes and filled with alkalinised and sterilised bouillon. The tube through which the expired air entered the flask was drawn out to a point at its lower end, which reached to the bottom of the liquid, so that the expired air escaped in tiny bubbles through a considerable depth of bouillon, and naturally ought to rid itself in its passage, of any solid particles which it might contain.

In a certain number of our experiments, the bouillon, which was kept at a temperature of 72° F was thickened with gelatine in order to prolong the contact of the air bubbles with the liquid. about half an hour's time was devoted to each flask, so that the liquid in each of them was traversed by from 250 to 300 litres† of expired air. The flasks were then left for several days in an oven at a temperature of 95° F.

The greater number of these flasks remained sterile; a few only lost their clearness through a growth of micro-organisms or a crop of moulds. These instances were, however, exceptional, and doubtless were partly due to errors in manipulation such as the introduction of a little saliva along with the breath or a too forcible expiration, etc.‡

These experiments of ours therefore entirely confirm those made by Tyndal. They go to show that expired air, in addition to being "optically pure" is almost completely free from germs. The lung is therefore, as Lister said, a filter for germs.

The mechanism of this filtration is easily understood, if we reflect how the air circulates in the lungs through bronchi, which become extremely small and are lined with epithelium.

Many other experimenters have endeavored to find pathogenic microbes in expired air; but always, so far as we know, unsuccessfully. M. Gaucher has made a great number of experiments on the air expired by consumptive patients, but he has never succeeded in finding in it the bacillus of Koch, or its spores. M. M. Charrin and Karth have made similar experiments with a like result.

From all these facts we may conclude that, as far as microbes are concerned, men or animals shut up in a confined place purify the air instead of fouling it by their respiration, and this is so, because the air of expiration contains fewer microbes than that of inspiration.

This observation of ours, however, does not in any way contradict the fact, which was long ago demonstrated by Messrs. Pasteur, Lemaire, Miquel, and others, that is to say, that microbes are abund-

*See Tyndal on Germs.

†Litre = 35 oz., 1 dr., 43 m. Expiration was performed slowly, after a long slow inspiration.

‡We have also endeavored to determine the exact spot in the respiratory tract where the stoppage, and doubtless the destruction also of the microbes, introduced during the act of breathing, takes place. For that purpose we have examined the lungs of a certain number of the larger animals, such as horses and oxen, just after they had been slaughtered, but neither the colorations obtained, nor the cultures made have given us indications sufficiently exact to permit us to express a definite opinion on this subject.

ant in the air of thickly inhabited places such as barracks, hospital wards, etc. It is not by the air of expiration, *by their breath*, that people in a crowded assembly charge the floating air with microbes, but rather by their garments by the various kinds of dust occasioned by their movements, by their expectoration, which dries on the floors of rooms and later on floats about in the form of a powder, which effectively produces the dissemination of microbes in the air. The respiration of men certainly brings into a confined place its own contingent of poisonous gases, but it tends to purify the air of the microbes it contains.

As an addendum to this valuable paper, your committee desire, as practical sanitarians, to emphasise the following conclusions :—

1. Nurses, physicians and all persons, brought for any considerable time in proximity to patients ill with infectious diseases, such as scarlet fever, diphtheria, etc., should, in addition to thorough cleansing of the person, put on clothing free from the germs of these diseases before entering crowded places such as churches, etc.

2. The discharges from the air passages of patients ill with diphtheria or any other acute infectious disease in which the microbes are given off from the air passages, should be immediately destroyed.

3. The sputa of patients suffering from phthisis, should, whenever it is possible to have it so, be received in suitable vessels and quickly destroyed.

[It is not to be forgotten that an abundant supply of fresh air is necessary to sustain the healthy and physical powers of nurses, attendants, and patients to enable them to resist the invasion of specific disease germs and contagious disease.] Adopted.

HYGIENE.

The Toronto Sanitary Association.—Correspondence, by "Architect."

DEAR SIRS,—Some few years ago a Sanitary Association was organized in Toronto, and though we have not observed any notice of its meetings during this winter, we trust that this is not to be taken as an indication that the members have become discouraged and allowed it to collapse. They did some good work during their first two sessions. A committee of the association gave valuable assistance in drafting the plumbing by-law, and a considerable number of papers were read and lectures delivered at their meetings, which were not only interesting, but valuable. Work of this kind has a double value, it not only benefits the members by putting into concrete form the result of their individual studies and enabling them to interchange ideas, but it affords a means of educating the general public on sanitary questions. There is no reason why a sufficient number of the general public should not be got to attend these meetings to fill a good sized room. Indeed, this was frequently the case during the first session. Has there been any falling off in the public interest in sanitary questions? If such is the fact there is surely no justification for it. We have not yet got a trunk sewer, the bay is a reeking cesspool; we have no garbage cremator; our water supply is insufficient in quantity, and, at times, by no means above suspicion as to quality. Diphtheria and typhoid are much more frequent visitors in our homes than they should be were our sanitary arrangements—not to say perfect—but reasonably good. The condition of our streets is at all times a disgrace to the city and a blot upon its fair fame.

These are but a few of the more glaring abuses which such an association should work at unceasingly until they are wholly suppressed. When that work is done it will be found that the horizon of its field has only widened, and that other work scarcely less important lies ready to its hand. Everything that in any way affects the public health comes within its sphere. We merely indicate the direction in which its efforts would naturally be turned: compulsory ventilation of manufactories and public buildings; the effects upon health of the gas supplied for our use; the providing of parks and recreation grounds; the proper placing and management of cattle markets; the provision of proper abattoirs; the prevention of adulteration of food and drink; the inspection of dairies; the question of public baths and wash-houses; teaching the poor how to cook; the dissemination of correct scientific ideas on the subject of vaccination, suitable dress, preventive medicine and the care of the body generally. The list might be enlarged indefinitely, but enough has been said to show that there is work enough in sight to keep a sanitary association busy for a long time to come, and we may be sure that while human nature remains what it is, careless and indifferent about many vital questions, it will never be able to say that its work is done.

The first duty of such an association is to educate public opinion. Many important sanitary reforms cannot be effected without the aid of legislation. A paternal despotism might force such reforms upon an unwilling people, but in a free country such legislation will only be granted when those who demand it are sufficiently backed up by the force of public opinion. This point cannot be too clearly kept in view, or too persistently inforced. When private individuals or even the members of a public association, move in such matters, unless strongly supported by the press and the public, they are sure to be looked upon as busy bodies who cannot be content to let well enough alone but *will* go poking about and stirring up unpleasant things that nobody wants to hear about. Very few persons have any intelligent conception of the necessity for sanitary reforms. It is only when an outbreak of typhoid or diphtheria or small-pox occurs that they are stirred up to a temporary interest in the matter. Then they are active in denouncing the authorities and demand that the immediate, or perhaps accidental, cause of the epidemic or particular case be removed from their own immediate neighbourhood at least. After that is done, or supposed to be done, no more is heard of them until another outbreak occurs. The more subtle causes of disease which exist in the general conditions under which life is lived, and which render such outbreaks possible while they prepare the human body to succumb to them are hardly ever thought of except by specialists. The seeds of disease like the seed of grain can only germinate when the conditions are favourable. Many of these conditions are now known to science and it is possible to control them if the proper means are employed. New discoveries are every day being made which render it more possible to control them. There seems no reason to doubt that the time will come when medical science will become preventive rather than curative. That time will not come, however, so long as the work is left wholly to medical men, sanitary engineers, and a few others. Preventive medicine and sanitary science are almost interchangeable terms. There is therefore urgent need for the Sanitary Association to be up and doing, and we hope soon to see them come to the front again and lead in the fight against dirt, disease, and death.

NEUROLOGY.

The Contagion of Murder: A Study of Criminal Anthropology.

Translated from Thèse de Doctorat du Dr. Paul Aubry, Paris.

The interest specially relating to this article for Canadians at the present time is that, as one often hears remarked, there seems to be an epidemic wave of crime sweeping over the American continent at the present time. It were time that the question be seriously considered whether there should not be a limit to the freedom of the press regarding the publication of itching news for itching ears. Personally we think that much of what is called in newspaper parlance, *live* news were much better dead, dealing as it often does with *dead subjects*.

The following translation well expresses modern views on the subject:—"The astonishing facility with which crimes are committed, the almost absolute similarity in the means of execution, the return, so to speak, periodically of certain murders induced Dr. Aubry to look into the cause and mysterious connections which bind these different conditions together. Now, this marked psychological phenomenon is not the result of mere imitation, although one might at first be led to think so. There is more, it is a combination of four very distinct terms: Suggestion, imitation, heredity, contagion; the whole of which constitute the principal elements of an epidemic.

Epidemic murder has been demonstrated by history; but it is only a few years since the truly pathological nature of these epidemics has been understood. Encouraged by the example of his masters, M. Aubry has not feared to add a stone in this great work. He has treated with authority this question so full of interest, so great in consequences. His work is divided into three parts: in the first place he has studied the contagion of murder in its general methods; he has searched out what were their chief factors, and under this head has reviewed the family, the prison, the sight of executions, the description, etc. In the second part he has treated of the contagion of crime in some of its special methods, vitriol, revolver, poisoning, criminal butchery. Finally in the third he examines epidemics and endemics.

We will not follow the author in the examination of these different questions supported by num-

erous and curious observations. We will speak only of the conclusions:

The idea of murder is essentially contagious. For its manifestation, two factors are necessary: 1. Heredity or degeneracy. 2. Education, and under this is understood the influence of examples. The account of a crime given in detail by the press nearly always brings a series of crimes, the means of execution of which, so to speak, are figured upon the crime-type. The acts of cruelty to which people lend themselves during great political and social revolutions nearly always give evidence of the influence upon the masses exercised by a few leaders. This is true imitative contagion. The prophylaxy of murders depends upon a healthy moral hygiene: 1. A healthy moral hygiene of the individuals. 2. The moralization of manners. 3. The regulation of the published accounts of crimes by the press. 4. A more reasonable severity by tribunals. We see then the great importance which the author attaches to good hygienic morals, and under this title we can only hope with him to see his conclusions adopted by competent authorities."

REPORTS OF SOCIETIES.

Toronto Medical Society.

STATED MEETINGS, *February 23rd, 1888.*

The President, Dr. Nevitt, in the chair.

Cases in Practice.—The first one presented was that of a child of nine years. It was under the care of Dr. Machell, who gave the following history:—The family had been four years in the country, and during the cold weather each year the child had been afflicted with an eruption, first in the flexures of the arms, then in the hollow of the back; again on the inner aspect of the thighs and now behind the knees. None of the family similarly affected; their food had been scanty this year.

The eruption was pustular, especially around the margins, scabby and bleeding in some places; serpiginous looking—one patch four inches, another one and a half inches in diameter but not circular. The skin around was thickened. The patches had been itchy with a watery discharge. No congestion around the sores. There was a stinging, burning pain apart from movement. It had improved in two days with zinc ointment. It was the general opinion of those present that it was a case of eczema.

Dr. Ferguson showed a case of sycosis from shaving. It was of two weeks standing and was being treated with mercurial ointment.

Dr. McPhedran recommended in cases of non-parasitic tinea an ointment of

Acid salicylic,	gr. xv.	
Lanolin,	℥i.	M.

Dr. Machell treated tinea in the following manner:—The head was first well washed with soap and water. Raw turpentine was then thoroughly rubbed in with a flannel until there was considerable stinging pain. Mercury was used thereafter. The turpentine destroyed the baccilli and recovery ensued in a few days.

Dr. MacCallum exhibited microscopically a section of the spinal cord taken from a man who had died of locomotor ataxia. The case had been five years under observation in the House of Providence. The chief symptoms in the case were, want of co-ordination and a feeling of dryness and discomfort in the posterior nasal region, due to want of secretion from atrophy of the mucous membrane. Death caused by a gastric and intestinal crisis of three weeks' standing.

March 1st, 1888.

A young man of twenty-three years was shown by Dr. Cuthbertson, with a tubercular disease of the right testicle. When only twenty, this testicle, without any apparent exciting cause, had become swollen and painful. This all disappeared and gave him no further trouble until two months ago, when it again enlarged, an abscess formed and broke, so that when first seen by his physician three weeks ago, there was a sinus leading down to the abscess cavity. A marked tubercular history was obtained from the patient.

Drs. Atherton and Oldright both favored the removal of the testicle.

Dr. Wishart showed a boy with some skin eruption of the face which he believed, from its appearance, to be scrofulous in its origin.

Dr. Doolittle related the history of a case where the uterus, after confinement, contracted a short

diameter from above downwards and a lateral diameter of seven inches—good recovery.

Dr. Nevitt knew the person to be neurotic. She suffered twice from pelvic cellulitis.

Two cases of intubation for laryngeal diphtheria were cited by Dr. Duncan. In one the irritation caused by the tube was very marked, but the child made a rapid and complete recovery, while in the other there was little irritation and great relief to respiration, but the child died on the third day from collapse.

Dr. Oldright asked the cause of a peculiar green mould appearing on the surface of different samples of urine from a patient. Every precaution to secure cleanliness had been observed. The patient had an enlargement on the left side.

March 8th, 1888.

Several interesting cases of diseases of the genito-urinary organs were mentioned.

Gonorrhœa with Formation of Abscess.—In one case cited by Dr. Machell, the abscess formed on the line of the urethra, midway between the glans and the scrotum. When opened half an ounce of pus escaped but there was no communication between the abscess cavity and the urethra. In this case the patient had obtained an injection from a druggist.

Another by Dr. Atherton where the abscess had formed just in front of the prostate gland. It burst and discharged pus aud urine. No strong injection had been employed.

Dr. Nevitt mentioned several obscure cases which had come under his care. In all there were symptoms of bladder trouble and fluctuating tumors were discovered in the bladder by means of a sound and with the finger in the rectum. In each case he had managed to perforate the sac with the sound and pus was immediately passed *per urethram*. Antiseptic injections completed the cure in a short time.

Dr. Ferguson stated that authorities believed the urethral mucous membrane to be totally non-absorbent and therefore an abrasion was a necessary preface to inflammation.

Syphilis.—Dr. Ferguson mentioned a case of a medical gentleman who came to him with a chancrous-looking sore on the head. There was no history of infection excepting that he might have touched his head with his finger after handling a syphilitic patient. The glands were enlarged and there was cachexia. In due time the rash, sore-throat, etc., developed.

Diabetes Insipidus.—Dr. McCullough related the history of a case of polyuria in a pregnant woman at the sixth month. Ten pints passed daily, sp. gr. 1004. No sugar. This continued until after her confinement, during which time she lost flesh and appetite. The gums receded from the teeth and the tongue glazed. Thirst very great. The case is now improving rapidly.

Dr. Greig mentioned a case in which, at the fourth month of pregnancy, an erythematous eruption appeared on the anterior and outer surface of one thigh extending as far as the knee. It was eight inches broad, clearly defined, smooth but not raised. No miliary points present and the redness did not disappear on pressure. The affected part was tender to the touch nor could the patient lie on it. It did not disappear after confinement.

March 15th, 1888.

A case of non-parasitic sycosis was presented to the society by Dr. Doolittle. It was situated on the more prominent portion of each cheek and had persisted for over three years. Dr. Graham looked upon the case as one of eczema at present and suggested that applications of extremely hot water should be made followed by diachylon ointment.

Quite a lengthy discussion followed upon the reading of a very able paper by Dr. McPhedran on *Spinal Irritation*. Some of the points taken up were: *the use of the term "spinal irritation."* Dr. Cameron objected as we already had one term, hysteria, not understood, and thought that these cases might be classed together. He believed Rosenthal's classification was a correct one, viz.:

1. Cases of Hyperæsthesia or Spinal Irritation.

2. Cases of a depressed state of the nervous system or Neurasthenia.

Dr. McPhedran quite agreed with the above classification, but stated that he had not discussed any cases of spinal neurasthenia.

Dr. Graham did not consider cases of spinal irritation and of hysteria sufficiently alike as to belong to the same class, nor did he fully appreciate Rosenthal's classification and asked what was meant by a "depressed state?"

Another point taken up was the *cause of spinal*

irritation. Dr. McPhedran stated that these spinal lesions were generally due to a lesion on the surface of one of the mucous membranes or to a visceral lesion.

Dr. Cameron coincided with this view, while on the other hand Dr. Graham did not believe the actual cause or lesion could always be discovered. "Why should a blister relieve the symptoms if the mucous membranes were the seat of trouble, unless indeed, it might possibly act through the blood, where, after all, the true seat of the lesion might be."

With reference to the *diagnosis* of these cases, Dr. Oldright believed it very difficult to make a correct classification. Spinal irritation might even be confounded with pleurisy. He cited two or three cases that had come under his own observation where paralysis had been one of the later symptoms of this disease.

Referring to *treatment* the use of the galvanic current was strongly emphasized.

GOVERNMENT REPORTS.

Diphtheria at the Institution for the Blind, Brantford.

The following is abstracted from the interesting 16th report of this institution, in which the physician, W. C. Corson, M.D, reports the details of the outbreak of diphtheria which took place in 1886-87 :—

"The spectral presence of a contagious and fatal disease, projected without warning into a community of young children, was sufficiently appalling when all the possibilities were considered. It was at this juncture that yourself, as Inspector, and Dr Bryce, Provincial Secretary of the Board of Health, was summoned to our aid by telegraph. By your prompt arrival the same evening, we had the benefit of Dr. Bryce's excellent counsel, not only in regard to the treatment of sick children, but in suggesting the best precautionary measures to prevent the further spread of the disease, and in investigating the cause of the epidemic. Dr Bryce kindly approved of the treatment entered upon, but advised an additional remedy, inhalation of steam, medicated by turpentine and carbolic acid. The apparatus for the generation of steam was immediately extemporized, but all our efforts, though of the most energetic nature, could not rescue the lad Alexander, for he succumbed to the disease the following morning. The two remaining boys, aged about ten years, were now struggling heroically with the disease in a severe form, and though both were delicate in appearance, yet they maintained their ground against uneven odds, and were finally brought safely through.

The next on the list was a female servant, employed on the boys' side, whose attack proved to be mild in character, confining her to her bed for a few days only.

Other cases now occurred in quick succession, such as the young female nurse, engaged from the J. H. Stratford Hospital, who escaped with a brief illness. Then followed a boy, a companion of the boy Alexander, whose case, though somewhat prolonged, was never the cause of serious anxiety. There then ensued a considerable period of rest without new manifestations of the epidemic, and we began to grow confident that we had seen the last of our enemy. Thus far, it will be observed, the disease had been confined to the male side of the house, and as a preventive measure all communication between the two wings had been as far as practicable broken off. But our hopes received a rude shock, for just one month from the convalescence of one of the little boys above named, his young sister was suddenly prostrated by diphtheria. A week previously the two children had been allowed to come together, but not, of course, until a thorough disinfection of the boy's clothing and person had been accomplished. Whether the disease was communicated in this way must remain a matter of conjecture. I understand Dr. Bryce believes it possible, but if that theory be correct, why, it may be asked, did not this boy communicate the disease to some or other of his companions with whom he was continually mingling?

Something more than a passing reference should be made to the case of this little girl, on account of her remarkable recovery from what seemed certain death, and by which we learn the lesson never to relax our efforts to save our patients as long as

life remains. Of course the disease was seen in this instance in its initiatory stages, and active treatment was at once entered upon, including the steam inhalations, but the disease progressed unchecked, the thick sloughy-appearing membrane finally covering the whole surface of the upper air passages, while the enormous swelling of the cervical glands gave the case an unpromising appearance. A still more threatening symptom arose in the form of profuse bleeding of the nose, caused, no doubt, by the separation of membrane in the nasal passages. Temporizing remedies were at first tried, but it was soon found that the flow of blood could be staunched only by plugging the nostrils. The loss of blood left the little patient with the pallor of death upon her countenance at every accession of hemorrhage. On one occasion, while I was present, she was observed in a convulsive struggle, and the little sufferer appeared to be in the last gasp, but the paroxysm ended in her coughing up a portion of thick tough membrane resembling an oyster. By the use of restoratives she soon rallied, and this event proved to be the turning point towards final recovery.

Still another case may be referred to, less fortunate in its result, but equally instructive. Later on in the epidemic a female pupil, aged 22 years, became the subject of diphtheria, and was placed under the same treatment as the others. There was nothing unusual in the early history of her illness, except that some laryngeal symptoms were developed, which gave us considerable anxiety. These, however, soon passed away, but in the progress of her illness an unlooked for complication occurred in the form of nausea and vomiting, necessitating the discontinuance of all active treatment and reducing the quantity of nourishment to the very minimum compatible with existence. As a natural result of this complication the heart's action became very feeble, threatening complete failure. Under these circumstances all our efforts were directed to sustaining the enfeebled heart, while for days the patient was not allowed to raise her head or make any bodily effort, but unfortunately all our efforts were in vain, for one morning a sudden change was noticed in her appearance, and before medical aid could be summoned she had passed away, death doubtless resulting from paralysis of the heart. In connection with this case it should be mentioned that Dr. Philip attended the patient, with me, throughout her illness, and also that her parents, having been apprised of the serious nature of her sickness, were present some days before her demise. I might add that Dr. Philip expressed not only a hearty approval of the plan of treatment adopted, but also gave his cordial co-operation in all the means employed to combat the epidemic.

As an example of the erratic nature of diphtheria the case of Jane Moffat may be mentioned, who had come very kindly to fill a vacancy in the laundry. She was taken down with the disease two weeks from the time of entering the Institution. Diphtheria is a disease supposed to belong almost exclusively to childhood and youth; here, however, was a woman 62 years old, whose age might seem proof against the possibility of contagion, but who takes the malady in severe form, the whole pharynx, roof of the mouth, and nares being covered by membrane, which, with the cervical swelling and engorgement, caused great difficulty in breathing and swallowing. After nights and days of anxious watching, in which the chances seem evenly balanced between life and death, a change for the better became finally apparent. After all trace of membrane had disappeared, and the patient had gained sufficient strength to sit up, it was thought prudent to have her removed to the J. H. Stratford Hospital during her slow convalescence, but I regret to say that after a stay in the hospital of several weeks she died rather suddenly, as I am informed, from probably one of the sequelæ of diphtheria.

Report of the Deaf and Dumb Institution, Belleville.

R. Matheson, Esq., Superintendent of the Institution, writes:—"A thoughtful writer, who has studied the subject of the education of the deaf thoroughly, both theoretically and practically, says: 'It is not very long since this class was considered incapable of moral or intellectual improvement, and consigned to a degree of existence little above the brute creation. The crude efforts made to improve their condition proved so entirely abortive of beneficial results that the wisest and most charitable instructors acquiesced in the unfavourable verdict. By degrees a system of instruction has been devised, whereby the meaning and use of words are made comprehensible to those who never heard the sound of the human voice nor never articulated an ordinary syllable. The process by which so great a vantage ground was reached was necessarily slow

and laborious, being hedged about by formidable difficulties and limited to a narrow field of labour. To-day the results of this system are seen in the successful education of the deaf and the achievements of those who are benefitted thereby. Deaf-mutes are made the social, almost the intellectual peers, of their more fortunate fellow-mortals. They understand the force and application of moral obligations, and are able to act an intelligent part in the performance of such duties as devolve upon them as rational beings. Many of them take high rank in the pursuits of the arts and sciences, and nearly all are useful and law-abiding citizens. This is a crowning glory of the noble educational work of the nineteenth century, although the system whereby such results have been reached was initiated in a former era.'

'The afflicted are always credulous and easily persuaded that advertised nostrums possess healing virtues. Unprincipled persons take advantage of this credulity and solicitude to impose upon this class worthless medicines and inventions. The deaf are conscious of the disadvantages under which they labour, and are anxious to improve their hearing if it is possible to do so. They read the advertisement of quacks, and believe the testimonials published as genuine acknowledgments of cures affected. Money that they need for the support of themselves and families is spent in purchasing ear-drums, audiphones, dentaphones, and other fraudulent contrivances that are of no benefit, but rather an injury. It may be that a comparatively few deaf persons, who affliction is temporary or superficial, are benefitted in a measure by some of these advertised antidotes, but a large majority receive no benefit whatever from such aids. I would, therefore, advise all concerned to be cautious how they spend money for such things, as in nine cases out of ten no value will be received for the expenditure. Presumptuous characters, by means of glowing advertisements in the papers and a free use of printer's ink generally, induce a good many deaf-mutes to part with their hard-earned dollars for what turns out to be a cruel farce or worthless compound. Children born deaf, or who lose their hearing at an early age by fevers and other diseases, are seldom cured by any means. When skilful and experienced physicians, who make a specialty of diseases of the organs of hearing, refuse to guarantee a cure and even refuse to experiment, it is not likely that "travelling doctors" or quack medicine vendors will be able to put them to shame. The interest I feel in whatever concerns the deaf, with whom I am so intimately and interestedly associated, induces me to sound the friendly warning, with the hope that it may save some from the impositions so generally practised.' "

GENERAL NOTES.

The Nobility of the Physician.

Perhaps never have words more graceful or sincere, from one of the army of patients, been spoken of the profession of Medicine than those in the dedication to "Underwoods" the recently published volume of poems by Robert Louis Stevenson. He says: "There are men and classes of men that stand above the common herd; the soldier, the sailor, and the shepherd not unfrequently; the artist rarely; more rarely still, the clergyman; the physician almost as a rule. He is the flower (such as it is) of our civilization; and when that stage of man is done with, and only remembered to be marvelled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably exhibited the virtues of the race. Generosity he has, such as is possible to those who practise an art, never to those who drive a trade; discretion, tested by a hundred secrets; tact, tried in a thousand embarrassments; and what are more important, herculean cheerfulness and courage. So it is that he brings air and cheer into the sick room, and often enough, though not so often as he wishes, brings healing."

William Harvey.

Dr. W. H. Stone in his recently delivered Harveian oration delighted his audience with illustrations drawn from the veritable *verba scripta* of Gulielmus Harveius. Quaint and unusual as are these old *lecture* notes, they amply describe the manner of the great discoverer of the circulation of the blood. Written

mainly in Latin the notes are full of Greek words, not always written in Greek characters; but though never intended to be seen by any eye besides that of the writer himself, they rise, said the lecturer, in passages almost to eloquence. Speaking of the maintenance of the human species by generation, in spite of the death of the individual he uses the expression, "By the string tyed to eternity." Again, to illustrate the peculiar method of these notes, Dr. Stone quotes, "Unde sacris literis greatest blessing, 1st Issue, that thy seed shall remayne for ever," and further on, "Apparet item maribus et foe minis qui moderate utuntur never more brave, sprightly, blithe, valiant, pleasant, beautiful." His humor is broad and sparkling. Speaking of the malposition of organs he points out that it occurs in "yeoung (sic) girls by lacing; unde cutt there laces." The spleen is described in man "as washhous to the kitchin and its absence in lower organisms," explained by "Inferior kitchins need noe washhous." He describes the thymus gland as follows: Thimus, sweete bread, nutt of veale, corpus glandosum molle, heare they sticke the piggg." His twelve *canones anatomiæ generalis* are admirable, one of them is a model, worthy of imitation by all lecturers "not to speake anything which withoutt the carcase may be delivered or read att home."

Cause of the late Emperor of Germany's Death.

The immediate cause of the death of the late Emperor of Germany, according to the *British Medical Journal*, was renal colic. He had suffered for several years from this malady.

A Treatise on Diseases of the Eye.

(PROF. EDOUARD MEYER, PARIS.)

P. Blackiston, Son & Co., Philadelphia, have recently catalogued a publication which has stood so unusual a test that we have no hesitation in stating it to be the most complete, and at the same time satisfactory, treatise on diseases of the eye, that we are acquainted with. Says Dr. Fergus, of Glasgow, its translator, "The original work struck me as being not only most concise, but also the most comprehensive Manual on the branch of which it treats that I ever perused;" and the writer of this review having perused the original work for some seven years past can but add his testimony to Dr. Fergus' statement. But to one, who, as a former student of Prof. Meyer, knows the author, there is something more than usually touching in his modest references, in the preface to this, the first English edition, to the fortunes of his work. He says:—*Habent sua fata libri.* The work was published first fifteen years ago to replace in the hands of the French student a translation of Wharton Jones' celebrated work, which had grown out of date. Since then the work has gone through three French and four German editions, and has besides been translated in to Italian, Spanish, Polish and Russian; even a Japanese translation has been issued.

A lecture at the Ecole Pratique of the Paris Medical Faculty, Meyer has cultivated the art of imparting knowledge and, as anyone would gather from even a cursory perusal of his work his teaching is as clear and pointed as his work is concise and practical. It were unwise to even attempt an analysis of the contents of this 600-page work with colored plates, for it must be studied to be appreciated; but its conciseness and directness of aim can be judged by the very first sentence, which states "The symptoms by means of which we recognize the situation and nature of an affection of the eye, may be divided into two groups—the objective symptoms and the subjective symptoms." The arrangement of the chapters and the sub-headings are even and well-balanced, while the progress of the subject from methods of examination through the description of the more common and simpler forms of disease to those treating of affections of deeper-seated parts and optical defects are admirably suited for giving the general student a good idea of those affections which come within the range of his facilities for diagnosis and treatment. We shall refer to but one chapter, which has struck us as being of special interest and importance to a general practitioner, viz.: that treating of "Amblyopia and Amaurosis." He states that the terms are now restricted to those cases where all examination fails to discover any lesion or atrophy of the optic nerves, and says "The diminution may then be considered as due to an interruption of power of transmission in the nerve."

After detailing the points in diagnosis and referring to variations in development he says: "Much more frequently the visual disturbance develops slowly . . ." Amongst these forms (favorable if cause be removed) we may mention cases of amblyopia due to excess in alcoholic liquors and tobacco, habitual constipation, affections of men-

struation, suppression of hemorrhoids or of pathological and physiological secretions, venereal excesses, irregularity of sleep, or fatigue of the eyes from want of sleep." As a diagnostic medium alone, this work should be in the hands of every practitioner seeking to attain to exactness in diagnosis of disease, but especially of those diseases having, as so many have, a neurotic basis.

University Department of Biology.

It is with pleasure that we notice the approval by the Legislature of the proposition to expend $30,000 on a new building in the Queen's Park for the Department of Biology. The rapid strides which biology has made even since the date at which the School of Practical Science was erected, have made it apparent that more laboratories and greater facilities for carrying on experimental work are necessary for satisfactory work. We understand that the construction of the building is to be pushed so that it may be occupied at the beginning of next session. The advantages to the science students will no doubt be equally appreciated by the students of the new Medical Faculty who are required to take the extended practical work in histology and physiology. We presume that the original uses for which the School of Science was erected will now be carried into practical effects. Science is booming in University circles just now, judging from the excitement at Victoria over Mineralogy *versus* Prof. Haanel.

Infectious Diseases Hospital for Toronto.

We congratulate the Local Board on its endeavours to get the necessary facilities for effectively dealing with infectious diseases carried into practical effect. We trust that a strong committee will be associated with the Board in order that the working out of the idea may be made as perfect as possible. If in addition to this the notification of disease and inspection of suspected houses is thoroughly carried out the control of this class ofdiseases might be considered fairly complete.

HEATING AND VENTILATION.

The Smead System of Warming, Ventilation and Dry Closets.

The *Smead system is the application of scientific principles to the warming and ventilation of buildings.

The heating is accomplished by causing the air from outdoors to pass over air warmers placed in the basement and thence by means of brick flues into the rooms to be warmed.

These air heaters are of large capacity, having from 250 to 300 square feet of radiating surface each, according to size. The amount of air turned on to each one of these air warmers is that which comes through a window of from 8 to 10 square feet in area.

The heating surface of the apparatus being very large and the amount of air let in upon it being correspondingly great, the air is simply *warmed*, not heated *hot*. By means of a device used only in the application of this system, the air as it comes into the room can be tempered to any degree desired by the simple turning of the crank.

When the pure, warm air has reached the room, what happens then? If no means had been provided for the escape of air already in the room, neither the heating nor the ventilation would be at all satisfactory. It would be like trying to pour more water into a bottle already full of water. But with the Smead system, ventilation has been provided for in the construction of the building.

The space under the floor has been made into large ducts leading into a chamber in the basement called the "foul air gathering room." Openings into these large ducts are made through iron gratings placed in the baseboard under the different windows.

Now, it can readily be seen how the heating and ventilation can take place. The pure, warm air comes in at the register and being light, at once rises to the top of the room, gradually pressing the colder and vitiated air out through the gratings in the baseboard at the bottom of the room. Really the warm air is running in at the top of the room and the cold air is running out at the bottom.

*In answer to some enquiries due to the mention made of the system in the report of the meeting of Executive Health Officers in our last number we insert the above.

A test with an air meter will show that the air is being changed entirely from five to eight times an hour.

Now, so much for the heating and ventilation. We have followed the air from the outside window, over the air warmer, through the register into the room, thence to the top of the room, thence to the bottom through the iron gratings along the ventilating ducts into the "foul air gathering room." Between this "gathering room" and the large ventilating shaft for taking the foul air out of the building, the dry closets are constructed. These closets consist of a closed duct from the gathering room to the ventilating shaft, over which and emptying into it the closet seats are constructed.

The foul air from the "gathering room" passing over the excreta dries it out thoroughly, so that when it is put in a stove or furnace it will burn like wood. When the duct is covered with iron seats, the excreta can be burned as it lies in the vault. After the air passes over the excreta it passes up the ventilating shaft which opens into the outer air eight or ten feet above the roof. A small heater is placed at the base of the ventilating shaft for use in warm weather. This system is widely used in the States and is rapidly coming into use in Canada. It is in operation in ten large school buildings in Toronto, and also in the cities of London, Ottawa and Montreal, besides a large number of smaller cities in Ontario.

In Cleveland, Ohio, it was adopted after a careful and extended examination. Dr. Smith, Chairman of the Committee of Investigation, concluded his report as follows:—

"We would recommend the introduction of the system for the following reasons:

1. On account of the perfect heating and ventilation for which it provides.

2. Because the temperature in each room is under perfect control of the teacher, and there is uniformity of temperature in all parts of the room.

3. The cost for repairs where this system is in use is absolutely nothing.

4. Because of the simplicity of the apparatus and the ease with which it is cared for.

5. Because the system of dry closets, which Dr. T. Clark Miller, President State Board of Health, describes as 'almost a new sun in the sanitary heavens,' is more satisfactory in its workings and costs less to introduce than any system of closets we could adopt, and absolutely does away with all cost for repairs. Respectfully submitted.

D. B. SMITH, M.D.,
W. H. MUNRO:,
Members of Committee."

J. F. Baldwin, M.D., editor Columbus *Medical Journal* states:

"The Smead system of heating and ventilation was placed in our new Fifth Avenue school building. This building wa only opened for pupils at the beginning of the present school session, so no test has been possible—that is, no real working tests. Soon after the work was done, however, the apparatus was fired up and tested by the Board on general principles. The system was placed in the building by a close vote of the Board. A few days ago, however, the same system was ordered for another building in process of construction by a unanimous vote. The dry closets are now in daily use in two buildings, and all are loud in their praise. I think the Board has found in these two a *ne plus ultra*."

In Detroit the Smead system has been introduced into thirteen large school buildings.

Dr. George P. Andrews, President of the Detroit Board of Health, writes to W. C. Wilkinson, Esq., Secretary of the Toronto School Board as follows:

DEAR SIR,—In reply to yours of the 7th, I enclosed to you the report of a committee, of which I was one. Our examination was exhaustive, and it gives fairly my views. We have had nothing at all comparable to it in our schools. I think the floor of the vaults should be of iron. I don't like the porous bricks, for they are too favorable as absorbents. Still if the desiccation is complete and the deposit frequently removed, and especially the details of the machinery, *i.e.*, the arrangement for a constant draught in the ventilating stack maintained, I don't see any danger to be apprehended.

Very respectfully,
GEORGE P. ANDREWS.

In Toledo, Ohio, the Smead system is in use in 22 out of 23 school buildings, and of it Dr. C. L. Van Pelt, Toledo's Health Officer, speaks as follows:—

"I have personally inspected the Smead closets, and will say that they fulfil all sanitary requirements perfectly."