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Original Communications.

ON CAPTAIN LIERNUR'S IMPROVED TOWN DRAINAGE SYSTEM.

BY ADAM SCOTT, C.E.

In treating of Liernur's improved town drainage system, Dr. Egeling, the Senior Medical Inspector of Holland, says:—

For the English reader, this system has a double interest, it embodies the principles which have been demonstrated in every report on the sewerage question—for the last dozen years at least—to be the only ones upon which a satisfactory solution is attainable. All culminate in this one leading thought, that the plan of removing all kinds and degrees of refuse by only one channel leads to the same perplexities and difficulties as treating persons, merchandise, and cattle as only one kind of freight, and transporting them in only one class of railway car would do, and that it is far cheaper, in view of the ill effects resulting therefrom, to employ a different form of carriage for each variety.

Starting from this leading principle, Captain Liernur divides the work to be done into four different classes:—1. The sewers proper are made absolutely impermeable and devoted exclusively to filtered house, kitchen, and rain water. 2. The drainage of the soil is effected by porous pipes, regulating the ground water. They lie at a higher level than the sewers proper, and drain into them. Of course, in towns that are sewered already, he makes use of the existing sewers and does not lay these subsoil drains. 3. Refuse liquids of trades and manufacture are only admitted into the sewers after being purified by their producers. 4. The fæcal matter—chamber slops, and sink

sediment included—is removed by a separate system of pipes altogether, the peculiar feature of which is, that in order to avoid as much as possible the dilution, which makes transport, utilization, and disinfection next to impossible, air pressure is used instead of water to remove the excreta out of the closet pipes.

The causes of river pollution are:—

1st. Excrement (solids and fluids), chamber slops, and the refuse of kitchen sinks.

2nd. Manufacturing refuse.

3rd. Street dirt.

4th. The dirt contained in house water.

All of these Captain Liernur keeps out of the sewers, and, consequently, out of the stream. His mode of doing so will be briefly described in turn.

First, as to the excrement (solids and fluids), chamber slops, and the fatty and sedimentary products of kitchen sinks. These are never allowed to enter the sewer, but are collected by a separate pneumatic system of cast-iron piping, nowhere exceeding five inches in diameter. Briefly this may be described as follows. The town is divided into drainage complexes of from 20 to 50 acres, according to circumstances. Each house is provided with a Liernur improved water-saving closet, or a Liernur closet without water; and these are connected by branch pipes through a main or street pipe with an iron tank placed under the pavement somewhere about the centre of the drainage complex. Into this tank all the closet pipes are emptied every day by pneumatic pressure, and then the contents of the tank, and of others similar to it, are in their turn emptied in the same manner, but through separate and independent pipes to a central reservoir, serving perhaps for ten or twenty tanks, of 250 to 500 acres, also according to circumstances. The motive power for all the operations is obtained by a stationary air-pump engine at the central reservoir. Every large town may thus be divided into several districts, each independent the one of the other, and served by a separate engine. The contents of

these reservoirs are by a continuous process, and without any exposure to the air, converted by evaporation *in vacuo* into a dry powder, which contains all the manurial elements to be found in the substance collected by the system. The drying process is effected without using additional fuel, the waste steam of the high pressure engine, of the caloric unities, in which only eight per cent. at the outside are converted into power, being found quite sufficient for the purpose. The principle is the same as that used in reducing liquid beet-root sugar. The sedimentary matters of house and sink water, I may mention, are separated from the water flowing off to the sewer by a very simple and ingenious apparatus.

My time is too short to give minute descriptions. Suffice it to say that the closet without water is more inoffensive to eye and nose than any water-closet at present in use, that no intrusion into houses is required, that there is nothing moveable in the whole network of pipes to get out of order, and that, from the moment matter is deposited in a closet till after it is converted into *poudrette*, there is no possibility that either the air or the soil can be contaminated. Also that any virus or germ of disease contained in excrement is rendered innocuous by heat, the only known agency which will effectually do so.

Further, let me say that in towns of average density of population this resulting manure is in a concentrated form, and so valuable (10s. per head per annum) as not only to cover the working expenses, but to provide for interest on and redemption of the capital invested, and to yield a handsome balance over and above.

Secondly, as to manufacturing refuse and waste water. The solution of the pollution problem is simply an impossibility as long as manufacturers are allowed to pour their refuse into sewers or streams. It is comparatively easy to clean such water separately, when perfectly fresh, and with its volume and constituents known or easily ascertainable, but it is impossible to do so when mixed all together in the sewers with the other refuse of a town.

Captain Liernur lays it down as an imperative rule that such cleaning must be done separately, and that each manufacturer must be made responsible for so doing. The question as to who should bear the cost is one open to discussion. In most cases the person making the profit must put up with the loss such cleaning may entail, but there are, no doubt, cases in which it should in part be borne by the community. The business of the engineer is simply to devise a means of testing whether this cleaning is done. For this purpose, Captain Liernur makes a small dip, or bend, in the branch pipe from the factory, just before entering the sewer. On this he erects a pipe accessible from the street, so that the inspector of nuisances can at any time take a sample for analysis.

Thirdly, as to street dirt. To prevent this from entering the sewers, Captain Liernur, in the first place, reduces the quantity of rain-water flowing from the surface of the street into the street gullies to the smallest possible quantity, seeing that it is this particular water which brings the detritus into the sewer. Secondly, he employs a pavement, which of itself furnishes no detritus or dust through wear and tear; and thirdly, insists upon street sweeping being done regularly and by machines, instead of by manual labor. To reduce the quantity of street-water flowing into the gullies, Captain Liernur lays the pavement nearly flat over its cross-section, so that the rain-water, instead of rushing to the gutter and there accumulating, remains not only divided, so as to obtain nowhere great depth, but is exposed as long as possible to evaporation and absorption. For the same purpose of prolonging this powerful agency for diminishing the quantity flowing off, he places the gullies as far apart as admissible for taking in roof and sidewalk water. By acting in this manner, it is only in case of violent and continuous rain that any water from the streets flows in the gullies at all, and then only a small proportion of it (about one-fourth). In ordinary rains, fully four-fifths of the water are evaporated, and the remainder is absorbed, thus entering the sewer in time as percolated or subsoil water. To

have no street detritus, Captain Liernur substitutes the well-known wooden pavement on every occasion that repairs of the ordinary roadway required. Wooden pavement, besides being noiseless yields no dust, is very durable, and is an improvement upon macadamized or stone-paved roads. This being done, the only other sources of street dirt are droppings from animals (which can easily be dealt with by scavengers removing them immediately), and soil brought in from the country on the wheels of vehicles and hoofs of horses. To remove this latter is easy enough when it is only done regularly. It can then be best accomplished by sweeping machines, which work very advantageously on the flat surfaces of the wood pavement prescribed. It will be seen that Captain Liernur thus keeps out of the gullies the great bulk of the street dirt, and he even retains practically the small quantity which enters them in times of violent rain, by constructing them in a peculiar way, so that the rain-water must strain upwards through a small round mat of woven straw before flowing off to the sewer. This mat casts the suspended matter down in a water-tight bucket, which can be taken out, mat and all, and emptied from time to time. The contents of the gully bucket must, of course, be removed by carts. Hence the rain-water entering the sewers of Captain Liernur's system is, as a rule, only that falling from roofs, &c, and the quantity that gets in by slow percolation is practically clean enough. Street dirt, as such, does not get in the sewers at all.

Now, fourthly, with regard to house water, it must be remembered that by the pneumatic system there are separated altogether from this (and consequently from the sewer) all excrement, chamber slops, and sink sediment. The importance of the daily separation of this last matter, the fatty and sedimentary products of kitchen sinks, must not be overlooked, 'as the substances are practically the same as excrement, only they have not gone through the human body, and are not so near, by three or four days, to fermentation. Until fermentation takes place it is evident that such matters can give off little or no

organic matter in solution, and as they are separated from the water at the start by a simple and ingenious apparatus, it follows that the water flowing off, which may be large or small in quantity, according to circumstances, must be comparatively clean. Captain Liernur, of course, does not claim perfect cleanliness for this water, but simply says it may be admitted into the stream with impunity. Theoretical purists sometime lift up their hands exclaiming about the offensiveness of cabbage-water, &c., forgetting how infinitely little the total quantity of liquid derived from this source is in a whole town. Such people would gild refined gold.

To sum up, let me recall to the reader's mind what liquids enter the sewers of Captain Liernur's system, and thus reach the stream. First, the purified water from manufactories; secondly, storm water from streets, after being practically deprived of all solid matters in suspension; thirdly, house water deprived of excrement, chamber slops, and sink sediment; and fourthly, subsoil water after percolation through the earth. To theoretic purists who may object even to this resultant liquid, I would point out that Captain Liernur has, at any rate, produced a liquid of a simple and unvarying character which is capable of being easily dealt with. As a matter of fact it is nearly as clean as that which fills every brook in the country and flows from the adjacent fields after a heavy rain. It is well known that this is far from clean, but it is unreasonable and impracticable to demand more. Most people will, I think, admit that every reasonable requirement is complied with, and by practicable means. Those who think otherwise had better turn their attention to regulating Dame Nature first, and, when they have succeeded, can try their hands on towns.

SANITARY LEGISLATION.

BY ALFRED J. H. CRESPI.

To remind the educated man that the motives influencing conduct are of extreme complexity would almost seem an insult to his understanding ; yet, in practice, nothing is commoner than to find simple remedies proposed as sufficient to hold in check great evils that have penetrated deep into every part of the social fabric, and which make themselves felt among all classes. Conduct, as has been so admirably and lucidly shown by that profound and original thinker, Herbert Spencer, in his great work on the "Study of Sociology," is influenced by education, race, social position, prejudice, self interest, as well as by the conduct and opinions of others, and by the state of society in which we live. Manifestly to hope or to suppose that a magazine article, an Act of Parliament, or even the life-long labor of one of those commanding intellects, which seem able to mould like wax the weaker intellects on which they bring their influence to bear, could radically alter society is the foolish fancy of a child. To appeal to higher motives generally goes for little. To point to the example of Christ, to repeat His words, is generally waste of time. Men may give a kind of intellectual assent to certain almost self-evident propositions, and the very next moment show, by their conduct, an utter disregard of those great truths to which they profess to cling.

Take such a matter as the maintenance of overgrown armies. We fortunate and humane Englishmen claim to be humble followers of the God of love. We admit the sinfulness of war, the extreme folly of training huge armies for the carnage of the battle-field, and the unsatisfactory character of long-continued international hostilities. Most really thoughtful and able men, in every part of Europe, admit that it is barbarous and foolish to submit the settlement of a trifling dispute be-

tween nations to the uncertain and ruinous conflict of war, or, as some people would say, whose religion shows itself rather in words than in actions, to the decision of the God of battles, as though the beneficent Creator of the universe could take special interest in the slaughter of mighty armies and the plans of opposing generals. Those who reflect for an instant admit that justice and humanity make it imperative that international arbitration courts should deal with impartial hand between nations, as national courts now do between individuals. But, let some cloud appear on the political horizon, and the warmest theoretical defenders of arbitration forget their often expressed abhorrence of war and call for hostilities to defend the threatened honour of their country. Arbitration, it then turns out, may do for Turks and Russians, but is quite out of place between Englishmen and Chinese, or between Frenchmen and Prussians. Revenge for supposed insults is at once the cry. The feverish excitement of war, the hope of victory, a misguided feeling of national pride, throw justice to the winds, and with solemn appeals on both sides to that God who loves the humble peasant as much as the powerful duke, sees no difference between Jew and Gentile, German and Hindoo, knows nothing of inferior races and subject nations, and has no particular respect for dominant classes, war commences, and blood flows like water.

Or, again, look at the devastation distinctly traced to intemperance. See how futile are the exertions of conscientious high principled teetotallers to bring over to their ranks the thousands of amiable ministers and clergymen who deplore the evils of drunkenness, preach against excess, admit that alcoholic stimulants are unnecessary and a source of danger, and yet, being accustomed to their glass of wine, cripple their own efforts to check the horrors of a great vice, by refusing to abstain, though ready enough to urge others to do so.

The remedies for the evils of war are not simple; those for the repression of intemperance are fully as complex. But we may be certain that, as nations slowly reach a higher state

of civilization, as their conduct, in private and in public, is more and more actuated by Christian principles, the resort to arms and the use of stimulants will become less common.

Look at another great question—the prevention of disease. What could seem more natural than that nations, local authorities, and private persons should separately and collectively strive to uproot the causes of suffering? What does observation show? That private persons, who could often do much in their own households, are satisfied with giving their assent to certain general propositions; there they stop. Though knowing that attention to food, clothing, ventilation, exercise, and temperance is of extreme importance, and rests wholly with each householder, in his private capacity, and cannot be undertaken successfully by anyone else, they habitually and systematically disregard the laws of health, meanwhile, perhaps, complaining of the supineness of local authorities, and of the incompetence of Government. At all times private persons throw on municipal authorities the onus of carrying out measures, no doubt important enough, as sewerage, the removal of decomposing substances, and other matters requiring corporate action, but of themselves not sufficient to preserve the general health. To show their appreciation, however, of these corporate measures, they obstruct the local sanitary officials as much as they possibly can, and grudge every penny spent on large and well-considered improvements. Local bodies, again, after complaining of the folly of householders, relieve their conscience by throwing the blame on the Government of the country, on scientific men, on some one or another not on the spot. And Parliament and its servants throw the blame with exemplary impartiality on the country, the various local boards, and on householders.

What else can we expect? The prevention of disease is in one sense simple, in another most difficult. Given enlightened and high-principled people, alive to their own interests, wise, self-restrained, determined to act like men, and the few matters they could not themselves attend to would be placed in

the hands of competent local and thoroughly intelligent rational governing bodies. But the rulers of a nation are neither superior to nor inferior to the masses they govern; at least not in the form of government which we enjoy. The prejudices, obstructiveness, incompetence, and want of principle of many of the ruled are faithfully reflected in the conduct and opinions of many members of the dominant classes, and even in those of some of the highest officials in the State. How can we expect a perfect code of sanitary laws while the people and their rulers are full of imperfections, and while sanitary science is in a state of rapid development? Obviously we cannot. At most our efforts will only be unsatisfactory compromises, and will be hereafter superseded by more comprehensive and better considered measures.

The greatest source of anxiety for the future of preventive medicine is that so little is thought of those wise and easy precautions that every educated man and woman can carry out, without assistance from or resort to central authorities. What is the use of clamouring for an Act of Parliament to enforce the proper ventilation of public buildings when nine-tenths of our people are unwilling to open the windows of their own sitting and bed rooms? What use is it to ask for laws to punish the adulteration of food, as long as four-fifths of our grown-up countrymen feed like swine, and daily revel in foods they know are unwholesome and injurious? What do people mean by complaining of filth, overcrowding, and other matters just as pernicious, when the very persons, who clamour for reform at the hands of Parliament for their weaker brethren, neglect these and many other matters in their own happier social circle, and in their own homes habitually do things they wish the law to punish in others?

No; side by side with wise governmental action and local supervision must go individual co-operation and a sense of individual responsibility, and as, little by little, from the social and political chaos in which we live, our descendants evolve more perfect rules of conduct, and are actuated by higher principles, so

will it be found that the efforts of one class will be supplemented by those of another, and the labours of the State will be turned to good account by those of individuals.

Seeing that every man, I care not who he is, is the product of millions of factors, which have to be sought out in the past actions of all men, in his own prejudices, opinions, and interests, and the modifying circumstances which, from hour to hour, are brought to bear upon him, what can we mean by asserting that any man would be competent to draw up a code of laws that would thoroughly answer the purpose the wise legislator should have in view?—the happiness and tranquillity of individuals and of the nation. Or, supposing a man could be found who could so free himself from the difficulties and prejudices of age and station that he could wisely think and impartially act, could we hope that any nation now existing would obey the laws he might enact, or that any body of officials could be found competent to administer them? Sanitary legislation is in precisely the same position as any other great question calling for legislative enactments. Has it not been repeatedly found that the ablest living sanitarians are not able to draw up a Public Health Bill, which, when accepted by Parliament, thoroughly answers the purpose for which it was framed? The very machinery to put the law into operation is so imperfect that disappointment everywhere meets us. Were these appreciative audiences, which have so often listened with admiration to the wisdom and learning of Dr. Lyon Playfair, able to give this distinguished statesman power to draw up a Public Health Consolidation Act, and were he to discharge his responsible and difficult task with the skill and discretion for which he is conspicuous, these very audiences would often be the first to break the law.

NOTES ON HOUSEHOLD SANITARY MATTERS.

BY JAS. H. SPRINGLE, ARCHITECT AND CIVIL ENGINEER.

(Continued from page 167.)

Having in previous numbers of the PUBLIC HEALTH MAGAZINE described the means of draining buildings into the common street sewers, it may not be out of place to make a few remarks on the sewer connections, and on the necessity which exists for some well-defined and stringent regulations which will compel all property owners to drain their several properties into the public sewers, saving and excepting only such as would discharge matters prejudicial to said sewers. At present, the only city regulation which has reference to the subject, says:—"The road committee shall have power to cause every owner of land adjoining any street or highway in which there is a common sewer to make a sufficient drain from his or her property, whenever, in their opinion, the same shall be necessary, and shall give notice through the City Surveyor when such drain shall be completed, and if said notice shall not be complied with, then the road committee shall cause the same to be done at the cost and charges of the proprietors."

Now, this mere power of the road committee to cause proprietors to drain their properties, is altogether insufficient, as is proved by the hundreds of properties remaining undrained. The power to enforce drainage, instead of being dependant for its operation upon the zeal, or caprice, or mere option of the Road Committee, should be prompt and imperative in its action, and its administration should form part of the duties of an Inspector of drainage, whose functions I have already described in the HEALTH MAGAZINE. What the Corporation intends to do in the matter of house drainage is as yet not known. It is now spending an enormous sum in reconstructing and arranging the city sewerage on a plan promising to be adapted to the future as well as present requirements of the city, and it may well be hoped that such drainage, and supervision of the same, as is demanded by the sanitary intelligence of the age, will meet with that recognition and support from the city authorities which its importance deserves. In connection with house drain-

age, I may here give a brief description of a plan of ventilated drainage, which promises to be very successful in certain cases, having seen, several years ago, the trouble and damage caused to the roofs and cornices of buildings in the winter by the ice. The flat roofs, just then coming into use, seemed to offer a means of getting rid of the difficulty, and in designing the roof for a large warehouse, I made the slopes of this roof to descend from the walls to the centre of the building, from which it was to be carried by a single pipe into a tank, placed in the upper story of the building, so that the water might be available in case of fire or for other service. This tank, which had an overflow pipe into the common sewer, was dispensed with, owing to the near completion of the City Water Works, and a single pipe conducted the water from the centre of the roof down to the drain.

All the winter difficulties usual to roofs were got rid of by this arrangement; but the roof, which was covered with metal, did not give satisfaction, as it was impossible to keep it water-tight. Since that time, 1855, the ordinary gravel roof, which is admirably adapted for the purpose, has been frequently used in the form above mentioned with great success. The pipe descending from this form of roof to the common sewer, by reason of its vertical position and height, makes an excellent ventilator for the sewer, and will withdraw large quantities of gas from the same, and recently Professor Godfrey has further utilized a pipe of this kind from the roof of the new medical college, by connecting with it the water closet service of the establishment. He finds the up draught is so strong as to render soil traps unnecessary. Of course, any such pipe to be competent for all these services requires great care in its construction, and as the up draught will vary greatly in different situations and circumstances, it will be well not to attach a water closet to it without a soil trap. As it is essential, also, for this pipe to descend pretty near the centre of the building, it might not always suit the interior arrangement of dwellings, and it must be evident that great precaution is necessary to prevent any settlement or movement of the pipe, as any fracture or displacement of its continuity would be very disastrous. Finally, care must be taken to prevent the entrance of substances likely to choke the pipe,—and water closets without traps offer great facilities for getting rid of all sorts of rubbish calculated to effect this.

Sanitary Reports.

MEETING OF THE PUBLIC HEALTH ASSOCIATION.

A meeting of the Public Health Association was convened at the rooms of the Natural History Society, on Friday evening the 10th inst., at 8 o'clock. After the reading of minutes, Dr. Rourke read an interesting, as well as valuable paper, treating of his new plan of improved sewer ventilation. Briefly it may be described thus: At a given point, is an exhaust pump, worked by an engine, and from this point a ramification of small piping is laid along the top of all the sewers in a certain limit, having minute openings to admit the sewer gas. As a vacuum is formed in the small pipe, it is immediately replaced by the sewer gas which is carried up and consumed in the furnace. Dr. Rourke contends that many miles of sewers might be ventilated in this manner, so dividing the city as to facilitate his plan.

Dr. Godfrey then rose and spoke as follows:—"Gentlemen, I think that to any reasonable mind there can be no doubt as to the excellency of Dr. Rourke's plan of ventilation of sewerage. The question is, could there not be some method of ventilation less expensive? I have for some time thought (and the plan that I am about to mention, I have practically carried out in a building at the corner of Ontario and St. George street) of having the drain of the house taken from the roof into the main sewer through the centre of the building—so draining off the rain and snow water as well; and that the higher descent from the sewer will take all the foul gas, not only from the house, but from the sewer itself. In this plan that I tried some

four years ago, from the water closets in the basement, which some forty or fifty persons have been in the habit of using all the winter months, I have never detected the slightest nuisance. It is common in many houses to have an offensive smell from the water-closets, but, according to this plan, I have never, as I said, perceived the slightest effluvia. To my mind the only question is, what becomes of this gas that is carried from the sewer up into the air? As far as the internal part of houses built in this way, I can answer as to their being free from any disagreeable smell, but whether the gas when carried up into the air is dispersed or falls back upon the city, I cannot say. Of course, in Dr. Rourke's system, this gas is all effectually disposed of. Before adopting my method, I considered it well, and I find it answer perfectly. A flat roof goes in combination with this method, and I have no doubt many of you gentlemen here will say that a flat roof is a failure, but I contend that if a flat roof is properly built, it is not a failure, and I hold that a flat roof properly constructed, will last for years and years. I have known one last for fifty years without the slightest alteration. You will save many, many dollars by adopting a roof of that kind; it is the roof *par excellence* for this climate of North America."

Dr. J. Baker Edwards, then said: "I have no doubt that ventilating by such means as Dr. Godfrey has shewn us, is very excellent. The question is, how are we to walk through the streets without being suffocated? You have gratings in your streets from which typhoid fever and other diseases come up, over which our children play, and we ourselves are obliged to walk. If we are going to make such very serious alterations in Montreal, in the condition of the drains, the question as to what mode we should follow, is a very important one indeed. In this plan of Dr. Rourke, I see three grand principles, which I have heard discussed over and over again; the introduction of fresh air; the removal of it and the foul gasses, and eventually their destruction by fire. These are three principles which are unquestionably scientific. I think, about two years ago, these were discussed in this very room, and I think we came to the

conclusion that if we could get several relieving points it would be of immense benefit to our city ; we would apply these in connection with our fire and police stations, carrying the gas so drawn through the furnaces. It would be necessary that the workmen should thoroughly understand their work."

Dr. Godfrey rose again, and said : " I maintain that if you stand over the grating in connection with the ventilator I have spoken of, you will find no effluvium, as it is all taken up through the ventilator."

Dr. Carpenter.—" As the question is which of these plans should be adopted, in my judgment, Dr. Edwards' system is the best system that can be obtained. We have two things to consider, first, what is done in Montreal ; and, secondly, what *can* be done? Now, I do earnestly hope that the plan proposed by Dr. J. Baker Edwards, and endorsed by Prof. S. Hunt, will be put into operation ; why cannot we do it this very winter? If it is not altogether perfect, at least we would have a certain amount of sewer gas consumed, which would be a great relief to us, and cost only a trifle."

Dr. J. Baker Edwards then moved a vote of thanks to Dr. Rourke for the paper which he had laid before the meeting, and was seconded by Dr. Godfrey.

By request, His Worship the Mayor rose and said. " I am quite unprepared to make any remarks whatever. The suggestions made some years ago by Dr. Edwards appeared to me at the time very reasonable, and I do not know why they were not acted upon, I can only say that the citizens of Montreal are too uneducated to understand these principles. I went in last year for the purpose solely of introducing sanitary matters. It is the citizens of Montreal that are at fault. The Legislature are very willing to grant any reasonable request. They have granted all that we ask, and more than we dare carry into execution. Dr. Rourke spoke of small-pox being the result of badly ventilated drains. We have had small-pox as an epidemic for the last few years, but the deaths have been amongst those who spoke the French language. Persons speaking our lan-

guage are comparatively free; persons speaking the French language die. *That is not the effect of bad sewerage.* I read, sometime ago, of a Health Officer in the States who said that every sanitary matter he could suggest was carried out with the utmost cheerfulness. How is it in Montreal? They sack the houses of our health officers, and the health officers are sometimes obliged to fly for their lives. As I said before, it is the ignorance of the people. I may take the opportunity of stating that never in the history of Canada has any Legislature been so willing to grant us everything we asked as the present one. In conclusion, I may state that I have been very much pleased with the way in which Dr. Rourke has illustrated his plan."

Mr. Springle said: "Dr. Rourke's plan is based upon the supposition that the ventilating by fire-shafts in England has been a failure, as was demonstrated. If this new system is to be adopted, we might try it on a limited scale first and see if it be successful. I think it would be."

FOREIGN HEALTH STATISTICS.

United Kingdom of Great Britain, during four weeks ending October 16th: 21,562 births and 13,984 deaths were registered in London and twenty other large towns, and the natural increase of the population was 7,578. The mortality from all causes was, per 1,000: In London, 21; Edinburgh, 21.50; Glasgow, 21.50; Dublin, 25.25; Portsmouth, 21.75; Norwich, 25.25; Wolverhampton, 24.75; Sunderland, 25; Sheffield, 25; Birmingham, 25.25; Bristol, 27.50; Liverpool, 25.75; Salford, 31.25; Oldham, 26.75; Bradford, 31; Leeds, 27.25; Hull, 29.50; Newcastle-upon-Tyne, 24.50; Leicester, 29.25; Manchester, 26.75; Nottingham, 22.50.

Other foreign cities, at most recent dates, per 1,000: Paris, 25 (typhoid fever, 52); Rome, 28; Vienna, 25 (small-pox, 12); Brussels, 20; Berlin, 30 (diphtheria 34, typhus fever, 27); Hamburg, 22; Calcutta, 32 (cholera, 7); Bombay, 26 (cholera 7); Madras, 38 (cholera, 45); Amsterdam, 29 (typhus, 3); Rotterdam, 18; The Hague, 26; Christiania, 17; Breslau, 29; Buda-Pesth, 36 (small-pox, 8); Turin, 18; Alexandria, 38 (typhus, 4).—*The Sanitarian.*

Correspondence.

To the Editor of the Public Health Magazine :—

The proposed tax on Insurance Companies is not only unjust as regards life companies, but perfectly ridiculous as regards insurance against accident. For instance a ticket for an assurance of \$3,000 for one day is sold for 20 cents; the Government tax on this would be 90 cents. This shows that the Bill has been drawn up in too great a hurry, and without due forethought.

As I have said, it is unjust, for the business of Life Insurance is a means by which provision can be, and is, made for the support of widows and orphans, and is deserving of every encouragement. Any tax, therefore, that increases the expense of insurance, will greatly discourage and prevent persons insuring their lives; in no other country is such a tax imposed. It is the duty of Governments in every country to do all in their power to help and foster these institutions; for, were it not for Life Insurance Companies, not only would our charitable institutions be crowded to excess, but paupers innumerable would be left in the hands of Municipal authorities or Governments to provide for. I have, in my own personal experience, seen cases where, had it not been for a policy on the life of the head and defendant of the family, widows and orphans would have been left to the cold charity of the world. It is hard, very hard, even under present circumstances, to get the industrial classes to insure their lives, although they are the people most in need of it; but if you tax them for making provision for their families, it is almost useless to make any effort in that direction.

A meeting of the representatives of Life Insurance Companies was held in the Citizens' Insurance Company's office this day, when the following gentlemen were requested to go to Quebec to induce, if possible, the Hon. Treasurer to strike out altogether the clause in his Bill respecting Life Insurance Companies: W. H. Ramsay, M. H. Gault, Walter Burke, Thos. Simpson.

Yours, &c.,

EDWARD STARK.

Montreal, 12th December, 1875.

Reviews.

CANADIAN ILLUSTRATED NEWS.—This weekly paper is fast becoming a *sine qua non* in every household. Its general get-up is much improved this year. As a newspaper, it is very excellent; and its art department is equal to that of any illustrated paper on this continent. In the week ending December 18th is an excellent portrait of the late lamented Rev. James J. Murphy, with a short biography of him; also, portraits of two members of the Ministry in the Legislative Assembly of Quebec, the Hon. Pierre Fortin, M.D., Speaker of the Legislative Assembly, and Hon. H. G. Malhiot, Q.C., Commissioner of Crown Lands. There is also a good cartoon on the Railway policy of the Quebec Legislature, and a wood-cut of that excellent little tug steamer, "Progress," making its way through field ice, and many other illustrations of interest. We cannot let this month pass without advising all our subscribers to take the *Canadian Illustrated News*.

THE CHOLERA EPIDEMIC OF 1873 IN THE UNITED STATES.—The introduction of Epidemic Cholera through the Agency of the Mercantile Marine; Suggestions of Measures of Prevention, by John M. Woodworth, M.D., Supervising Surgeon United States Merchant Marine Hospital Service; Washington Government Printing Office, 1875. Space does not allow of us entering our review this month, as the subject is of great importance, and deserves more than a few cursory remarks.

PUBLIC HEALTH MAGAZINE,

JANUARY, 1876.

HYGIENIC, VITAL AND MORTUARY STATISTICS.

We are glad to be able to give our readers the good news that the Quebec Legislature have determined to establish a comprehensive system of Hygienic and Mortuary Statistics. This, there can be little doubt, will greatly increase the prosperity of our Province. It will, among other things, be a stimulus to immigration, when it is shewn conclusively that we compare favorably with the other Provinces and the United States as regards healthfulness. Hon. Mr. Ouimet, Dr. LaRue, and other medical men in the Legislature, have been working for some time in this matter, and last month a committee was struck to take evidence and lay a plan before the House for the above end. Dr. Geo. A. Baynes, of Montreal, who has devoted much time to this branch of sanitary science, was called on to give suggestions as to the practicability of such an undertaking, and as to what system could be adapted to this Province. As soon as we can we will furnish our readers with an approximate percentage of the mortality in the Province. We have been collecting facts slowly, and we hope at an early date to have a fair statement. This step of the Legislature will partly aid us.

Dr. Baynes' suggestions, which have been collected from many systems now in use, and are specially adapted to the Province of Quebec, may be summarized as follows :—

“To have valuable Hygienic statistics we must work on an accurate basis of facts, derived from a sufficient amount of experience, and tabulated with proper precision. The elements

of statistical inquiries are individual facts, which, having been put together, or classed, must have definite and constant characters. For example, if numbers of cases of a certain disease are to be assembled together in one group with a definite signification, it is indispensable that each of these cases should be what it purports to be, a unit not only of a definite character, but of the same character as the other units.

“In other words, an accurate diagnosis of the disease is essential, or statistical analysis can only produce error. A great responsibility rests on those who send in inaccurate statistical tables of diseases. It is much better to have a large heading of undetermined diseases than, when in doubt, to put a case of disease under a heading to which it has no pretensions (*Parks*). Therefore, it is absolutely necessary that the sources of information should be from responsible persons.

“Having established this fact, it is necessary, then, for the Legislature to determine those best suited to collect and supply the requisite returns upon which the statisticians are to base their statistics.

“In this Province there is much more difficulty in obtaining this information than at first sight would be supposed.

“There is the ignorance of the poorer classes who do not see the benefits that will eventually come to them by assisting those who have the matter in hand. Then again, their poverty will not allow of them paying the requisite fee for such registration of births, marriages and deaths.

“To complicate matters, the various creeds and nationalities object to civil officers examining their private books. This latter objection can only be surmounted by the consent and order of the bishops and other persons having authority over the dissentient clergy, many of whom keep no register whatever of the births in their congregations, or the burials at which they officiate. I should recommend the following instructions to be given the person or persons appointed to attend to these matters:—

"In the record of births, the date and place of birth, the name of child, (if he have any) sex, nationality, and color of child, the names of the places of birth of the parents, occupation, residence, and date of record.

"In the record of marriages, the date and place of marriage, the official station of the person, by whom married, the name and place of birth of the contracting parties, the residence of each, age, nationality and color, condition, (whether) widowed or single, occupation, name of the parties, and date of the record.

"In the record of deaths, the date of the death, the name of deceased, sex, nationality, color, and condition, (whether single-widowed or married), the age, residence, occupation, the place of birth, place of death, the names and place of birth of the parents, the disease or cause of death, the place of burial, and the date of the record.

"Compel parents to give notice to the proper person appointed for that purpose of the births and deaths of their children.

"Every householder should give like notice of every birth and death happening in his house; the eldest of kin should be compelled to give notice of the death of his kindred, the keeper of houses of correction, prisons, hospitals, &c., should, in like manner, under a penalty if they neglected, give notice of births and deaths happening among the persons under their charge.

"Every sexton, or other person having charge of a burial ground or cemetery, or the superintendent of burials, having charge of the obsequies or funeral rites preliminary to interment of a human body, shall refuse such interment unless accompanied by a certificate properly filled up, as per blank form, by a properly qualified physician or surgeon, or other responsible person. Such returns to be sent in weekly, under a penalty if neglected.

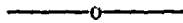
"Any physician or surgeon having attended a person during his last illness, shall, when requested, within a certain time to be determined upon after decease of such person, forth-

with furnish a certificate, as per blank form, to be supplied him by the authorities, without charge, under a penalty if neglected.

"The health officers, or other persons appointed for the purpose, having received the *weekly* returns from the above persons, shall be required to make a *monthly* return to the statist or statist of his district appointed by the Government for the Province, as per blank form.

"The Government must appoint at least two qualified statist, whose duty it shall be to receive the monthly returns of the health officers, or other persons appointed to send said returns, and to compare, examine, tabulate, and report on the foregoing returns, sending them, as per blank form, annually, to the Minister of Agriculture."

As we go to press, a telegram from Quebec informs us that Dr. LaRue's "Bill respecting Compilation of Statistics of Births, Marriages, and Deaths, and Causes of Deaths, in the Province of Quebec," has passed.



SANITARY HINTS; OR, HOW TO KEEP YOUR HOME HEALTHY.

"Heaven helps those who help themselves," is a saying which applies to nothing with greater force than to sanitary matters. This (fortunately for the present, and still more fortunately for the ensuing generation) is an age when great efforts are being made, both by legislative enactment and private munificence to improve the sanitary condition of the dwellings of the poorer classes.

But it cannot be too strongly impressed upon the minds of those on whose behalf these efforts are made, that the most important part of the work lies with themselves; and that no number of Acts of Parliament, and no outlay of funds will protect them from the ravages of epidemic and contagious dis-

orders, unless they themselves second the exertions made for the improvement of their condition by close attention to certain simple but all important sanitary rules.

The most recently built model homes, though replete with all the appliances which modern science can suggest, may readily be converted into pestilential fever dens, through the neglect by their inhabitants of cleanliness, ventilation, and the proper removal of refuse; while, on the other hand, there are few dwellings, even of the poorest kind, which cannot, by regular observance of such rules as it is my present purpose to point out, be made fairly habitable and healthy.

Surely, this being so, no one will refuse, who considers all that is meant by that one word *Health*, to spare a few moments necessary to master the suggestions which I propose to offer.

Health is that which, while it is necessary to the rich man to enable him to discharge his serious duties and responsibilities, and to appreciate the luxuries which his wealth places within his reach, is essential to the poor man to enable him to support those who are dependent upon him, and to derive enjoyment from the intervals of leisure spared from his days of toil.

How immeasurably above all other earthly considerations, therefore, is *health*, and how culpable is he who recklessly or carelessly throws away this precious boon! Let it not be supposed that health is a necessary attendant on riches, or that the upper classes are those who alone, or even first, benefit by the introduction of improved sanitary appliances. There is that in human nature which invariably makes it easier to suffer in company, especially if the company be that of our betters, and it would, we fancy, contribute greatly towards the contentment of many of our poorer brethren, if they could realize more fully the drawbacks, nay, the sufferings, which are in many cases the attendants on that which appears a prosperous and enviable position in life. The sense of heavy responsibility; the necessity oftentimes to keep

up a greater appearance than income justifies; the incessant *brain-toil*, with the infirmities, mental and physical, which it only too surely brings with it; the disorders consequent on inability to find time for sufficient bodily exercise, and innumerable other causes, go to swell the list of troubles which may well make Lazarus hesitate to envy Dives.

What does our laboring friend think when he is told, as he may be by any West-end physician, of the prevalence among the upper classes of painful disorders positively *induced* by the mental strain of business or professional responsibility, excessive study, and necessary sedentary habits; the same complaints, though not of course unknown among the poor, being amongst them of comparatively rare occurrence? No, let the poor man be content; let him say, with one of England's greatest poets -

"Order is Heaven's first law, and this confess,
Some are, and must be, greater than the rest,
More rich, more wise; but who infer from thence
That such are *happier*, shocks all common sense!"

Above all, let him remember that if he has *health*, he enjoys a blessing which is indeed "far above rubies,"—one for which hundreds of the envied rich would abandon without regret all the honors and luxuries of their position; and let him determine to preserve that precious gift for himself and others, by closely observing such principles and rules as we shall endeavor to lay down for him.

AIR.

The admission of plenty of fresh air into one's house is perhaps the first and most important consideration in the maintenance of health. Abundance of fresh air will of itself act as a preventive of disease, just as plentifully diluting a virulent liquid poison with water lessens and ultimately destroys its power.

We recollect hearing an anecdote related of Mr. Banister Fletcher, C.E., which is very applicable here. Mr. Fletcher was asked if he could improve some small houses in a court. He went to see them and advised a skylight over the staircase, with coarse boarding at sides, and perforated zinc over the

doors. He went a few mornings after this was done, to see how it answered, when he was accosted by one of the tenants, who said, "Oh, sir, we are all so much obliged to you for what you done. We've felt so much better. We wake now of a mornin' fresh as larks, and we used to have *sick* headaches."

When practicable, always keep the top sash of your window open in preference to the bottom. *Keep the register of your stove open.* An open grate with a fire in it, is one of the best modes that can be devised of ventilating a room, the draught drawing the foul air up the chimney. Where you have no fire, avoid the pernicious habit of closing the register, or stopping up the flue—particularly in bed-rooms—you thereby deprive yourself of one of the best aids to health you have. If the down draught from the chimney compels you, as may sometimes happen, to stop up the flues, do so, and treat the room by window ventilations as above mentioned. Never sleep in a small room without a fireplace, if you can help it. If you cannot, leave the door open; or, better still, open the window an inch at the top, even in the coldest weather. Rooms which have no fire-places should always have ventilating panes in the windows.

AVOID OVER-CROWDING.

This is of course a point of vast importance as regards *morality* and decency; but as a *sanitary* consideration is, to our thinking, of secondary consequence to that of *ventilation*. The number of persons inhabiting or sleeping in any given room does not affect the healthfulness of that room so much as the facilities for the egress of foul air and the entrance of fresh air.

By a sanitary act passed in England, 1866, a limit to the number of persons who may inhabit any particular room is made, being one to every 300 cubic feet of air. But the opinion of the best medical authorities is, that 500 cubic feet should be allowed for each adult.

But the view we wish to impress upon our readers is that no quantity of space will render a room healthy, unless a current be maintained by proper ventilation, so that pure air may

be constantly taking the place of that which has passed the lungs.

WATER.

Keep your cisterns clean and covered. Cisterns and butts, of whatever material they are made, should be thoroughly cleansed at regular intervals, and should be kept covered. Woolen butts should be pitched inside. *Drink no water that is not clear and bright.* In any case, water for drinking purposes is better *boiled*, and should perhaps (as it will then have a flat, disagreeable taste), be flavored with tea or coffee. If boiled water be filtered through charcoal, this flatness will be removed, and its sparkle and brightness restored. Filters can now be purchased very cheaply, and no house should be without one. *Drink no water that has been standing.* This applies to any water which has been standing long in any position, but of course especially to such as has been near a sink or drain-trap. *See that you do not draw your supply from the same cistern that supplies the closet.* It should be enacted by Parliament that, the supply of water for the use of the occupants of a house should not be drawn from the same receptacle by which any closet is supplied, as the water may become tainted through the pipe supplying the closet.

SINKS AND TRAPS.

Look carefully after all drain traps. By every passage which lets water into a drain, bad air will return, unless the traps are kept in proper order. Frequently examine, therefore, all closets, sinks, and traps. See that felt gratings are kept on all traps, and not laid aside as is constantly the case. It is important that water be constantly poured down all traps which are in positions where water does not frequently pass in ordinary course.

If you do not understand the action of a bell or other trap, by all means examine one carefully, and you will see that they are *not traps at all*, unless kept full of water. It is well in hot weather, or when infection is abroad, to keep the water in the trapwell charged with some disinfectant. This will be sup-

plied to the poor gratuitously at the Board of Health Office. Any defect in a closet, or stoppage in, or bad smell from a drain, should be immediately seen to, and remedied, as more evil than can afterwards be cured may arise from these causes in a very short time.

DUST BINS.

Every house should be provided with a proper ash-pit or dust bin, and these should be emptied at least once a week, which removal should be undertaken by the Corporation. It is well to keep some disinfectant sprinkled over the contents of the dust bin.

Do not put any vegetable or animal refuse into the dust bin, as they rot there and throw off poisonous gases. *Better to burn them.*

All cesspools should be abolished by Act of Parliament, and every owner of premises where they exist should be required by law to fill them up and drain the premises into the common sewer. Slops should never be allowed to remain in any part of the house, but let them be promptly collected and passed into the drain. All floors should be thoroughly scrubbed at least once a week, and in hot weather it is well to mix some disinfectant with the water. Do all scrubbing in the morning, so that the floors may be dry by night. Never sleep in a damp room if you can help it.

WHITEWASHING AND PAPERING.

Whitewashing should be done at least once a year. Papering should be renewed at least once in three years, and care should be taken always to strip off all old papering before putting on the new.

It is better, from a sanitary point of view, that small rooms, and those occupied by the poor, should not be papered at all, but coloured, as the colouring is more easily renewed, and does not harbor infection or vermin. If, however, the rooms are large and airy, there is not, of course, the same objection to papering. Avoid bright green papers, as there is generally much poisonous matter in the colouring.

Always renew paper and whitewash after illness in any particular room or rooms, and have the paintwork and flooring thoroughly cleansed after the room has been properly disinfected. It is much cheaper to pay for whitewash than for medicine.

Miscellaneous Selections.

"TAKING COLD."

BY J. R. BLACK, M.D., NEWARK, OHIO, U.S.A.

Of all the erroneous notions pertaining to the preservation of health, none is fraught with more mischief than that about taking cold. According to the popular, and I may also say to some extent professional view, taking cold is the greatest disease and death producer in the world. Fully 80 per cent. of those who consult physicians premise by saying that they have taken cold. If a relapse occurs during convalescence, ten to one the blame is laid on the action of cold. "My pain is greater, I must have taken cold;" "My cough is worse, I must have taken cold;" "I do not feel as well this morning, I think I have taken cold, but I don't see how," are expressions which the physician hears a dozen times a day. The latter is thereby often led to the reflection that if it were not for death-dealing colds he would have little to do, and convalescence would seldom be interrupted. But if the physician takes the trouble to think a little more upon this subject, he will be convinced that to his own craft is due this stereotyped and never-ending complaint of his patients about taking cold. The sick and their friends nearly always take their cue about disease and its causes from the trusted family doctor; and he accounts very often indeed for an aggravation of the symptoms of those under his charge (the cause of which aggravation by the way may be, and often is, very difficult to detect) by the easy and satisfying explanation of having taken cold. In this way he gets over the trouble of attempting to make plain to untutored minds what is often a puzzling problem to the most trained intellect, and at the same time shifts the responsibility for the relapse on the uncomplaining and much-abused weather. So it is that men and women have been led to regard climate changes as the greatest enemy to their health; if it were not for them, their health would be next to perfect from the beginning to the end of the year. Thousands of consumptives, especially in the first and second stages of the disease, are firmly of the opinion that if they could only escape the malign influence of one cold after

another, their recovery would be assured. To this end precautions of the most thorough character are scrupulously observed, and yet cold after cold is taken; the patient, mother, or nurse knows not how.

To the physician, the taking of cold means the suppression to a greater or smaller degree of the sensible or insensible perspiration, and a temporary diversion of the blood from the capillaries of the surface to some internal part. There is, however, reason to believe that the characteristic effects of what is known as a cold in the head may be unattended with any interference of a proper functional activity of the skin. The respiration of very cold and damp air may produce direct derangement in the action of the lining membrane of the nostrils, throat, and windpipe. More especially is such an effect liable to arise from breathing for hours a very warm, dry, house air, of a temperature of 60° or upwards, and then in less than a second of time, the cold, damp air outside, of a temperature at zero, or even far below it. In my estimation this is the main cause of that exceedingly prevalent complaint, chronic catarrh of the head. The capillaries and follicles of the mucous membrane of the nostrils are every day repeatedly swollen and engorged with blood by highly heated air—so much so as to arrest for a time the usual mucous excretion—and then shrunk and chilled with cold. This sudden and oft-repeated alternation is too much for the vital harmony of the part; it becomes irritated, deranged, and diseased; just as even the tough skin of the hand will become irritated and inflamed by being repeatedly plunged in cold and then in hot water. In primitive times, when houses were more open, and consequently of a temperature more nearly that of the ambient air, such a thing as *ozæna* was almost unknown.

It has long been a familiar fact that cold as a disease-producing agent gives rise to no uniform results. Let a wave of cold air sweep over a continent, and how diverse the results upon the inhabitants! Upon some the result is a cold in the head, upon others an attack of rheumatism, upon others an attack of neuralgia, or of pleurisy, or of ague, or of lung fever, but upon the larger majority the effect is the very opposite of a diseased condition; that is, the cold air braces, tones, and enlivens the whole body. Why such diverse effects, why should an external condition be the source of disease to one and of increased health to another? If cold is *per se* necessarily

antagonistic to health and life, why should the larger part of mankind feel better and stronger under its influence? One of the plainest rules of logic is that a cause cannot produce opposite effects, or that putrid pus injected into the blood of two living animals will not produce increased health in one and disease in the other. The absence of uniformity in the effects of cold upon the body, either in the production of a characteristic disease, or in the presence or absence of this state, indicates that it is not necessarily a cause of disease, and that when it becomes so the effect properly arises from some special abnormal condition of the body. In other words, a cold is simply a 'developper of a diseased condition,' which may have been latent or requiring only some favoring condition to burst out into the flame of disease. That this is usually the correct view of cold as a disease-producing agent under all ordinary circumstances may be made plain by reflection upon personal experience, even to the most ordinary understanding. When the human body is at its prime—with youth, vigor, purity, and a good constitution on its side, no degree of ordinary exposure to cold gives rise to any unpleasant effects. All the ordinary precautions against colds, coughs, and rheumatic pains may be disregarded, and no ill effects ensue. But let the blood become impure, let the body become deranged from any acquired disorder, or let the vigor begin to wane, and the infirmities of age be felt by occasional derangements in some vital part, either from inherited or acquired abuses, and the action of cold will excite more or less disorder of some kind, and the form of this disorder, or the disease which will ensue, will be determined by the kind of pre-existing blood impurity, or the pre-existing fault of the organic processes. If the pre-existing fault be in a deficient excretion of lactic and uric-acids by the kidneys and skin, the disease developed by the cold will be rheumatic; if the lungs be at fault, either by acquired or inherited abuses, inflammation will be likely to ensue; or if there be conjoined with the pulmonary fault an impure condition of the blood from the long-continued re-breathing of breathed air, consumption will not unlikely show itself. In no other way can the influence of cold in the development of diverse diseases be accounted for; developing this disease in one, and that disease in another; this disease at one time in a person, and another disease at another time; while at other times and seasons, great and prolonged exposure to cold is harmless.

It follows from these facts and considerations that the secret of avoiding the unpleasant consequences thought to spring wholly from the action of cold upon the body has very little dependence upon exposure, but a great deal upon an impure and weak condition of all the vital processes. In other words, with an average or superior constitution and an intelligent observance of all the laws of health, men and women could not take cold if they wanted to, they might be exposed to the action of cold to a degree equal to the beast of the field, and with like impunity. But in the case of persons with feeble constitutions, and who disregard knowingly or otherwise, and most frequently otherwise, the conditions of healthy existence, no degree of care will prevent the taking of cold, as it is termed. They may live in houses regulated with all the precision of a hot-house—they may cover themselves with the most highly protective clothing the market provides, and yet they will take cold. I do not think the consumptive person lives, or ever will live, even if kept in a temperature absolutely uniform, and clothed in a wholly faultless manner, in whom the well-known signs of one cold after another will not be apparent. But, on the other hand, there are those who, like the late Sir Henry Holland, of good constitutions and living in accordance with the laws of health, may travel as he did from the tropics to the poles again and again, clad only in an ordinary dress coat, and yet scarcely know what it is to have a cold or sickness of any kind. The truth is, that in order to avoid taking cold from ordinary, or even extraordinary exposure, the vital processes of the body must be made strong enough to rise above the untoward influence of external conditions. If the body is not thus superior, it is so weak that it can only act harmoniously under the most favorable conditions, and a continued state of health is not among the possibilities.

The conclusion from all this is, that neglecting the conditions upon which strength of constitution and purity of blood depend, and then striving to avoid in a sedulously careful manner the evil influence of cold upon the body, is like neglecting the substance for the shadow of health, or, more properly, it is like one who starves his body, and then strives to keep quiet in order that his strength shall not be exhausted. Let food be taken, and the exhaustion from exercise will not ensue; let all the conditions of health be observed, and then the natural changes of the weather will fall harmlessly on the healthy functions of the body.