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THE

SANITARY JOURNAL.

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THE DISPOSAL OF HOUSE AND CLOSET REFUSE.

By J. P. SPENCER, C.E., Newcastle. Read at the meeting of the North Eastern Sanitary Inspection Association, Carlisle: (From *Sanitary Record*).

The question of the disposal of house refuse having frequently come before the sanitary authorities of this country, and apparently without any unanimous conclusion having yet been arrived at, it may not be out of place briefly to review a subject which is not only important in itself, but appears always to bring out a free expression of opinion and a considerable variation of sentiment, whenever it is introduced.

Too often these discussions have been allowed to lapse into the controversy as to whether the water-carriage system of the disposal of sewage, the pail system, or some modified form of either of these was the best; but it must not be forgotten that in cases where the sewage has been disposed of in the best form of water-carriage operations, the ashes and other refuse remain still to be dealt with.

In this paper it is proposed to touch on the question of sewage disposal to a very small degree, and only as bearing upon those classes of dwellings where the present water-carriage system is found by experience to be scarcely suitable. The condemnation by sanitary reformers, of the old style of ashpits or middens is now universal; but it is not so many years since it was thought the best and most approved method of disposing of refuse. Unfortunately while the workers and thinkers in sanitary science are active and anxious for the public health, the Legislature is, as usual, a long way behind. All sanitary engineers, medical officers, inspectors of nuisances, medical men generally, and all thinking and intelligent members of the community condemn the system known as the privy and ashpit; yet the Statute Book requires that such shall be provided, and there it stands.

The first step in the right direction appeared to be an effort commenced about fifteen years ago, to so construct these ashpits as to cause the ashes to fall upon the most offensive contents, and to some extent absorb the gases. This, however, was not found to be practically effective, and moreover it assumed the principle that the accumulation of refuse for many days, and even weeks, was inevitable. This must be wrong, and any mode which favours the accumulation for more than two days should be discountenanced. Nightly removal would be better, and is by no means impracticable either on the score of expense, or for any other reason.

The first suggestion of the pail system appeared to come from Rochdale, where

it was at once commenced on a large scale and has since been greatly improved and developed. Here, however, the collection of refuse is in large tubs, separate from the privy pails; and this again would seem to involve a somewhat prolonged accumulation. If so, it is a mistake, as next in importance to the immediate removal of sewage comes the daily removal of refuse.

It may by this time be inferred that the object of the author is to recommend the nightly removal of house refuse, and the avoidance, at any reasonable cost, of a prolonged, or large accumulation on the premises.

Up to the present time there seems to be no better mode of accomplishing this than the pail system. This plan to be successful should be carried out in conjunction with efficient drainage; because if no proper gullies and drains be provided the temptation will arise, among the poorer classes, to throw slops into the pails. This would greatly detract from their usefulness and probably cause them to become a nuisance. Hence it is certain, that the present pail system is by no means perfect, but it must be acknowledged to be a great improvement.

The question whether or not the excreta should be allowed to go into the pail is open to doubt; if it be so, by far the best mode is to have only the pail, and to allow the excreta, the ashes, and other refuse to be all put into it.

This is the least offensive, the least costly, and probably the least unhealthy process. A large proportion of the gases are absorbed by the ashes and dry rubbish, and the latter also constitute a convenient vehicle in the form of which to convey the refuse away. As a rule this also prevents the pails from becoming very dirty, and a free sprinkling of deodorising powder is generally all that is required.

Where water-closets can be provided the nuisance liable to arise from the refuse pails should be really a minimum. Unfortunately, for the lowest class of dwellings, no suitable water-closet has yet been invented, and, failing this, the next best thing appears to be the pail system.

A great objection is sometime taken to the alleged nuisance caused by the vans conveying the pails through the streets: this applies chiefly to what is known as the separate pail system.

The ordinary ashpits are now generally cleaned out at night time, and no great nuisance, in a properly managed town, ever arises from the conveyance of the contents through the streets at night. The only nuisance is where the refuse heap has temporarily lain on the street, or where from neglect the ashpit has been allowed to remain too long a time without being cleaned out. This, on the pail system, would be abolished, and there is no valid reason, in most towns, where back lanes exist, why the contents of the pails should not be emptied into ordinary carts every night and conveyed to the depot.

Having got the refuse to the depot the next question is, what to do with it. In country towns the distance is not too great to have the depot in some suburb where it cannot be a nuisance, and there it may be allowed to remain until gradually taken for light manure by farmers.

In large towns the distance is too great and if no sale can be obtained for it, in its crude state, it should be burnt. There is now no difficulty in disposing of it in this way, as suitable destructors have been established in many towns with excellent results.

The question of cost is no doubt an important one, but the question of health is more important.

The expense evidently varies to a large extent in different districts, for instance the cost of the pail system in Bury was something like 16*s.* per pail per annum. This included cartage and every legitimate charge. It was not stated whether any special circumstances rendered the cost greater in Bury than elsewhere, but the author's experience is that in some other places the cost is not so great In the borough of Tynemouth, for instance, the cost is only 7*s.*; in Birmingham it appears to be about 15*s.*; but in judging of the relative costs, it should be borne in mind that if water-closets were at once substituted for every pail closet in a district, the refuse would still cost a great deal for disposal in the aggregate.

In speaking of the cost as above, it is only right to say that in Birmingham the pails are removed in vans and cleaned, whereas at Tynemouth they are not, and should that be done at the latter place an additional annual amount of about 4*s.* per pail would have to be added. Of course the expense must depend, to some extent, upon the distance from the depot and other local circumstances in each town, but the author estimates that an average cost of 12*s.* per pail, per annum, is sufficient to include daily removal, and cleansing of pails, so as to prevent any nuisance.

The cost of cleansing the pails is no doubt very great; but where the excreta and the ashes are all put into the same pail, and reasonable care is taken to provide drainage and keep out slops, it will be found unnecessary to remove the pails to the depots for cleansing, except at intervals, in the poorest neighbourhoods. Where cleansing becomes, after a time, necessary, the author suggests that in the case of galvanized iron pails it would be better to use heat instead of water for the purpose.

A proper drying process, which could be easily devised if a destructor furnace were on the premises, would speedily destroy any injurious attachment or incrustation. In the case of wood pails a simple sluicing with a hose would be a less effectual but still perhaps a sufficient mode of cleansing. Like everything else, the pail system requires a little tact and management in the working; and this is, it may be presumed, one of the duties for which inspectors are engaged.

The first cost of construction of the pail receptacles is very small, for where the cost of a water-closet with ashpit attached would be over 20*l.*, or the cost of a privy and covered ashpit 17*l.*, the cost of a pail closet would not exceed 10*l.*, built of brick and roofed in, and including 4*s.* for the pail. This should fall upon the owner, and he should be required from time to time to renew the pail when worn out. A pail will last, however, for many years.

Like every other reform, the pail system of disposing of house refuse has, and no doubt will still have, many difficulties surrounding it. The mere fact of the gradual favour that the 'combined' pail system is gaining over the separate system, on the question of sentiment or nuisance, is a proof that it is gaining headway. The only, though vital and important, argument in favour of the water-carriage system of sewage—viz., its immediate removal from the premises, is the same which forms an important element in the pail system of refuse removal; consequently those should carefully and impartially consider the one, who consistently advocate the other.

Above all things it is to be hoped that no difficulties or expense, either temporary or permanent, will ever induce sanitary authority to return to the unsanitary and dangerous system of fixed ashpits. No argument, and certainly no reason, can be found to justify such a course; and, whether they be constructed as privies or as ashpits only, and on some modified or even improved form, so long as the principle of them involves the accumulation and long detention of the refuse, they must be wrong. No precaution can really be taken to render them innocuous; and even if they be lined out with cement, which will crack; or sloped inside, which will leave a sharp furrow at the bottom for liquid refuse; or sunk into the ground, which will cause percolation; or kept above the ground, which will cause leakage upon the surface; they will surely remain offensive, less only in degree than the old unhealthy privy and ashpit, which has in times past slain so many thousands.

The author, therefore, ventures to recommend all concerned to avoid any kind of fixed accumulative ashpit, whether ancient, modern, or modified in type, and to insist upon such a practice as will absolutely entail a removal every second day, and enable a convenient system of removal every day, whenever considered expedient, in consequence of infectious disease or other causes. In all cases of infectious disease the pail system is most important and by far the safest.

In the water-carriage system of sewage

disposal the germs of disease are carried away through miles of pipes, having thousands of connections or inlets into houses spread over a large area. They are carried off out of sight, we know not whither, and left to be stranded we know not where—probably to propagate infection and breed disease in diverse quarters. This danger need not occur in the pail system, because the germs of disease can be secured and destroyed at once without further chance of propagation.

The following, among others, is a good way of dealing with the danger. Immediately a case of infectious disease is reported at the Health Department, let the ordinary pail be removed from the house where the patient lies, and a pail of a distinctive colour—say bright scarlet—be put in its place. Every night it could be removed, and, it being a standing rule that every scarlet coloured pail be destroyed after being once used, the contents *and pail* would be burnt at the depot, a new special pail being substituted each time of removal, and, in turn, burnt.

Thus, at a small extra cost of a few shillings per day, the probability of the spread of infection from this source would be obviated.

This method has been carried on for some time past at Nottingham, and has been found to be very beneficial as a precaution, and great credit is due to the Sanitary and Health Department there for having introduced and carried out such a good practical mode of checking the spread of infectious disease.

The important question of refuse disposal as well as of sewage disposal, is yet far from being fully developed, and is still in a transational state; hence none of us can afford to be dogmatical, and these remarks are put forward expressly for the purpose of raising discussion and eliciting useful information and not by any means with the idea of propounding a settled practice. The author, however, ventures to advance them in arrest of hasty judgment and premature condemnation of the pail system of refuse disposal; and, while he leaves, on the present occasion, the advocates of the separate system of pail closets to defend their practice, he has no hesitation in recommending the pail system for the reception and removal of house refuse, whether it be used as an ashbin only, or as a combined privy, ashes and house receptacle; and if such a mode of refuse removal cannot be approved by all, it is hoped that at least until some better method is propounded, its present merits will be recognized.

AIR AS A SANITARY AGENT.

By R. Angus Smith, LL.D., Ph.D., F.R.S., F.C.S., &c. (*Concluded.*)

The fact is certain that fevers have not been traced to the escape of gases of putrefaction when there has been a large amount of water and exposure to the air. But they have been found when the water is not very great in amount, and the decomposition is made under cover, as in sewers. The question arises—Is this owing to the concentration, or to the difference of decomposition in darkness, or to the better supply of oxygen? The effect of sunlight in warm countries does not allow us to suppose that the daylight always produces in vapors an innocent state, although it has a great effect in that direction when there is little water. With us, at least, innocence in the atmosphere seems to be rather something connected with the abundance of air in proportion to the impurity. This air, again, may act in two ways. It may act by rapid oxidation of the substances in water, or by dilution of the gases when formed; and the destruction of putrid matter in water is really very rapid when plenty of air is allowed. This air is brought to the Clyde by the water and also by the waves, both artificial and natural, exposing a great deal of surface. The air may act also merely by rapid dispersion of the gases. Still, we must not forget that these gases or vapors are not

reported to us to produce any marked type of disease over the Clyde, even when they come in a state so concentrated as to produce sickness; whereas gases from sewers, in a condition which may not produce immediate illness, may produce in time typhoid fever, as we are credibly informed. We must conclude, then, that it is not mere dispersion, but that it is a more thorough putrefaction and oxidation which takes place in the Clyde, and a more complete destruction of the organic substance by the abundance of air, than can take place in sewer water, whatever the senses may indicate to us. Of course, we must ever give some credit to the flow of air up the river, and the ever-fresh breezes that come from the Atlantic, as well as the mixture of air with water caused by steamers.

If nature had contrived no method of destroying such seeds of death, populations such as this is would never have grown up. And what is the method? That method is—first, putrefaction; at least I know of none other, except the concluding portion of the work—viz., through oxidation. When, therefore, you see the Clyde seething with gases of putrefaction, and when you smell it to such an extent that a feeling of loathing is produced, you may remember this—that the work of destruction is going on with a wonderful rapidity, and that the enemies of life are being slaughtered there, millions upon millions, never to appear again in a similar form, though other generations of them may rise up. As putrefaction seems not to take effect without the actions of organisms, I had the idea that it might be arrested by an abundant use of air, and I had some belief that the oxidation took place very rapidly after putrefaction. It was when examining this that I found it necessary to touch also upon the question of nitration in water. When nitrogenous bodies decompose with an abundance of oxygen the nitrogen becomes oxidised and nitric acid is formed. I had long suspected that the reverse also took place; and that when there was an excess of putrefactive matter, oxygen was absorbed, and even removed from the nitrate, whilst nitrogen was given off. This process I was able to verify by carrying it on in the laboratory. It was clear then, and beyond all cavil, that rivers could purify themselves in time and organic matter be thoroughly removed. It was clear that organic substances, that germs of disease, that microbes, and the smallest organisms themselves, were all subjected to this universal and unsparing attack of putrefaction and oxidation. The result, as expressed in my report of the Rivers Pollution Prevention Act, was expressed in the following terms:—

Putrefaction destroys organic matter without the influence of oxygen. It breaks up organic compounds and destroys organisms. The evidence seems to indicate that it destroys even those bodies that produce disease, but that in certain conditions it produces others. This is a point not to be enlarged upon without more knowledge, but it is evident that by putrefaction we get rid of an enormous amount of offensive matter. Oxygen cannot enter under the surfaces of actively putrefying bodies; but wherever it is allowed to enter by the putrefaction being less active an action begins which in time completes the destruction of the body. We are not therefore, to suppose that the germs of disease can resist all these efforts of Nature to destroy noxious things; nor

are we to suppose that an invisible germ of disease can pass on from stage to stage unaffected by the putrefaction of sewage and the action of air. We must believe, for the present, that it was not so. In water we see perfect purification, nitrogen itself being lost.

In ordinary putrefaction, sulphuretted hydrogen comes off in abundance, with much carbonic acid and some nitrogen. Oxygen resists this action, and if the oxygen is supplied in a concentrated condition a change takes place; nitrogen is evolved as the principal gas, and a decomposition of nitrogen compounds takes place. Nitrogenous bodies are thus destroyed—in one manner by their voluntary putrefaction, in another by oxidation. Up to a certain point, not determined, the greater the amount of nitrogenous bodies the more rapid is their decomposition.

The oxygen of the nitrate passes in part to the carbon; some will be retained, forming a carbonate. I have not estimated how much, or if all, is to be taken by the carbon.

If the solution is weak, the nitrogen takes up the oxygen, and does not allow it to pass away, thus forming nitrates.

Putrefaction and oxidation are two well-known modes of destroying organic bodies at ordinary temperatures. The second is not proved to be connected with organisms.

How far, then, can oxidation, or a great supply of air, be employed to destroy putrefaction, or to purify?

The bearing it has on the analysis of water will be clearly seen by chemists. The bearing on the sewage question is also interesting. Substances and living things may be carried by the rapid sewage system into the range of a new activity before undergoing that putrefaction which breaks them up in proximity to us or in the sewers themselves. It seems to point to a plan of causing the destruction of organisms by putrefaction and subsequent oxidation or by chemical action. At least, it seems to me that we require to learn if it be true that any of the germs of disease, or which germs of disease, will live in an abundance of good air. We know that abundant dilution will render them all ineffective. It is probable that there will be a difference amongst them in this respect, whilst all will yield to the double action of—first, putrefaction, and then oxidation.

Certainly at least this is one of the conditions, and now we may ask what is the character of these changes evolved in the word decomposition? I have said the bodies arising from the decomposition may be very numerous; if so, the modes of decomposition must be very numerous, and the term used, viz., putrefaction, cannot represent only one chemical change. There is one stage of it, however, which seems to be more efficient in breaking up the compounds than any other, and this takes place when the sewage has a certain amount of air allowed to it. How much is not very clear, but there is evidently a limit. Within that limit thorough putrefaction begins, organic substances rapidly disappear, and gases in great abundance come from them. Carbon and hydrogen, sulphur and nitrogen, each in its own way, either in combination, as the carbon, for example, always is, or as bodies perfectly free. It is this grand breaking up fœtid organic matter which nature has contrived in order to produce purification, otherwise this city (Glasgow) would be sending down its river such loads of impurity as even that willing stream would scarcely be able to bear. I wish, therefore, to bring forward now more emphatically the doctrine that putrefaction in a certain stage is one of the greatest of purifiers, and perhaps the most complete that nature has devised. It has often been asked what will become of those many poisonous emanations which arise from the human body even in health, and from those still more dangerous substances which are generated within it during many of these multifarious diseases to which man is subjected. The germ theory of disease has caused alarm in many directions, and it has been imagined that some little germ of disease passing into a sewer or pure river might carry with it power to infect other organisms to such an extent that there was reason to fear for the lives of all inhabitants on its banks. This extreme appli

cation of a theory might not be unreasonable were it not that we knew from results that no such power exists in any of those germs known to us.

Let us consider the number of polluted liquids which pass from the houses and hospitals from such a city as Glasgow, and the fact that so many of its inhabitants go down to the banks of the Firth, towards which the waters of the Clyde flow, and receive their health and strength themselves and their families, and we shall see how absurd the ideas have been concerning the power of individual germs, or even multitudes of germs, in such situations.

From the sewage of a room, as we may call these impurities, we may readily pass on to a subject which has always been important in the eyes of those who have any appreciation of the importance of the attention to public health. It is a subject which impresses upon the attention of every town, and it is one which for many years caused the inhabitants of Glasgow to think seriously, viz., the treatment of sewage. It has happened that some of my latest work, as indeed some of my earliest, has been upon sewage.

It is remarkable how rapidly sewage enters into putrefaction, and to know the results of this putrefaction has been a considerable difficulty. The gases from sewers have been found guilty of producing a peculiar form of fever, very well known to medical men, in some of its stages, and apparently so definite that it may be considered as ranking with one of the chemical tests in its strictness. The gases which come from it are the results of the decomposition of organic matter, and the number of compounds into which the material of animals may be broken up is so varied that at present it may be said to be entirely beyond our ken. These compounds vary in character to such a degree that they may form the most innocent gases, the most wholesome food, or the most virulent poisons, venomous substances that destroy entirely vital functions of the human body in a scarcely appreciable time. Some of these obnoxious bodies arise from the decomposition of sewage, and, as already said, seemed to be formed at some particular proportion of the supply of air.

It is easy to see that it is a mistake to suppose that by sending putrefying liquids down to the lands we are giving these lands all the sustenance which the sewage originally contained. If we wish to use them as sewage it is better to use them before putrefaction, the loss by putrefaction being great. I suppose we can scarcely doubt that putrefaction takes place more rapidly when the organic matters are diluted to a very considerable extent with water. Having made many experiments in order to learn the condition of the air found lying over somewhat solid putrid substances compared with the same substances very diluted with water, it was found that the greatest amount of ammonia and the most offensive odors were from the more solid. This is quite in accordance with the explanation given of the more complete disruption of the organic matter in water, and it was these experiments that led me first to think of driving the air through sewage matter in order to produce oxidation, expecting readily to form nitrates, and in the belief also that excess of air would be offensive to the microzymes, although a small amount seemed necessary for their activity.

The most complete experiments on aeration which I was able to perform were done by the apparatus of Dr. Storer and Mr. Cranston. The Messrs. Storer were good enough to put at my service two of their revolving screws, which are used to agitate the water, to draw down air into the centre, and to send it out at the circumference of the vessel. For this purpose they put also up in my laboratory a gas engine, to drive these screws, and I was thus provided with very efficient apparatus, for which I cannot sufficiently thank them. The result of the aeration of sewage, and of other liquids, containing organic matter to a similar extent, was, that in all cases putrefaction was delayed by aeration. The dissolved oxygen also recovers itself in the aerated specimens better than in the non-aerated. This shows that aeration not only prevented putrefaction, but prevented also the chemical action consequent upon it. It had, in fact, to a large extent, and for a considerable time, rendered the organic matter inert, or nearly so.

* * * * * *

If the oxygen is found to diminish the activity of those minute moving particles which form or produce a disease called chicken cholera, as Pasteur has shown, and if oxygen also puts an end to the decomposition in sewage in a manner rapid and decided, so that decomposition will not begin again for some two or three weeks, according to the weather, we may ask how far it may be used directly in the destruction or weakening of microbes in other situations. When Dr. Koch found bacilli peculiar to consumptive patients, and existing in their lungs, it was natural for me to ask him whether some excess of oxygen might not prevent their growth, as I found a similar result in sewage. However, it was a question more easily put than answered, and I suppose we must leave it. We get, here, into a number of difficulties which can only be solved by careful observation, and I do not know yet how far we are to understand what is the tenacity of life of various forms of microbes in various gases. It is clear that experiments relating to the existence of life in particular gases are not sufficient for us, because, as Pasteur shows, although they may live, they have in certain conditions, if not entirely, lost their power of giving disease, or, as he says, become attenuated. Here we have a large field before us, and it is to the attenuation or destruction of these forms of life that microscopists and physiologists must now attend. In the long discussions, and somewhat bitter ones, that have taken place regarding vaccination, I do not know that any one has attempted to act upon the agents in a manner suggested in the case of chicken cholera. I am not a medical man, and must speak of these things only as a chemist; but it seemed to me natural to think that if some modification of the matter of small-pox could be obtained by oxidation, another step would be to attain that modification in a still greater form upon the bodies of the patients. As we have seen that oxygen is the great purifier in the regions of the air over the great oceans and in them, and is working even in the soil in our towns, and in our homes amongst our furniture, and upon ourselves within and without, and that it so rapidly removes that disagreeable matter of our town sewage, let it be compelled to purify even disease itself when it has attacked the human body. This is only an extension of the great idea of sanitarians that pure air is wanted all around us, and that by pure air we can obtain one of the first steps to health, although there are cases where this idea must be modified.

It is interesting to consider the cause and production of zymotic diseases according to the various views which mankind have had. The angel of death has always been sure in his work, but his work has been unseen unless the darts of Apollo, which caused the plague in the Grecian army, were the well seen beams of the sun acting on masses ready to decay. Now the agent is believed to be armies of numberless living particles, one may almost say, totally invisible to the naked eye, and known to a few only who use the microscope. Whence do these armies come, and how are they fed? If they are formed readily out of the substance of the person whom they attack they do as other armies do—feed upon the plunder taken from the enemy. But if so why do they ever cease as long as food for them remains? There surely must be some limit to their capacity of growth, otherwise destruction to the attacked would always follow. I do not know if I have read sufficiently on this point to know the general opinions, if indeed there are any; it may be that there is formed within men and other animals a certain amount of material from which bacilli may feed even in healthy bodies. It may be that this material may be more in some persons than others, and it is just possible that this may be removed by certain agents, one of them being the oxygen or pure air which I wish you to think, and by the various exercises and changes of place which enables the oxygen to be more active within us.

Still there are other things to be thought of, and surely these little bacilli which have been mentioned are under some other command, and they themselves may have a General whom they learn to obey. If the growth depends merely on the

food supply, then we are brought to chemical agency affecting their increase or decrease, and this agency in a limited sphere, but their lives may be regulated by other movements, some on the earth and some in the stars. The sun's direct rays must affect them as it does all things around us, and its indirect action, when it sends out magnetic currents that bring the earth in constant and varying sympathy, may also influence the lives of the minutest creatures, as they no doubt influence the still less observable chemical action.

There was once a considerable discussion as to the part played by organic life in fermentation and putrefaction; and Liebig took up the chemical idea and objected to the belief that microzymes were necessary for chemical work. He lost, apparently, the day; but under the life of the microzyme chemistry and physics are at work, and how they manage to produce the result is still a problem to us. We must not suppose that when chemical action is not violent, as it sometimes is, that it is entirely absent. If we take a liquid containing a strong solution of crystalisable salt, and add a minute crystal to it, how readily the whole mass takes the form of this crystal; and yet how weak, apparently, is the first, and how slight the connection between the two, whether chemical or physical, or both. This leads us to think that the various powers of creation are by no means inert in the production and the continuance of disease; and the lower we go in the scale of animal life the more likely we are to meet with causes acting in a manner different from those of higher organisms, and more allied to those of the inanimate world.

ELECTRIC LIGHTING & VEGETATION.

When the question of electric lighting as a substitute for gas first attracted public attention some years ago, much interest was manifested in the probable effects of it on vegetation. It was considered feasible by many scientists and practical men, that it might be used to force plant growth, and bring into the market at early periods of the season, delicacies of fruit and vegetables, which are at present forced under glass at considerable expense. The idea was that the lamps might be arranged to shed a sufficiently powerful light over a grape house, or forcing bed for early vegetables, to keep up the growth both day and night. And many market gardeners hailed the proposal with satisfaction, as they looked forward to being able to use it in the spring when fruit trees were in bloom, for the purposes of setting the buds. In the Old Country particularly, it is found that fruit trees on walls frequently fail entirely, from the effects of one night's frost, and the suggestions put forth were, that by means of the electric light, the fruit buds would have enough strength to set, and thereby overcome the effects of the frost. We can remember seeing this theory advocated in some of the leading daily journals in this country.

The drawback to this general use of the light has been its great cost, and no experiments have yet been made on a scale large enough to call it a commercial test.

The light has been used on several occasions for bringing on fruit, and it is on record that grapes have been forced and ripened under this light in a dull and sunless season; so far the results were satisfactory, but the fruit in some cases was found to lack the lustre and luscious flavor it possesses when ripened by the sun, this being due probably to the want of the heat, or red rays which are the warm portion of the sun's light.

Electric lighting has made considerable advances in the last two or three years, and there are reasonable hopes that it will yet be reduced in price so as to become an universal and household light. We see it employed in street light-

ing and for public buildings in many of our large cities, and the use of it is spreading. The city of Winnipeg adopted it last winter. The first Company failed and a second commenced to light the streets during the early part of the summer. In July, a light was displayed at the corner of a street where there were some shade trees, the lamp was so placed that the arm supporting it threw a dark shadow along the trees on one street, and left those on the other under the full influence of the light. Being summer time, there was not a very good opportunity for observing the effects of the light, still the writer made some notes, which are not of much use, as the marked branches were unfortunately cut off, accidentally, before observations had been made three weeks. It is not easy to say what were the definite advantages gained during the two months the writer watched the trees; the foliage of those in the shade did not appear so strong as in those which were exposed, and to the eye, (no measurements being taken) some of the uppermost twigs of the favored trees appeared to have grown considerably, whilst the foliage seemed a little more luxuriant.

We bring these notes before our readers, that they may be induced to make observations on trees similarly placed. The most important and interesting result to be obtained is, how far will the growth of the early spring months be forced while frost is still in the air, and how will this affect the growth of the tree, its foliage, and health?

For this purpose every one can become an observer, and the points to which they should direct their attention, are, to take notes of the growth of twigs, or branches, from this time forward; to observe the formation of buds, the period of leafing; the effect of the early spring on the bark of the trees; the appearance of the trees during the period of foliage, and their appearance in the fall; how and when they shed their leaves. Observations should be made on the same tree, on the exposed and unexposed side, and comparisons drawn to trees in the neighborhood, more or less directly under the influence of the light. Maple trees being compared with Chesnuts, and so on.

We will gladly publish the results of any observations sent to us, and our columns will always be open to any communications bearing on this very interesting subject.

INTERNATIONAL HYGIENE.

It is well known that most disastrous consequences to life and general prosperity have frequently resulted from the spread of epidemic diseases from one country to another. The subject of international hygiene has, therefore, long engaged the attention of the people of various countries, and several important conferences have been held of representatives from different countries, for the purpose of deciding upon certain sanitary regulations, which, if adopted, would be mutually advantageous to all concerned. The most important conference in this behalf was held in Paris in 1850-'52, the work of which extended over a period of eighteen months. Twelve powers were represented, and eventually five agreed to carry out certain international sanitary regulations. More recently, conferences were held at Constantinople and Vienna, at which, however, it appears but little was accomplished beyond very interesting studies. The most recent conference, and that in which the largest number of powers were represented, was held at Washington, (U. S.) in the early part of the year 1881. Twenty-one governments sent representatives to this; Canada being represented by Dr. J. C. Taché, Deputy Minister of Agriculture.

As it is most desirable that in every country all matters relating to the causes and spread of disease should be delegated to one central authority, so it might be well if there could be but one absolutely impartial, common sanitary authority for all countries. But to suppose that any such

organization could be formed and be of practical use would be rather utopian.

The greatest difficulty, perhaps, to contend with in the adoption of international sanitary regulations, is that of the too often conflicting interests of "trade" and "commerce." Mr. Evarts, as Secretary of State, at the opening of the Washington conference, said, "nations, in regarding these matters, must understand that there is a great continuing interest of intercourse and commerce which must not be lightly disturbed, and should be no more disparaged and no more interrupted than a reasonably solicitous attention to the preservation of public health should require." This ought not to be the feeling; but the interests of trade and commerce are all-powerful, and, as the majority rule, the public health must be a secondary consideration. As with individuals, so with nations, the accumulation of wealth is, practically, regarded as of more consequence than health.

Another difficulty, and one which became prominent at the Washington conference, was the great extent of territory of some countries as compared with others, the sparser population, and the consequent difficulties in obtaining regular and accurate statements or statistics relating to the condition of the public health. While the difficulties relating to "trade" might, with the consent of the people, be overcome, those relating to extent of territory and scattered population might be absolutely insurmountable. In regard to the latter difficulty, at the Washington conference, Canada was at a disadvantage, but her interests were carefully guarded by her representative there.

Again, some countries have sanitary organizations within themselves so much superior to what other countries have that a difficulty comes up here. A fair degree of reciprocity between them all cannot be at all easily obtained.

The whole subject of international hygiene may be considered under three heads: first, its nature and objects, and the obligations as relating to all countries considered as a compact; second, as it relates to each country *in itself; third*, as it relates to foreign countries, on the territory of each party to the compact.

First, then, as to the nature and objects of international sanitary regulations, and the obligations as relating to all the countries in the compact.

Though international hygiene involves very wide-spread interests, it only comprises, after all, a comparatively small portion of the subject of public health, having relation only to those diseases which are communicable. It is not directly concerned with drainage, sewerage, water supply, &c., though indirectly and to a limited extent it has a bearing upon these, as it has, and more directly, upon the food supply. It is almost wholly limited to infectious diseases—to all that relates to those agencies, whatever they are—seeds, germs, contagiums, which may be carried about from one country to another in merchandise of various sorts, wearing apparel and by persons. Cholera and yellow fever being so rapidly destructive of life, are the diseases which have engaged the principal attention of conventions. The latter seems hardly to concern Canada, no cases of it having ever yet been known so far north, with the exception of a few cases brought by shipping; though it seems quite possible that the contagium of it might at times be imported and develop the disease during the hot season. Small-pox and typhus come next in im-

portance, while scarlet fever, diphtheria and even measles, may be conveyed long distances from one country to another. Some diseases of animals, as farcy and glanders in horses, for example, are communicable to man, and may be also so conveyed and in like manner.

The object of international sanitary regulations, then, is that every nation concerned or contracting shall use every means practicable and possible in order to prevent the development and extension, and the introduction, or conveyance from any one of the countries to another, of any such disease To use such preventive means is an obligation which one country owes to another, just as one family in a community is under obligations to use every means possible to prevent the conveyance to another family of any infectious disease with which it may be afflicted: As Dr. Cabell, chairman of the National (U. S.) Board of Health, said at the Washington Convention, "it would, indeed, be a most desirable consummation if each civilized nation would assume the responsibility of preventing the transmission of its epidemics into other countries, since the end could be accomplished more certainly and with less obstruction to commerce by such means than by throwing upon other nations the burden of adopting costly methods of excluding such epidemics."

As before observed, the great superiority of the internal or domestic sanitary regulations in some countries, as compared with those of others, makes fair reciprocity almost impossible. Until a change is brought about in these last referred to, equal, mutual benefit could not be obtained. Hence difficulties and hesitations on the part of nations.

In reference to this question of mutual benefit and reciprocity, the delegate from Spain, Dr. Cervera, at the Washington Convention, observed, "if we give to a nation the authority to visit our ships as they leave our ports, and if they give to us the same right, at first sight it looks like a perfect reciprocity, but it is only apparent. In Spain, for instance, we have a perfect sanitary organization. What reciprocity can exist between two countries where the one has a perfect sanitary organization and the other has none at all, or an imperfect one? A bill of health delivered by a physician who is at the head of the Board of Health of a port, deserves, of course, more consideration than another bill of health delivered by a person who is not a physician." This naturally leads to the

Second part of our subject, international sanitary regulations, as they relate to each country in itself.

There are means by which the development, outbreak and spread of infectious diseases may be more humanely and effectually prevented than can be accomplished by the most perfect foreign inspection of ships, or the most rigid quarantines. These are more perfect internal or national sanitary organizations, and the adoption and practical carrying out in every country of efficient domestic sanitary measures, such as have proved in some countries to be eminently successful and satisfactory---more perfect systems of drainage in cities and towns, and more complete methods for the removal of all waste organic matters therefrom, with abundant supplies of pure water, and systematic regulations for the immediate suppression and stamping out of chance outbreaks of epidemics. Much has already been accomplished by internal sanitary work in mittigating the ravages of cholera.

It is universally believed, however, that the carrying out of some international sani-

tary regulations would be very advantageous to all concerned in the compact. Hitherto the chief reliance for preventing the spread into other countries of any infectious disease, has been the time-honored protection of quarantines. But for some time there has been a growing conviction that too little attention is paid to the condition of vessels, their passengers, crew and cargo, at the port of departure, and that vessels have been allowed to go to sea in a condition greatly favoring the development of infectious disease, and increasing the difficulties and delays of quarantine restrictions at the port of destination. This brings us to the

Third division of the subject of international hygiene, namely, as the regulations relate to foreign countries, on the territory of each party to the compact.

It has been properly urged that there should be a system of inspection of ships and their contents at ports of departure, through the agency of foreign inspectors. Doubtless such a system of inspection, whether made by medical officers of local health boards, or by medical officers employed by consuls of foreign countries, would be of great value, and would greatly lessen the difficulties of quarantines; but not to the extent of dispensing with them. There are many ports and places of departure of vessels which have neither a consular officer of a foreign power, nor local board of health to which such inspection could be entrusted; while at large sea-ports like Liverpool and New York, it would be a matter of great difficulty to make a thorough inspection of all outgoing vessels. The chief reliance, therefore, must be placed upon quarantines. It has been said that "quarantine may be likened to a net which catches all vessels entering a port; whereas foreign inspection, if relied on, might prove a delusion and a snare." It should certainly be required that all out-going vessels be properly cleansed, and suspected ones thoroughly fumigated and disinfected before being loaded.

It has been further proposed to establish in each country an international system of *mutual notification*, as to the actual sanitary condition of the country and the prevalence of infectious diseases This was a leading subject of discussion at the Washington convention.

At this convention, Dr. Taché submitted two fundamental propositions concerning the measures above alluded to, which were adopted; they are as follows:—

Resolved, That this committee recommends to the International Sanitary Conference that it be admitted as an international principle of sanitation that it is highly desirable to adopt an internal system of notification concerning sanitary matters and the appearance and disappearance of contagious or infectious diseases.

Resolved, That it is the opinion of this committee that it would be highly advantageous to permit certain sanitary inspections to be made by foreign agents in ports of various nations, subject to such rules as are necessary for the safeguard of each country's sovereignty and of each country's commercial interests, and that the said opinion be expressed in the report of this committee to the Conference.

It is to be hoped the time is not far distant when a general system of international sanitary regulations may be agreed to and carried out by all civilized nations. The conveying of infection from one country to another by railways as well as by means of ships, demands consideration. This is a point which we purpose taking up at another time.

THE CAUSE OF TYPHOID FEVER.

More than seven years ago a physician and writer of high standing wrote to a leading London medical journal on the cause of typhoid fever. "How long," he wrote, "will etiologists continue to resist the conclusion that the infective agent of typhoid is derived from a specific mildew, occuring on fæcal matter." It seems as plain as can be that the contagium of typhoid, whatever it is, is most intimately associated with fæcal matter. Scientific research proves that the contagium itself is a very low form of vegetable growth—a sort of mould, or that it is most intimately or inseparately connected with such a plant.

As the above named writer observes, "nothing is clearer than that most of these low terrestrial organisms will not only sustain themselves when they are accidentally immersed in fluids containing nitrogenous matter, but will multiply rapidly under the abnormal conditions."

The vegetation found over and over again in the intestines and other parts of the body of those who had died from typhoid fever, is the water condition of the plant, and by cultivation on the free surface of a suitable soil it reverts to its original or mildew form. "It is, then, a warrantable scientific inference that the vegetation in the typhoid tissues is a casual and degenerate stage of its existence, and that its true, or highest or original form, is that of a mildew growing on a free substrate.

"Other animal and vegetable matters may occasionally be overrun by this specific mildew of typhoid, and may thus cause the surrounding atmosphere to be charged with particles of the mildew. The toxical properties of these particles may be modified by the qualities of the substrate; but it is probable they will, if imbibed, cause some one or more of the typical symptoms and lesions of typhoid. Hence, possibly, febriculæ, and bastard or obscure forms of typhoid. The one great substrate, however, which has supplied the typhoid mildew in all ages and in all countries is fæcal matter. By this hypothesis every phenomen which has been observed in every epidemic, and in all isolated cases of the disease, may be clearly interpreted. For instance, the celebrated Munich problem, which has exercised Professor von Pettenkofer for so many years, admits of the readiest solution by this mildew on fæcal matter. Granted that the rise and fall of the ground-water governs the Munich epidemics, and that typhoid rages most when the water is lowest, as the water falls in the privy-shafts, the excrement surface for the mildew increases, and, as a consequence, the air is poisoned to a greater extent. When the water rises, the substrate adhering to the sides of the excavations is covered, and the mildew swamped."

It appears evident, moreover, that in the water phase of this plant, it will develop and multiply in milk. Hence the origin of epidemics of typhoid through the milk supply.

With the view of obtaining information bearing upon the origin of typhoid fever, the editor of this Journal sent out some months ago to a large number of medical practitioners throughout the Dominion, the following questions:

1. In your experience, or so far as you have observed or recollect, in cases of well-marked typhoid fever, have you nearly always, most commonly, or only rarely, been able to trace its source as from another case of typhoid?

2. In other cases, have you, in a large proportion or in a small proportion, observed that the origin seemed to, or may have been associated with excreta, especially human excreta, as in privy vaults?

3. Has this medium of communication usually seemed to have been the air or the water?

A large number, it was satisfactory to find, replied to these questions. To the first question, that concerning the source of the disease being another case of typhoid, about 60 per cent. answered, "only rarely." Only rarely were they able to trace its source as from another case of the disease direct. About 15 per cent. wrote "commonly." The remaining 25 per cent were nearly equally divided, between such replies as "very frequently," "commonly," "about one-half," So that considerably more than one half had "only rarely" been able to trace their cases of typhoid fever to other cases of it. Most of their cases had probably had some other origin.

To the second question, relating to the connection of the disease with fæcal matter, nearly 60 per cent. answered, a "large proportion;" 12 per cent. answered, "commonly" or "frequently;" about 20 per cent. wrote, "small proportion," and the few remaining wrote, "rarely."

To the third question, was the medium of communication—the carrier of the poison, air or water, 82 per cent. believed the medium to be usually water, the remainder—18 per cent. thought it usually air.

So that the medical evidence in this enquiry was very largely to the effect that cases of typhoid are only rarely caused by contagion coming direct from another case of typhoid, but frequently from excremental matter, and through or by means of water contamination.

But this plant—this Bacillus, as it is called—from a Latin word signifying a small stick or staff—is only one factor in the causation of typhoid, and there is doubtless one other factor at least. Why is it that when two persons have been equally exposed to the infection—to the germs of the vegetation—the disease is developed in one and the other escapes it? Its germs, or rather the spores of the plant (it is a sporing plant, and all such multiply very rapidly by means of the spores), take root, so to speak, develop, multiply and give rise to typhoid fever in the one case and not in the other. Dr. Alfred Carpenter has put forth the hypotheis, that in all zymotic diseases, such as typhoid fever, there are three factors: one, the specific contagium—the essential germ; another, the meteorological condition of the atmosphere; and a third, an excess of used up or waste matters in the fluids of the body This last factor arises from the waste matters having been but imperfectly removed from the body by the excretory organs,—the skin, kidneys, liver. He doubts if the contagion of disease would have any effect upon the body if the recipient of the contagion were perfectly healthy—if there were no impurities, no excremental matter, in the fluids of the body. We are fully in accord with this view. This would explain, too, why it is that the plant ceases to grow and multiply in the body after a certain period of time in cases of recovery from the disease. We know, furthermore, that individuals often have better health after an attack of fever than they had had previous to the attack. Have the parasites removed from the body some foul substance which ought not to have been there? Possibly. We might, on this view, almost regard these fever plants as friendly scavengers.

However this may be, without the specific contagium—the typhoid plant—there would be no typhoid fever. The waste, foul matters in the blood can be much more safely got rid of or avoided—as by attention to the laws of health, individually—to the diet, exercise, the condition of skin—than by inviting the services of bacilli of any sort. To get rid of the filth, upon which the bacilli feed and grow and multiply, is, without doubt, to get rid of, or to prevent, the fever.

CAUSES OF INTEMPERANCE IN THE USE OF ALCOHOLIC SPIRITS.

If those who work so earnestly, and for the most part, doubtless, sincerely, in the cause of temperance, who appear to think the sole cause of the intemperance they seek to suppress lies in the beverages which consist largely of alcohol, and who therefore advocate "prohibition," would look further for other causes of the excessive use of such beverages, and endeavour to strike a blow at them, they would unquestionably accomplish more in the direction they aim at, the suppression of intemperance. We do not believe it possible that prohibition ever can be carred out at all successfully. There are, and always wil be, many who believe there is great good in alcohol if used in great moderation, notwithstanding all that can be said to the contrary. There are, too, and will be so long as the present domestic habits of the lower classes prevail, many whose desire for such a stimulant is altogether too strong for them to resist, who will make it in secret, in defiance of all laws, if they cannot get it in any other way, or who will resort to other and worse stimulants. These, we maintain, will make successful prohibition an impossibility. Let temperance workers commence to strike death blows at two other important, fruitful causes of this intemperance: these, tobacco and unhealthy, depressing homes.

All, it appears, who have given the subject much attention, are convinced that smoking, especially amongst the young, creates a desire for stimulants, and that many have become addicted to the use of alcoholic drinks through the depressing effects of tobacco. There are a few, and the writer is convinced, after twenty years of mature observation, that there are only a few—those of vigorous constitutions—who find a real solace in tobacco, who do not *seem* to receive any injury from it, who live on to old age in spite of its use. The majority who use it know at least that it injures them, yet they persist in using it almost from sheer habit, as children persist in chewing gum or in sucking their thumb. Though tobacco involves strong interests—of growth, manufacture, trade, they are not so strong as those associated with the manufacture and sale of alcoholic liquors. Little can be truly said in favor of tobacco as being of any use whatever to man. It is a rank, vile poison, most repulsive to the human constituton, as the early experience of almost every one who has used it can verify. Prohibition might be carried in regard to it. And if its use were entirely dispensed with, we believe intemperance in the use of alcoholic drinks would soon be largely reduced through this alone.

Unhealthy homes—those associated with foul unventilated rooms and bad cookery—drive thousands to the bar-room. A good deal has already appeared in this JOURNAL on this subject. Temperance-men and others might do much—very much, to promote the cause of temperance by assisting in enlightening the poorer classes in the ways of making their homes healthy and attractive,—by teaching wives and mothers how to help in this, and how to cook plain foods well. What is more saddening than to think of the many of our fellow creatures, honest industrious ones withall, who live out their life breathing over and over again the same foul air in small, close, unventilated rooms and shops, eating only most improperly prepared food, and finding solace chiefly in tobacco and alcoholic stimulants? Who is to enlighten them and help them? A few of the more intelligent ones of the class understand something about these things, but only a few.

In conclusion, we may refer to a letter written some time ago, by a "workingman," to the London *Christian Register*, as evinence of the truth of the above: In a leather factory in which he had worked

With about a hundred others in one room, there was no ventilation and no way of securing fresh air. When he left his work at night he felt so faint and lifeless that he longed for a stimulant. Many of the men went at once to the nearest saloon when the day's work was ended. The men (he pointed out) thought it hard work that made them feel so tired, but in reality it was the breathing and re-breathing, hour after hour, air which had been deprived of its oxygen and was loaded with poison. Ill-health was general among the workmen, and it was not strange that the liquor shops in the town were well supported. The recent factory act will doubtless greatly modify evils of this sort as regards factories in Canada.

DEWIT TALMAGE ON PHYSICIANS.

In one of his sermons the Rev. DeWit Talmage spoke as follows: Encourage all physicians. You thank him when he brings you up out of an awful crisis of disease; but do you thank him for treating the incipient stages of disease so skillfully that you do not sink as far down as an awful crisis? There is much cheap and heartless wit about the physisian, but get sick and how quickly you send for him. Some say doctors are of more harm than good, and there is a book written, entitled, "Every Man His Own Doctor." That author ought to write one more book entitle it, "Every Man His Own Undertaker." Do you think physicians are hard hearted because they see so much pain? Ah, no! The most eminent surgeon of the last generation in New York came into the clinical department of the New York Medical College when there was a severe operation to be performed upon a little child. The great surgeon said to the students gathered around: "Gentlemen there are surgeons here who can do this just as well as I can. You will excuse me, therefore, if I retire. I cannot endure the sight of suffering as well as I once could." There are so many, trials, so many interruptions, so many exhaustions in a physician's life, that I rejoice he gets so many encouragements. Before him open all circles of society. He is welcomed in cot and mansion. Children shout when they see his gig coming, and old men, recognizing his step, look up and say, "Doctor, is that you?" He stands between our families and the grave, fighting back the disorders that troop up from their encampments by the cold river. No one ever hears such hearty thanks as the doctor. Under God he makes the blind see, the deaf hear, the lame walk. The path of such is strewed with the benedictions of those whom they have befriended. Perhaps there was in our house an evil hour of foreboding. We thought that all hope was gone. The doctor came four times that day. The children put aside their toys. We walked on tip-toe and whispered, and at every sound said, "hush!" How loud the clock ticked, and, with all our care, the banister creaked. The doctor stayed all night and concentrated all his skill. At last the restlessness of the sufferer subsided into a sweet, calm slumber, and the doctor looked around to us and whispered: "The crisis is passed." When propped up in pillows the sick one sat in the easy chair, and through the lattice the soft south wind tried hard to blow a rose-leaf into the faded cheek; and we were all glad, and each of the children brought a violet or clover top from the lawn to the lap of the convalescent, and little Bertha stood on a high chair with the brush smoothing her mother's hair, and it was decided that the restored one might soon ride out for a mile or two, our house was

bright again. And, as we helped our medical adviser into the gig, we saw not that the step was broken or his horse sprung in the knees. For the first time in our life we realized what doctors are worth. In some of our minds among the tenderest of all memories is that of the old family physician.

SOUP.

At this season of the year particularly, soup is always in order. When well made it is nutritious, and easily assimilated by the nutrient organs. *The Caterer*, London, gives the following on making soup: "There is a remarkable difference of opinion as to the quantity of cold water to be added to beef and beef-bone in order to make broth or *bouillon*. A pound of water is exactly a pint; whereas some authorities (Liebig, Dubois, and Bernard the latest) declare that a good broth requires equal quantities of solid and liquid—a pound of the one to a pint of the other—the most recent authority of all, and a very great one, too (Jules Gouffé), recommends in one recipe 2¾ pints, in another 3½, and in a third no less than 4 pints or pounds of water to the pound of beef. Here is an immense range; and between these extremes there is endless variety of opinion. The difference is incalculable between a broth made by adding a pint of water and one made by adding four pints, to every pound of beef. And observe that the difference goes further than the simple broth or *bouillon*: it affects the character of the double or consumed broth which ensues. * * *

A good deal must be left to the judgment of the cook, who has to take into account the result which he or she desires to obtain. A middle rule was laid down by the French chemist, Parmentier, in the last century: let the water be double the meat—a quart for every pound. This is the ordinary practice of French kitchens. If the *bouillon* is wanted very light, re double the water; if strong, reduce it.

* * * *

"The secret of making soup is to begin with cold water, to bring it slowly to the boiling point, a mere ripple on the surface, to let it simmer gently and continuously for hours—never boiling up and never ceasing to simmer. On these three points—the gradual production of the heat, the moderation of the boiling, and keeping it up to the end—the flavor and the clarification of the broth largely depend; and it is easy to manage this in an earthen vessel. But it is just as possible with an iron or copper stock-pot.

"Soup should never be greasy. Every particle of fat should be removed. It is tedious to do so, however, by the ordinary process of skimming; and so we are sometimes advised to make the broth beforehand, and to make a supply for two days. When the broth cools the fat will cake on the surface, and may then be easily removed. The advice is good up to a certain point. It saves labor to make a good supply of broth at a time; it loses nothing in two days, even in hot weather, if kept in clean, fresh vessels. But there is a simple mechanical contrivan - to get rid of grease, which ought for ever henceforth to render the little eyes which appear on the surface of soup an impossibility. All the fat rises to the top of the stock-pot; if there is a tap at the bottom of it, the broth will flow out without a particle of grease.

"Common sense will tell the cook to beware of salt. It is well to put it into the stock-pot from the beginning, because it helps to make the scum rise; but what is barely enough for a full stock-pot may be a great deal too much when the liquid boils down to half. The liquid flies off in steam, but the salt remains."

In making vegetable soups, a tablespoonful or two of beef peptonoids, of Reed and Carnick, New York, obtainable of most druggists, added to each pint or more of the soup, improves it surprisingly, gives it a "body" and makes it very much more nutritious. We advise the readers of this journal to try it.

Matters Recent and Current.

A MERRY CHRISTMAS AND A HAPPY NEW YEAR, we wish for each and every one of our Subscribers; and sincerely hope that nothing will prevent the fulfilment of the wish, and that they and the Journal may all meet again next December, the better for having lived another year.

WHY WILL NOT each one of our Subscribers induce some one who is not a Subscriber to become so, and so spread sanitary information and help us to improve the Journal? If each one wills to do so, it could easily be done. To each one individually we say, please will to do so before the New Year.

THE DON MARSH, TORONTO.—The condition of this waste piece of earth and water is receiving deserved attention at the present time. Such a marsh in the immediate neighborhood of a city should not be allowed in any case, and of course this one is not improved by the filth flowing constantly into it, What is to be done with it? In this age when trains of cars run through mountains and the waves of the sea can be stilled—with oil, why could not a portion of the Scarboro heights be "run down" over the Don marsh and form good, solid building sites? What Engineer will look into this?

NO GERMS IN THE MOUNTAINS.—Among the mountains, (*Med. Times and Gaz.*) we are told by Freudenreich, there are no germs; on Lake Thun there is scarcely one to each litre of air; in a room in Thun Town, sixty in the same amount of air. Contrast these figures with Miguel's results, viz., at Montsouris observatory 760 germs per litre of air, and in the Rue de Rivoli 5500. The reason for this strange difference is doubtless that up in the mountains the germs are starved, whereas in a town street they increase and multiply up to the food limit—the Malthusian theory being, no doubt, true of germs, if of nothing else. Expose a carcase on the top of the Schilthorn, and see if the air around it will not soon teem with germs, flocking down on it like vultures out of the blue. The converse of the experiment—the removal of all food out of the way of germs—is what sanitarians are constantly attempting at lower levels, with, as yet, but moderate success.

ORGANISM OF CROUPOUS PNEUMONIA.—Some observations upon the micrococcus of croupous pneumonia *Medical Times and Gazette*, Dec. 1, have lately been presented to the Physiological Society of Berlin by Mr. Friedländer and Dr. Frobenius, of that city. The micro-organism is characterised and distinguished by the presence of a peculiar mucous capsule, which it retains when re-cultivated in gelatine. Inoculation with this "cultivated" material was made into the lung-tissue of rabbits, but without effect. Similar injections into dogs and, with still more constancy, into mice produced all the phenomena of guenuine croupous labar pneumonia. In a few cases, inhalations of the material in pulverised form were equally successful.

AFTER DEATH FROM CHOLERA.—In the November number of this JOURNAL, was a notice of the result of the German Commission to investigate the cholera in Egypt. M. STRAUSS, has just made a report to the Société de Biologie on behalf of the French Cholera Commission. The report includes the study of twenty-seven autopsies, which were performed within half an hour of death, so that putrefaction may be excluded as a cause of any of the changes found. The stools contained rice-like bodies, formed by collections of epithelial cells affected with that special form of necrosis known as "necrosis of coagulation." Microscopically, in the contents of both the stomach and alimentary canal, were a great many microbes. There was superficial desquamation of the mucous membrane of the small

intestine, most marked at its lower end, and the walls of the intestine were found to be infiltrated with microbes, bacteria, and micrococci of various shapes and kinds—some rather long, resembling the microbe of charbon; others, in the submucous tissues, exactly like tubercle-bacilli, only rather smaller. The blood was found to be greatly modified; it would not coagulate, the red corpuscles sinking to the bottom, leaving a clear supernatant serum. Microscopically, the leucocytes were in marked excess, and highly granular, the colored corpuscles being scattered about instead of gathered into rolls or piles. Between them were seen small, very pale, elongated bodies, contracted in the middle, extremely slender, recalling the shape of the lactic ferment. With the aid of heat these bodies underwent proliferation, and arranged themselves in little chains. The serum of the blood was mostly found to be extremely acid, and once the fluid in the pericardium was noted to be acid.

TUBERCULOSIS OR CONSUMPTION IN BIRDS.—A valuable paper was contributed to the London (Eng.) Pathological Society, (Nov. 20), by Mr. J. B. Sutton, which leaves but little room for doubt that consumption in birds is identical with that in man. Mr. Sutton had spent two years in investigating the matter, and had examined "from all sources," more than two thousand birds of various species. The disease first manifested itself in the alimentary canal in the form of yellowish-white nodules, varying in size from a small pin's head to a mass as large as a chestnut. They projected most into the interior of the bowel, thus causing death by obstruction, or projected on the serous surface, setting up peritonitis. The liver next became the seat of the nodules. The spleen rarely escaped. The lymphatic glands in the neck were affected in severe cases. The kidneys, heart, etc., were rarely the seat of gross lesions. Only once was a deposit in the lungs met with. The birds almost exclusively affected by this disease were those which lived on seed, grain, and fruit (by grain was meant barley, maize, oats, etc). Twice it occurred in flesh-eaters, but no case was met with in those subsisting on fish. The struthiones, particularly the rhea (South America ostrich), were very liable to this affection. The birds most liable were the common fowl, the peacock, grouse, guinea-fowl, tragopan, pigeon, and partridge. Possibly the two flesh-eating birds contracted the disease by eating the flesh of birds who had died from it. Dr. Gibbes submitted specimens of the organs of rhea, peacock, tragopan, and golden pheasant affected with tuberculosis to microscopical examination with the following result: Sections of liver, stained with logwood, showed with the microscope cells of varying size, filled with bacilli. These bacilli were also arranged in tubular masses in what appeared to be vessels. They had the same reaction to staining agents as the bacilli found in tuberculosis; with a high magnifying power (× 4000) they were indistinguishable from them, and they also contained rounded bodies resembling spores. Bacilli were found in the lung and lymphatic glands of the peacock, and in the lung, intestine, liver, and spleen of the golden pheasant. The question for consideration was—was there any chance of the disease becoming transferred from man to other animals? On a farm where the disease was originally watched some of the pigs died from peritonitis, the coils of the intestine being matted together by small growths. These pigs were fed on refuse from the kitchen, including the offal from the poultry. With regard to this it appeared that in the Grand Duchy of Baden the veterinary surgeons reported on the frequency of tuberculosis in pigs fed on the residue of the distillery and kitchen waste, the infection starting from the alimentary canal, and affecting the liver, spleen, and occasionally the kidney.

OVER EDUCATION.—Time and again we have written strongly against the over education of the present, believing it to be highly injurious physically, mentally and morally. A late member of the *British Medical Journal* states: "Education has so long and loudly been proclaimed the panacea for all diseases and disorders of the body politic and an idea has gone abroad that its influence is wholly benign.

To many therefore it will sound like rank blasphemy to hint that this supreme remedy covers a hidden poison and that if rashly and indiscriminately applied it is as likely to kill as to cure. The medical men of to-day cannot bring forth the statistics to support their views, but they can present their observations of cases showing that inordinate and ill-directed education is working havoc amongst the rising generation and that a stern penalty will have to be paid hereafter for the physiological improvidence of to-day. They have seen healthy children grow sickly under the pressure of school tasks, and revive again when these were interrupted. They have seen clever children turn dull and stupid under the burdens laid upon their sprightly but immature minds. They have seen delicate and badly nourished children break down altogether under their work, and die of school-bred disease. Their professional experience convinces them that educational pressure is being applied injudiciously, in the attempt to make the weak keep abreast of the strong, and the young, tender, growing nervous systems cannot without detriment pass through the educational ordeals now required of them. They see true education lost sight of in a confused turmoil of examinations and cramming, and they would be culpable if they did not protest against the pernicious system in vogue. Suicides have been increasing in number all over Europe and have in all places advanced *pari pas u* with education. The revival of suicide in Europe has almost coincided in time with the modern extension of schooling, and suscides are now most abundant in the very regions in which schoolIng is most extended." Some months ago we gave statistics showing that crime has been much more common, proportionately, in the New England States than in the South, with much greater educational advantage (?)

THE MICROCOCCUS OF SCARLET FEVER.—In the *Gazette Medicale de Paris* of Sept. 29, M. Pohn-Pincus states his belief that he has discovered, in the desquamating epidermis of scarlet fever patients, micrococci which are the germs of the disease. He demonstrates them by partially detaching a lamella of the epidermis. He uses mettyl-violet for staining scrapes off some little fragments of tissue, subsequently places them upon a glass slide, and teases them out as finely as possible with needles. He says their dimensions are very small, but does not give measurements. They are united in small groups and are found in the depressions upon the borders of the detached cells. No attempt has yet been made to cultivate these micro-organisms or to inoculate them.

AIR AND WATER UNDER THE MICROSCOPE.—The bureau of medicine and surgery of the United States navy have some valuable and beautiful micro-photographs, which have been produced by members of the medical corps. These photographs represent the conditions of air, water, etc., when viewed with the microscope. "Some of the most interesting are those representing chains of micrococci in sewer culture-fluid, spores in torula form from scum from sewerage, specimens of dust in air of bedrooms (presumably unventilated), blood from patients suffering from typhoid fever, scarlet fever, and other diseases, foreign substances in air and sediment in water. The many specimens of moisture condensed from air show a heavy deposit of spores, crystallized substances, irritating solids, etc., one showing the condensation of air long stagnant, being especially rich in foreign substances. These specimens show the necessity for thorough ventilation."

TUBERCLE-BACILLI OF CONSUMPTION.—After a series of culture and inoculation experiments, made in conjunction with Dr. Arndt, in Königsberg, Dr. P. Baumgarten concludes that it is the peculiar bacteria discovered by Dr. Koch and himself which call the tubercular process into existence. If it be urged that the contagion does not exist in the bacilli but is simply associated with them, he would reply that from the experiments it is evident that this hypothetical extra-bacillar virus is so intimately bound to the bacilli that it acts only with

them and through them, since the disease may be caused by bacilli artificially cultivated in albuminous material, in which they are capable of infinite increase without losing this hypothetical infection.

STARVE THE DISEASE GERMS.—In his remarks on the typhoid plant, at the London Convention, the editor of this JOURNAL advised the starving out of the plant or germ—the depriving it of the soil to live upon by the proper disposal of all filth, and suggested that where filth is abundant they might be regarded as kindly scavengers, some times preventing more serious evils. A leading London (Eng.) Exchange (*Med. Times and Gaz.*) of Nov. 24, states that, probably people do not pause to consider whether the world could get on without these germs. "The biologist will be inclined to make much of germs; they came on the scene before man, and will probably outlive him; they are necessary to the balance of life on the earth, and where refuse lies thick are as much in place as dogs in an Eastern city, or vultures in the desert. Man's best way of dealing with them is not to fight them so much as to starve them. Cut off their diet and they will disappear."

POISONING GERMS.—It is said you may destroy the disease germs by poison. This is unscientific. It is not carrying into practice the old truism, that prevention is better than cure. Unfortunately we have not yet discovered a substance that will attack them in the air, which will not also impartially attack the lungs of any individual, sick or well, who occupies the room in which the attack is made. But sometimes it is necessary to try to poison them. At an interesting lecture at the Parks Museum recently, Dr. Lee, who has made many experiments and clinical observations, admits this. He holds to carbolic acid, and as the result of his experiments, considers that the vapor of a 2 per cent. solution of carbolic acid will destroy germs in the air. Some germs, but perhaps not all. Their tenacity to life varies greatly. The practical point of the lecture was to warn people against putting their trust in saucerfuls of solution of carbolic acid or Condy fluid placed about a room. "They give a false sense of security, and are worse than useless. If we want to strangle germs, we must go after them. They have more sense than flies, and will not come to be poisoned." Doubtless abundance of fresh air circulating in a room is, after all, the best germicide. And it can always be provided, and safely.

VALUE OF SANITARY CONVENTIONS.—There is no one method, says the *Sanitary News*, which will popularize sanitary information to a greater extent, with an equivalent amount of labor, than the holding of meetings to discuss subjects not only of a sanitary character, but of a nature demanding the attention of political economists and tax-payers as well. Six or seven sanitary conventions, such as were held in London, Ont., and Baltimore, last month, and to be held in Trenton, New Jersey, and Ionia, Michigan, this month, will place a greater number of people in the way of securing healthy homes and healthy living, than the publication of several thousand state board of health reports each year.

DAWNING OF A HAPPY ERA.—Some time ago, Dr. George Wright, of Toronto, at one of the meetings of the Toronto Medical Society, said, "may we not reasonably hope that, as our knowledge of prophylacties and sanitary matters becomes more systematic and scientific, we may be able to control some diseases that now sorely perplex the profession and impair our usefulness? I am somewhat hopeful that an era in medical research may be dawning upon us that will greatly aid in lightening our burdens, and in the course of time, lessen the necessity for such a class of the community as physicians and surgeons—a consummation, in the opinion of some, very devoutly to be desired."

GENERAL KEER'S HIMALAYAN TEA.

DIAGRAM OF A CUTTING FROM A TEA PLANT

Copied from Lieut.-Colonel Money's Work, "The Cultivation and Manufacture of Tea."

a. Flowery Pekoe. *b*. Orange Pekoe. *c*. Pekoe. *d*. Souchong 1st. *e*. Souchong 2nd *f*. Congou. Mixed together, *a b c*. Pekoe. *a b c d e*. Pekoe-Souchong. If there were a leaf below *f* it would be named Bohea.

I I. Stem. *K a*. Shoot. *L J h*. Buds from which new shoots will spring as season advances. *Black lines*, Place where leaf should be nipped of.

This high class black tea is not only one of the *best* in the market, but one of the *cheapest*. The price has purposely been fixed as low as practicable. It may safely be affirmed that no tea of equal quality has ever been offered the public in America, under a dollar a pound. Its delicacy of flavor, aroma and refreshing power, give it a very high place among teas; and as its strength or liquoring power is remarkable—if economy is an object—it can be made to go nearly twice as far as other teas. It is well known in England that Indian teas, as imported, are absolutely pure—a very important matter to health. This tea was selected and packed in India to General Kerr's order, and has therefore never been in the market before, but is exactly as received from India. General Kerr, whilst in India, drank Himalayan tea in preference to all others, and therefore, from long experience of its excellencies, he is encouraged to import it, in order to supply, as he believes, a great want, a really good pure tea of excellent flavor, &c., at a very moderate price. Anything that will tend to reduce the present large consumption of green tea, will be allowed by the medical faculty to be a boon to the country.

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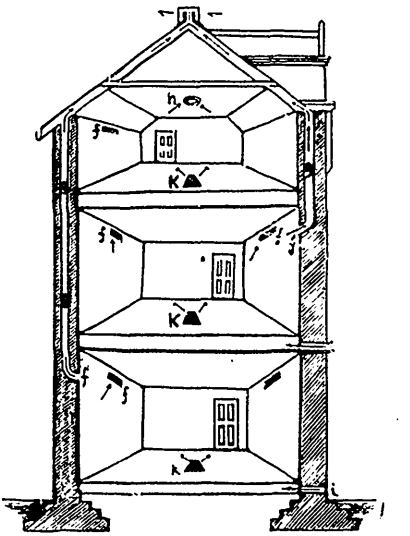
30 to 40 PER CENT. DISCOUNT.

OTTAWA—CANADA'S CAPITAL. Ottawa, as Canada's Capital, must have in store for it a happy future. Commercially—as a centre of trade, it may never have a great reputation, which is not, we think, to be regarded as at all a disadvantage, though traders might bring it in more money. Its manufacturing interests and facilities should receive abundant attention, and its educational interests and facilities should be advanced to the utmost. Ottawa is beautifully situated, with fine scenery. It ought now to attract many Summer visitors. It has superior hotels ; one hardly inferior, in every thing that pertains or can contribute to comfort, to any hotel on the continent. Few cities of like size can boast of such a hotel as the Russell. But what we particularly wished to do when we commenced this subject was to urge that above all it be made a clean, healthy city. A city with a low mortality is one which now attracts those especially who can live where they choose. We would urge the city authorities to commence right—the city is hardly too large yet for this. It is very difficult to restore the purity of soil once polluted. With imperfectly constructed sewers, and above all, accumulations of excrement in cesspools and out closets (the abominations of this age) the soil soon becomes so polluted as to be a favorite soil for the growth of the specific organisms which give rise to zymotic diseases, such as typhoid fever and diphtheria.

This is a very important subject for the people of Ottawa to consider. It might very well be thought of and discussed in connection with the approaching municipal elections. To begin early to have the city thoroughly cleaned (as no city in Canada is, but the capital might properly lead) and keep it so, by perfectly constructed drains and sewers, and by daily or at least tri-weekly cartage.

"BITTER SWEET" Thirty per cent of the candy sold says an exchange is white earth with a liberal sprinkling of the black article.

TRICHINIASIS is said to be raging with great severity in parts of Germany. At Ermsleben some of the inhabitants of nearly two-thirds of the houses are stated to have been attacked. Many deaths had resulted. An outbreak is also announced in Russian Saxony.



IMPROVED METHOD OF VENTILATING BUILDINGS.

Here three rooms are represented as ventilated by the improved ridge tiles. The vitiated air from the two lower rooms escapes through openings *f f*, into flues, *g g*, which are in communication with the roof space. The air from the upper rooms passes through openings *h* in the ceiling directly into the roof space. The vitiated air passes out from the roof space through the openings in the ridge tiles. Inlet passages, *i i*, for fresh air communicate with grids, *k k*, in the floors, or fresh air may be otherwise admitted.

THE BERLIN HYGIENIC EXHIBITION closed, after proving a great success, alike from a financial and other points of view Nearly a million visitors inspected the collection, and the receipts amounted to over 25,000*l*. Many of the most important exhibits are to be preserved in the new Hygienic Museum.

MEETING OF THE PROVINCIAL BOARD OF HEALTH.

The regular quarterly meeting of this Board, was held on November 29th. Dr. Oldright, Chairman, presiding. There were present also, Dr. Rae, of Oshawa, Dr. Yeomans, of Mount Forest, Covernton and Cassidy, of Toronto, and the Secretary, Dr. Bryce. After the reading of the usual minutes, the Chairman referred to the steps taken by the city in regard to the appointment of Sanitary Police shortly after the recommendations made by the Board, and said that the city Medical Health Officer had thereby gained much information that would be of use to him in future for further sanitary reform.

Dr. Bryce read a number of letters from different towns in the Province in regard to the establishment of Local Boards of Health.

Dr. Covernton referred to a letter received from a baker, in reference to a diminution in the consumption of bread in oppressive weather. Only a speculative answer could be given.

Dr. Yeomans read the report of the Committee on School Hygiene. There were 480,000 pupils and 7,000 teachers in Ontario, and there was spent annually in the interests of education in the Public Schools about $3,400,000. During school a large part of existing disease and deformity was acquired, and the efficiency of teachers was greatly lessened and the the physical and mental development of pupils retarded through neglect of school hygiene. They could educate the rising generation on the subject and thereby promote the health of the youth and influence opinion through the schools, and the ultimate effect would be to render the enforcement of sanitary legislation an easy task, by educating the mass of the people in the great benefits resulting from an intelligent obedience to the laws of health. There were causes of disease which no legislation could reach. It would become the Board to consider the advisibility of admitting a standard of air space as one to be recommended to the Province. 1,000 cubic feet he thought should be allowed to each pupil. He referred to the great reduction in the prevalence of infectious disease in the Hamilton schools from the adoption of the health reports or notifications.

Dr. Cassidy read the report of the Committee on the Smoke nuisance. Smoke was considered to be injurious to vegetation. Regarding its influence on animal life there was difference of opinion. It might be made obligatory on all who used steam engines to burn coke or hard coal. The gas engine might be used in some cases.

At Friday's meeting, the report on school hygiene was adopted, after a full discussion, and a resolution was passed that the minimum of air space should in no case be less than 500 cubic feet for each pupil, and this small space only in cases where the air can be changed six times per hour, and thus allow 3,000 cubic feet of breathing air per hour per head. A lengthy report on the condition of Ashbridges Bay was considered and adopted.

Drs. Coverton and Cassidy, the Chairman and Secretary, were appointed a committee to make arrangements for the holding of the Sanitary Convention at Ottawa, and also to secure a course of lectures in Toronto. Dr. Yeomans read the reports of the delegates to the Sanitary Convention at Kingston, in September last, which were adopted. The Board adjourned to meet again in a week or two.

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THE PUBLIC HEALTH FOR NOVEMBER.

OTTAWA.—No epidemic here; generally healthy except usual increase in diseases of the respiratoy organs.

TORONTO.—From here, there is not anything of special importance. The usual increase at this season of lung effections, with a good deal of diphtheria and typhoid.

HAMILTON.—Dr. Ryal reports no epidemic, some cases of diphtheria, measles, scarlet fever and typhoid, with increase in diseases of respiratory organs and malarial fevers.

KINGSTON.—Dr. Saunders reports a peculiar form of influenza as epidemic there; characterized by two or three days fever at the outset, an aggravating constant cough, with lung inflammation in some cases. Ulcerative tonsilitis common, and a good deal of typhoid and remittant fevers.

BELLEVILLE.—Dr. H. James reports an increase of scarlet fever—"almost epidemic." The usual increase of lung and bronchial troubles.

BROCKVILLE.—Dr. Moore reports diphtheria epidemic there, "increasing both in number of cases and severity; due largely he believes to the improper construction of the system of waterworks, with the lack of any system of drainage. The water in the wells being poisoned in consequence of the earth being saturated with foul matter."

LONDON.—Dr. Edwards reports the health there still "very good;" some measles; typhoid fever on the increase.

CHATHAM.—Dr. Bray reports whooping cough epidemic, but of mild type; general health good; low mortality.

ST. CATHARINES.—Dr. Greenwood reports typhoid of a mild type, and some diphtheria with usual increase of lung and bronchial disease.

BARRIE.—Dr. McCarthy reports scarlet fever and whooping cough on the increase, the latter epidemic in localities; a few cases of diphtheria and typhoid—lung affections increasing in intensity and number—mortality low.

PETERBORO.—Dr. R. W. Bell reports the epidemic, "of pretty severe type," which prevailed all fall, now on the decrease; diseases of respiratory organs on the increase; some typhoid; no diphtheria.

STRATFORD.—Dr. D. M. Fraser reports diphtheria as epidemic there; "the locality has been generally healthy, with increase of diphtheria, typhoid fever and bronchial affections."

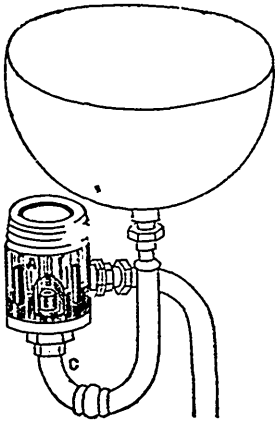
A SANITARY ASSOCIATION for the Province of Quebec has been formed, Dr. LaRocque, Health Officer of Montreal, informs us: "People are fast joining it, and many wealthy persons are disposed to aid it." We are glad to learn that it is the intention of the Association to publish a sanitary journal in the French language, for the education of the French population; and also their intention to join the Dominion Sanitary Association.

A NUMBER OF BOOKS have been received, but the reviewer has been ill and unable to look over them.

BREATHED AIR AND DIPHTHERIA.—Some time ago Dr. H. James, of Belleville, in his annual address before the Murchison Scientific Club, gave the following facts: He had attended a family which occupied a house with small rooms; on his visits he found the air "very unpleasant, oppressive and sickening;" the family was proverbial for keeping their doors closed, notwithstanding that he frequently lectured them upon the subject. On attending the youngest boy with his third attack of diphtheria, within a period of five or six months, at an evening visit, he noticed a misty coating on the windows, from the breath of the occupants. With the consent of the family he carried away with him a pane of glass taken from one of the windows; this he cut into several pieces. On the tenth day after, one of the pieces had developed, from the misty coating, a crop of a "living fungus," which the doctor believed to be that of diphtheria.

THE GRATITUDE OF PATIENTS, Baudry says, is, I know, a part of the disease. It is pronounced during the fever, cools down in the convalescence, and is cured when health returns.

FOUL COURT-ROOMS PREVENT CLEAR JUDGMENT.—On a number of occasions we have drawn attention to the very badly constructed and badly ventilated state of most of the Court-rooms in this country. Judges and others in attendance have suffered greatly on account of the foul air in court-rooms. Dr. H. James, of Belleville, once examined the air taken from a crowded court-room in that city, and, of course, found it very foul. He says: "I maintain, according to the laws of physiological chemistry, that it would be impossible for judges, attorneys, teachers or children, in crowded rooms to put forth a healthy mental effort under such unfavorable conditions to health. The effort to retain one's judgment and clearness of mind under such peculiarly painful influences, would in a short time injure the constitution and destroy life." It may be that the foul air is sometimes responsible for some peculiar verdicts and judgments.



THE MERCURY SEAL TRAP.

The water, when discharged from the basin, enters the reservoir *A*, and the inverted glass cup *B* is raised nearly to the top, allowing free egress to the water. As the water recedes, the cup falls back into the mercury surrounding the end of the inlet pipe *C*, thus making a perfectly air-tight joint, which cannot be broken or unsealed by evaporation or syphonage.

INFANT MILK-FOOD.—A late number of *Science*, on the authority of a German Scientific Journal, refers to a process for preserving milk, which makes this exceptionally useful for sick infants. It consists in simply putting new milk without any addition into glass bottles, stoppering and then heating them by steam for one or two hours to a temperature from 212 to 248 degrees, under a pressure of from two to four atmospheres. The milk is "not merely rendered capable of preservation but the casein is peptonized, so that in contact with the gastric juice it is converted into fine, easily divisible and digestible flocks, as in the milk of a non-ruminant animal." Any contagiums too, as of foot-and-mouth disease or tuberculosis, with all germs, are destroyed by the heating. Cow's milk treated in this way, it appears, is not coagulated by rennet, and even when acidified or allowed to sour, yields "a fine granular coagulum," which the infant can digest without distress.

CONCIOUSNESS.—An interesting article on the investigations of the past few years, into the physiology of the brain and psycology, in the *New York Medical Record* for November, concludes as follows:—Has anything in our investigation given us a clue to the origin and meaning of consciousness? Nothing. Consciousness is an ultimate fact, beyond which we can not go, and all attempts to explain the transition from the unconscious to consciousness are mere tricks to evade the real question. The materialistic hypothesis regards the soul as a function of organized matter, the result of vibrating molecules in the same sense that heat is the result of such vibrations. But this is entirely untenable. The step from vibrating molecules to thought and feeling is an impassable one, and that unconscious atoms should become conscious by agglomeration into complex molecules is simply unthinkable. Our immediate knowledge is that of consciousness. Consciousness is the fact; matter, the inference.

NOTICE TO CONTRACTORS.

SEALED TENDERS, addressed to the undersigned, and endorsed, "Tender for Morpeth Works," will be received until WEDNESDAY, the 2nd day of JANUARY, 1884, inclusively, for the construction of

A Pier at Morpeth,

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according to a plan and specification to be seen on application to Mr. John Duck, Customs Officer, Morpeth, from whom printed forms of tender can be obtained.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, the blanks properly filled in, and signed with their actual signatures.

Such order must be accompanied by an accepted bank cheque, made payable to the order of the Honorable the Minister of Public Works, equal to five per cent. of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department will not be bound to accept the lowest or any tender.

By order,

F. H. ENNIS,
Secretary.

Department of Public Works,
Ottawa, Nov. 29th, 1883.

PREVENTION OF CONSUMPTION. — Dr. Burdon Sanderson predicts that the discovery of the bacillus tuberculosis will serve as the foundation of an efficient prophylaxis against pulmonary consumption and the other less familiar forms of the disease.

IN CARRYING CHILDREN in the arms (*N. Y. Med. Times*) care should be taken not to carry them habitually on the same side, as this tends to make them one-sided. Not only the bodies, but the heads and faces of a whole family can sometimes be drawn over to one side. The only remedy is to change the position frequently.

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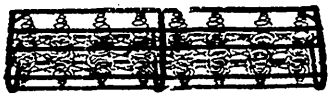

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BEST IN THE WORLD,

Sent on Trial Free of Charge, and Guaranteed against Breakage for Five Years.

The only Chain Top Folding Spring Mattress with the Springs set on a rigid foundation, which holds them firm, and prevents the outside rows from tipping out of position; and, being set in line, the Bedding is thereby prevented from dropping at the head and foot, while the network of diagonal chains gives an even yielding support to the Springs and produces more elasticity, and is vermin proof.

FOUL AIR AND TOBACCO.—The Montreal *Herald and Star* once gave its readers the following very sensible remarks: "Some workmen think themselves tired when they are only poisoned. They labor in factories, breathe air without oxygen, and live in an atmosphere of death. They are, too often, allowed to smoke, and thus add fuel to the flame which is consuming them. They knock off work "tired" and listless, when they are merely weakened by foul air and made dull and heavy by an atmosphere charged with disease. They keep the windows shut and close the door on health, while they lift the gratings of the tomb by breathing and re-breathing the poison from their own lungs, and the floating particles of matter about them. Open the windows—let in the sunshine and the breese, stop smoking, and you will soon find that it is the poison of confinement, and not labor, that wearies and tires."

NOTICE TO CONTRACTORS.

SEALED Tenders, addressed to the undersigned, and endorsed "Tender for Post Office, &c., Berlin, Ont.," will be received at the office until WEDNESDAY, the 19th December next, inclusively, for the erection and completion of

POST OFFICE &c.,

—AT—

Berlin, Ont.

Plans and specifications can be seen at the Department of Public Works, Ottawa, and at the Post Office, Berlin, on and after MONDAY, the 26th instant.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures.

Each tender must be accompanied by an *accepted* bank cheque, made payable to the order of the Honorable the Minister of Public Works, *equal to five per cent.* of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called on to do so, or if he fail to complete the work contracted for. If the tender be not accepted, the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order,

F. H. ENNIS,
Secretary.

Department of Public Works,
Ottawa, Nov. 16th, 1883.

Notice to Contractors.

SEALED Tenders, addressed to the undersigned, and endorsed "Tender for Heating Apparatus," will be received until Monday, the 31st instant, for a

HEATING APPARATUS

required for the Parliament House, Winnipeg, Man.

Plans, specifications, &c., can be seen at the Dominion Public Works Office, Winnipeg, Man., and at this Department, on and after Monday, the 17th inst., where forms of tender, &c., and all necessary information can be obtained.

Each tender must be accompanied by an *accepted* bank cheque, made payable to the order of the Honorable the Minister of Public Works, *equal to five per cent.* of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called on to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department will not be bound to accept the lowest or any tender.

By order,

F. H. ENNIS,
Secretary

Department of Public Works,
Ottawa, 13th Dec., 1883.