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THE
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DEVOTED TO
PUBLIC HEALTH.

VOL. II.]

JULY, 1876.

[No. 7.

Original Communications.

OZONE.

BY AN AMATEUR IN METEOROLOGY.

(Continued.)

For a long time many believed that Ozone was not to be found in ordinary atmospheric air, and only quite recently has this point been settled, apparently beyond question. The experiments of Houzeau, Schonbein, Andrews, and Lowe, prove that it is almost always, if not always, present in the air, though in ever varying quantities, varying daily and even hourly. Mr. Lowe based his opinion on several thousands of experiments, and he writes, "On no occasion has my sensitive powder test failed to show traces of it, even at a time when the ordinary test-slips have remained for days uncolored."

Dr. Fox says: "Ozone is found in very small quantities at times when the atmosphere is much contaminated with oxidizable emanations, putrid or otherwise, disengaged from decomposing animal and vegetable substances. A moist and calm state of the weather accompanied by a minimum of Ozone, has been considered to lead to the development of fever, in consequence of the accumulation of the products of decomposition and fermentation. The air in this meteorological state becomes contaminated with an excessive amount of poisonous substances, not only on account of the absence of all movement of this medium, but from the want of sufficient Ozone to oxidize them, or to render them innocuous. On the accession of an ozoniferous current, a mitigation in the intensity of such a fever and its gradual extinction have been noted.

As regards the influence of the seasons on the amount of Ozone manifested, most observers have found it to be more

abundant in winter than in summer. This has been accounted for in this way: that more of it is consumed in oxidizing the organic emanations which are so much more abundant during the latter season. It appears from observations made at Rouen, which are said to have been very accurate, that the spring season exhibits the maximum of Ozone. The means of the different seasons for the four years, 1861-1864, are represented by the following figures: Winter (January, February, March) .22; Spring, (April, May, June) .56; Summer, (July, August, September,) 37; Autumn, (October, November, December,) .19. According to this there was less Ozone in the atmosphere of Rouen in winter than in summer.

Dr. Prestel has found the greatest quantity of Ozone in the air at the time of the equinoxes; that of the spring equinox being in excess of that of the autumn. He found the lesser quantity just before the solstices; that before the winter solstice being greater than that a little in advance of the summer solstice.

Schonbein states that the falling of snow is attended by a very strong Ozonic reaction. This he believes to be owing to an electrical disturbance in the air that is said to be caused principally by the breaking up of the snowflakes. Scoutetten finds the occurrence of snow and hail to constantly coincide with an increase in the amount of atmospheric Ozone.

Again quoting from Fox, he says: "Speaking generally, it may be said that Ozone is contained in the air in larger quantity during the winter and spring months than during the summer and autumnal ones. Why? Winter and spring are especially characterized by rain, snow, hail, a maximum of electricity, low temperatures (hence a minimum of decomposing and noxious principles) and high winds. The great activity of vegetable life during the latter season must not be forgotten.

Summer and autumn are, on the contrary, distinguished by high temperatures, a maximum of air-pollution owing to the decomposition of a comparatively large amount of animal and vegetable matters, by a minimum of electricity in the lower atmospheric strata, and by the infrequency of gales."

There is a daily and even an hourly, as well as a monthly, variation in the amount of Ozone in the air. It has been pretty conclusively shown that there is a greater amount of it in the air during the night and early morning than during the day. The Ozonic reaction is said to be strongest toward sunrise; the next strongest toward sunset; the next when the sun is near the nadir; and the minimum near midday.

Ozone is Nature's great disinfectant. "A little Ozone goes

a long way" in disinfecting. Schonbein found that air containing $\frac{1}{341000}$ of Ozone had the power of disinfecting its own volume of air loaded with the effluvia given off in one minute from four ounces of highly putrid flesh.

"Ozone is found in greater abundance in pure country air than in impure town air, on mountains than in valleys, at the seaside than inland, in well drained and ventilated towns than in those where these important sanitary matters are neglected.

"It is nature's great deodorizing and purifying principle, that oxidizes the emanations from decomposing animal and vegetable substances with which the air is constantly being contaminated, thus rendering them innocuous. The atmosphere would be so polluted by its admixture with the noxious matters evolved during the putrefactive changes which are unceasingly taking place on the globe, as to be unfitted for sustaining animal life, were it not for the all-pervading influence of the 'great disinfectant' Ozone. In thus sustaining the salubrity of the atmosphere by destroying its impurities, it, in its turn, suffers destruction. If this were not so, there would necessarily be an accumulation of Ozone prejudicial to animal and vegetable life; for it is always being produced not only on the surface of this planet, but in the wondrous envelope which encompasses it."

It has been observed that air, in passing over densely-populated towns, becomes deozonised, the Ozone having been used in the oxidation of the noxious exhalations arising from all aggregations of human beings. In large commercial cities, Ozone is steadily deficient. It was found that the air of the public grounds at Washington gave evidence of abundance of ozone, while in the air of the streets it was absent. On this point, Dr. Evans observes: "The N.E. wind reaching Hackney from the country is found to be highly charged with Ozone, but on arriving at Fulham, after having crossed London, it appears to have lost almost all traces of this substance. Precisely the converse of this occurred on Saturday, when the wind blew from the S.W."

At seaside stations an enormous amount of ozone is indicated, while the quantity exhibits great uniformity. There is a greater amount of it found at elevated than at low-lying stations. This is especially the case at inland stations. "Mr. Glaisher found that an ozonoscope indicated at a height of 85 feet on the sea-coast 2°.2; whilst at the same elevation inland it exhibited 0°.6. At 170 feet the coloration inland amounted to 1.3, and at 255 feet to 3.8."

Prof. Heaton, Burder and others assert that Ozone is never present in the air of inhabited rooms, even though a window

may be open. Fox says, however, "A very sensitive test suspended in a room with closed windows, situated in the country, or on the outskirts of a town, will, according to my experience, generally indicate its presence. The current of air which is always rushing towards the fireplace contains a sufficient quantity of this body to produce, after an exposure of a day or two, a very decided coloration."

As to the natural sources of atmospheric Ozone, it is thought that the friction of water drops against air, and the attrition of particles of air against each other by the wind, producing electricity, generates Ozone. The researches of Dr. Daubeny, in 1866 (*Rept. to Brit. Assoc.*), tended to show that atmospheric "Ozone is almost entirely due to plants, the green parts of which generate Ozone during the day, whilst emitting oxygen; and that flowers generate no Ozone."

The artificial generation of Ozone in rooms, especially in the wards of hospitals, has been suggested by Dr. Richardson.

It must be borne in mind, that while a certain proportion of Ozone in the air appears to be essential to health, a large amount of it may be deleterious.

Correspondence.

PULLMAN CARS AND VENTILATION.*

To the Editor of the Sanitary Journal.

SIR,—For some time past my attention has been directed to the construction of the sleeping department of the Pullman cars, and in hopes that the requisite modifications would be gradually introduced, I have not previously adverted to the matter. At present the beds in each section are opened out at night, after having been tightly closed for a period of twelve or fourteen hours. Into these very beds a stranger enters, probably partially recovered from some infectious disease, such as small-pox, scarlet fever, etc. He makes his exit, and at once these beds are closed and fastened down carefully again until the following night, when the same process of bed making is observed, with a change of sheeting, as the case may be. Now, it appears to me that a perforated modification of the bed casings would very considerably improve the condition of comfort and purity of atmosphere. Such perforations to be directed outward so as not to communicate with the interior of the car.

* A portion of this letter was published in the *Mail* a short time ago.

It is high time some action should be taken in so important a matter, when the public are liable to become the subjects of disease, in so unlooked for manner. If you will endeavour to draw attention to this point in your valuable Journal, it may tend toward inducing the Pullman Company to reconsider the present construction of their *sleeping car*, in which disease, is often *wide awake*.

Truly yours,

JAMES A. GRANT, M.D.

Ottawa, June 23, 1876.

LIMIT TABLE OF WEIGHTS AND MEASUREMENTS.

To the Editor of the Toronto SANITARY JOURNAL

SIR,—The following table will be of service to the many examiners in Life Insurance in Canada, who are at the same time subscribers of your most excellent Journal. It was constructed by me seven years ago, as a guide in The Globe Mutual Life of this city, but has never been published. Experience has confirmed its value as a rule, that applicants 25 per cent. under standard weight and 45 per cent. over, are not safe cases for insurance at regular rates. As a limit therefore of under and over-weight, it will aid the examiner in forming an opinion of the safety of the risk for his Company :

LIMIT OF UNDER-WEIGHT, 25 PER CENT.—LIMIT OF OVER-WEIGHT, 45 PER CENT.

Height.		Chest.	Standard Weight.	25 p.ct. Under-w't.	45 p.ct. Over-w't.
ft.	in.			lbs.	lbs.
5		33½ in.	115 lbs.	92	167
5	1	34 "	120 "	96 "	174 "
5	2	35 "	125 "	100 "	181½ "
5	3	36 "	130 "	104 "	188½ "
5	4	36½ "	135 "	108 "	195 "
5	5	37 "	140 "	112 "	203 "
5	6	37½ "	143 "	114 "	207 "
5	7	38 "	145 "	116 "	210 "
5	8	38½ "	148 "	119¾ "	215 "
5	9	39 "	155 "	124 "	224¾ "
5	10	39½ "	160 "	128 "	232 "
5	11	40 "	165 "	132 "	239 "
6	0	41 "	170 "	136 "	246 "
6	1	41½ "	175 "	140 "	254 "

Twenty-five per cent. underweight is the loss of one-fourth of the man, and calls for the most searching investigation on

the part of the examiner. These light-weight cases may be the result of chronic dyspepsia, diarrhoea, or dysentery, marasmus, hæmorrhoids (bleeding), hypertrophy of the heart with excessive impulse, albuminuria, Bright's disease; and, in the case of females, some chronic uterine disease. The exceptions are few in which it is safe to disregard these limits. In every such case of under-weight, tests for Bright's disease, and other obscure organic mischief are imperatively indicated. In this connection will be seen the importance of being accurate in stating the height and weight. Mistakes might cause the rejection of a good risk, or the acceptance of a bad one, at the Home Office.

Yours very truly,

THEODORE PARKER, M.D.,

(Medical Director of the Globe Life Insurance Company of New York.)
New York, June 16, 1876.

PRACTICAL NOTES AND EXTRACTS ON HYGIENE

BY THE EDITOR.

(Continued.)

EXAMINATION OF WATER.

A complete examination of a sample of water can only be conducted in the laboratory, and by a professed chemist; but some easily applied methods may be described here, by which a fair estimate of the quality of water, and as to whether it may be safely used, may be arrived at. Regarding the examination of water, Wilson says: "It is advisable to make inquiries with regard to the source of the water, and to determine the probability, or otherwise, of its pollution. Wells, for example, which have hitherto yielded a good and wholesome water, may become contaminated with the fluids draining away from the recent filth-accumulations, from graveyards, from neighbouring cesspools which have become leaky, or from the bursting of some sewer or drain. Reservoirs or cisterns, again, may become so foul, through neglect of cleansing them at stated intervals, that the water-supply is eventually rendered totally unfit for use, and becomes productive of disease; or the cistern overflow pipe, should it open directly into a drain, may become the channel for the escape of pent-up sewer-gases, which are, in their turn, absorbed by the water stored in the cistern. In small villages, a sudden rise of the subsoil-water, occasioned by heavy rains following a period of drought, may wash into the wells the soakage of middens, cesspools, or open ditches

filled with sewage; or the supply of a large town from a river contaminated with sewage, may convey impurities to every household, through some temporary inefficiency in the filtering process. All these, and numerous other contingencies, have to be borne in mind, more especially as regards the possible contamination of a water which is constantly used, inasmuch as it is not sufficient to pronounce such a water unwholesome, without, at the same time, endeavouring to ascertain the source of the pollution.

In collecting water for analytical purposes, and particularly when it is intended that the samples shall be transmitted to a professed analyst for examination, the following directions should be observed:—An ordinary glass-stoppered Winchester quart bottle will answer very well for the conveyance of the water. It should be cleaned out with strong sulphuric acid, then rinsed with ordinary good water until the rinsings are no longer acid, and finally washed out with some of the water to be examined. The bottle should be filled almost up to the neck, stoppered, and the stopper covered over with a piece of clean calico, tied, and sealed. No luting should be used except sealing-wax, and even that should be dispensed with if possible. If the water contains organic matter, it should be examined at least within forty-eight hours after being collected.

In collecting pond or lake water, the bottle should be plunged into the water as far as possible from the bank, with the mouth well under the surface, so as to avoid the scum, care being taken, at the same time, that the mud at the bottom is not disturbed. If the sample is taken from a town supply, it should if possible be collected direct from the mains, or from the water-jets at the cab-stands or public fountains, in which case the water should be allowed to flow for some time previous to filling the bottle. If taken from a house service-tap, the water should also be allowed to flow for some time before collecting. With regard to river water, it is recommended to select the middle of the stream, to avoid the outlets of sewers and feeders, and to note whether there has been previously a heavy fall of rain or a long drought."

In making a physical examination of water, Parkes says: "The *smell* and *taste* of the water give some indications; for the smell the water may be warmed, or distilled, when the odour of faecal matter is often brought out clearly both in the distillate and residue. If the water is put in a stoppered bottle, which it half fills, and is exposed to light, and then opened and smelt after a few days, commencing putrefaction, or the formation of butyric acid, or something similar can sometimes be detected.

Taste is an uncertain indication. Any badly tasting water should be rejected, or purified before use. Suspended animal organic matters often give a peculiar taste, so also vegetable matters in stagnant waters. Some growing plants, as *lemnia* and *pistia*, give a bitter taste; but most growing plants have no taste. Perfectly dissolved animal matter is frequently quite tasteless. As regards dissolved mineral matters, taste is of little use, and differs much in different persons.

Iron is the only substance which can be tasted in very small quantities. A permanently hard water has sometimes a peculiar *fade*, or slightly saline taste, if the total salts amount to 35 or 40 grains per gallon, and the calcium sulphate amounts to 6 or 8 grains. Water nearly free from carbonic acid hardness, such as distilled water, is not so pleasant as the brisk well carbonated waters; but it is difficult to define the kind of taste or absence of it.

The suspended matters may be either mineral (sand, clay, chalk, fine films of mica), or dead animal or vegetable matters, or living creatures (plants and animals).

To detect the presence of Suspended Matters.—Pour some of the water into a tall white glass vessel placed on white paper or plate, and look down it; a depth of 2 feet is desirable, but a stratum of a foot or 18 inches will give valuable information. A similar glass with distilled water should be used for comparison. Substances giving colour and opacity to water can be thus detected when merely looking through the water gives no indication. Perfectly pure water has a bluish tint, and several feet of thickness do not obscure the bottom of the vessel. As water becomes turbid the bottom of the vessel is less distinctly seen, or is obscured altogether, by perhaps only a few inches of water. The depth obscuring the bottom of the vessel should be noted, and the kind of colour.

Living animals moving through the water, like the water-flea or cyclops, are best detected by looking through the water. Any water which is very turbid is a suspicious one.

Suspended sand or clay gives a yellow, or yellow-white turbidity; vegetable humus and peat gives a darkish; sewage gives a light brown colour. But the colour or turbidity alone is a very insufficient test. Then boil the water, and pour it back into the long glass. Sand, chalk, and heavy particles of the kind will be deposited; finely suspended sewage and vegetable matter is little affected, unless it be a chalk water, when the deposit of calcium carbonate may carry down the suspended matter. When the water is commencing to boil, smell it to see if there is any trace of sewage." If there is not, add a little caustic potash to the hot water. If an unpleasant odor is now detected, it is very good evidence that the water contains considerable quantity of organic impurities.

CONDITIONS OF EXCELLENCE IN PLUMBING WORK.

Report to the Public Health Association of New York, by JAMES C. BAYLES,
Chairman of the Com. on House Drainage and Water Service.

In the brief report which we have the honor to offer this evening, I shall present a few facts of interest which we deem of prime importance in connection with drainage and water service in houses drained into sewers and supplied from public mains.

It is because of the conditions with which we have to deal—especially those pertaining to foul and unventilated sewers, of bad construction and inadequate capacity—that the problem of sanitary house drainage presents so many practical difficulties. Were our sewers well ventilated, we should have a very simple problem for consideration. As it is, however, the difficulties are more apparent than real, for with good materials, good workmanship and adequate ventilation for the waste pipes, experience has shown that it is possible to drain houses even into foul and unventilated sewers, without danger of bringing poisonous gases into them. These three essential conditions of safety will be briefly considered in this report.

1st. *Good Materials.*—In much of the plumbing work of the time, we see exemplified the worst evils of the contract system. Bids are made by competing plumbers on loosely drawn specifications; sometimes upon a close calculation of how little the work can be done for; sometimes with a knowledge of what others have bid; and sometimes with a reckless purpose to get the job by putting the figure so low that no one is likely to go lower—the bidder feeling certain that he can make a profit out of it in some way. The sharp competition which now exists in the plumbing business enables builders to get work done very cheap by contract, and as work cheaply done is rarely worth more than is paid for it, we find a growing demand for cheap and inferior materials. It is not unusual to find iron soil pipe used which is utterly unfit for employment in buildings. We have seen pipe set up in houses which, tested with calipers, has been found to be not more than an eighth of an inch thick. The objections to this kind of pipe are numerous and important. It does not possess the requisite strength; it is too quickly eaten through with rust, and it is very apt to have sand holes in it which soon develop points of leakage. The difference in cost between light pipe and that of suitable weight is not great

enough to make the economy profitable. We learn upon enquiry in the trade that the principal is for very cheap and light pipes. As made, they are as hard as chilled iron—owing to the fact that they are cast so thin—and almost as brittle and difficult to cut as glass. If dropped they are very apt to crack, and in this condition are often put in by careless workmen, who are unwilling to report the fractures they have caused in handling, for fear they will be charged with the price of lengths to replace those broken. In much of the cheap work of the time we find four-inch iron pipes used, which average about eight lbs. to the foot. In good work, four-inch iron pipe should weigh at least 12 lbs. to the foot. Pipes of this weight, well made of good iron can be had in the market, and they should always be called for by architects.

In lead pipes the objections to light weight are based chiefly on the fact that they are not durable, and are more readily perforated by corrosion than pipes of proper thickness.

When cheap materials are tolerated at all by builders, we usually find them in all departments of the plumbing work of a house.

Among the worst evils of the present time are the cheap pan and valve closets now so generally used. Wrong in principle, flimsy in construction, and liable to constant derangement in their working parts, they are, as the rule, a perpetual source of trouble, a constant nuisance, and almost always a constant danger.

So long as the contract system is tolerated, so long will cheap material be used in plumbing work. If we force plumbers to bid below the cost of good work, we cannot expect them to lose money in executing their contracts. If we expect them to do a dollar's worth of work for fifty cents, we expect to cheat them, and we have no good reason to complain if we find that we have ourselves been cheated.

We now come to the consideration of the second condition of safety—namely,

Good Workmanship.—In New York there is no trouble in getting work done well, if we are willing to employ honest and capable men, who will demand a fair price. There are plenty of plumbers who know how to do good work, and will always do it if we give them a chance. In a consideration of the subject so brief and general as this report must necessarily be, your committee cannot point out what they believe to be the difference between good and bad workmanship in plumbing. To do this would be to present a complete manual of the plumber's art. We can only say that good workmanship

can be had whenever there is a demand for it, and the difference in cost between good work and bad is far less than is commonly supposed. The most moderate bills for plumbing work we have ever seen—quality, durability and economy of renewals and repairs considered—have been those presented by plumbers who have been given a *carte blanche* to do work as they thought best.

In the judgment of your committee, the ignorant, incompetent and dishonest plumbers, whose work we see around us on every side, are the legitimate product of a pernicious system encouraged by builders and tolerated by the public, and that with the abolition of that system he will disappear from the ranks of the trade. Two or three instances which have come to the notice of your committee will serve to show the effect of this system in lowering the standard of workmanship. In one of these instances a plumber working by contract had substituted $\frac{3}{4}$ inch gas pipe for the lead pipe called for in the specifications in all positions where the fraud could be covered up and hidden. In another case the contract for plumbing work in a row of new houses was awarded to a man who underbid all competitors. He did the work, and while it was not well done in any respect, it was accepted and paid for. The houses were subsequently sold and occupied, but it was not long before the foul and offensive condition of the cellars attracted attention and led to investigation, which revealed the startling fact that in no case had any connection been made with the sewer. The soil pipe was carried down to the cellar and far enough underground to conceal the fact that it ended there. The drainage of the houses had been emptied into the soft "made ground" constituting the cellar bottom, and when the soil ceased to absorb it, the smell gave warning of the nature of the evil to be remedied. The architect had taken it for granted that the soil pipe would be carried out to, or in some way connected with, the sewer, but this was not specifically called for, and the plumber had taken advantage of this omission to save expense. These are extreme cases, and are only used by way of illustration. We do not usually find dishonesty in the matter of workmanship carried so far, but it commonly goes far enough to give rise to conditions prejudicial to health, if not fatal to life.

In the judgment of your committee, the only remedy for bad workmanship lies in educating the public to an appreciation of the importance of good workmanship. Character and experience should count for something, and those who build houses must be willing to let the plumbers make as large a

margin of honest profit as mechanics in other trades are allowed.

Ventilation for Water Pipes.—The third and last condition of safety to which your committee would call attention is good ventilation for the waste pipe system of a house. From the best information we can obtain, we believe that the soil pipe of a house should be carried from the sewer to a point above the roof with but one bend, and without diminution of size in the upper lengths. We believe, also, that there should be no trap in the soil pipe at any point, and that the sewers should be allowed to “breathe” through the pipes. When basins, baths or water closets are located in such positions that a long branch waste is needed to connect them with the soil pipe, said branch waste should be carried up and above the roof.—The only exception to this rule is in the case of houses in which the plumbing work has already been done imperfectly, and where leaks in pipes cannot be closed. In such cases the pipe had better be trapped below all house connections.

The importance of waste pipe ventilation seems to be very fully appreciated by sanitarians and by plumbers, but not by the general public. The idea seems to be that, as traps are specially intended to close waste pipes against an inflow of sewer gas, any further precautions taken to secure that end would be superfluous. This idea, is, of course, a mistaken one, based upon a misconception of the conditions existing in sewers and the forces at work to displace, or saturate with gaseous impurities, the water seals in traps. From careful and repeated experiments made under conditions favorable to fair and unprejudiced judgment—experiments which we should be glad to repeat in the presence of this association when opportunity shall be accorded for a fuller and more comprehensive report—your committee are satisfied that but little dependence can be placed upon traps of the usual S or half S form. We have found that their tendency to become unsealed cannot be guarded against under any but exceptional conditions, and that additional security is not attained by giving them more dip. This objection does not apply to all traps, however, and we take pleasure in calling your attention to a device of this description, invented by a skillful and intelligent practical plumber of Brooklyn, Mr. John Foley, which we are satisfied cannot under any circumstances be emptied or unsealed. The trap is adapted for use in all situations where traps are needed, and while its water seal offers no greater barrier than those in traps of other forms and equal capacity to the passage of sewer gas by the process of absorption and transmission, it only requires to be supplemented by the ventilation necessary under all circumstances, to make it perfectly safe and satisfactory.

In concluding this very incomplete and unsatisfactory preliminary report, your committee would say that the only noteworthy improvement of recent date which has come to their notice, in connection with water service, is a new pipe made by Messrs. Tatham Bros., of this city. This is a wrought iron pipe with a continuous tin lining. The iron pipe is made in the usual way by lap-welding. A tin pipe drawn to the required size is then slipped within the iron tube and expanded by hydrostatic pressure until it is locked firmly in position by conforming to all the inequalities of the iron surface. The screw couplings are also lined with tin by a very ingenious method, and tin washers are provided for insertion in all connections, which are so formed as to insure the maintenance of a continuous tin lining of sufficient thickness to resist the corrosive action of any water which would not destroy block tin pipe. Your committee consider this pipe theoretically and practically perfect. It seems to us to possess many practical advantages over tin-lined lead pipe, the merits of which have been so fully and conclusively shown in the public addresses on water of our respected president, Prof. Chandler. These are the only recent improvements of importance in plumbers' materials which have come to the notice of your committee. But few of the inventions of this kind upon which letters patent are granted possess any great practical value; but the fact that so many are turning their attention to the improvement of plumber's materials is gratifying as indicating an appreciation of the importance of improved drainage systems and a desire for progress in the direction of sanitary reform.

TRIALS AND TRIUMPHS OF A SANITARIAN.

BY BENJAMIN LEE, A.M., M.D., OF PHILADELPHIA.

(Read before the Section on State Medicine and Public Hygiene, American Medical Association, Philadelphia, June 8, 1876.)

"The Fever at Croydon, and Intermittent Water Supply as a Cause of Typhoid."

Alfred Carpenter, M.D., contributes to the *British Medical Journal* of Nov. 25th, 1875, a most interesting and instructive article, consisting of a brief history of a ten years' contest between an intelligent and determined sanitarian on the one side, and an apathetic health board, an ignorant populace and a venal and abusive press on the other. It opens with the epidemic of 1865 in the same district, the lessons which he

learned from it in regard to contamination of water-supply, and the methods of reform proposed. After a serious resistance, the local board at length yielded so far as to initiate a system of ventilation of the public sewers and certain improvements in the water supply, the result of which was that for ten years there was no recurrence of fever as an epidemic. Sporadic cases, however, indicated that still all was not right. A careful study of these cases showed him that they invariably followed an intermission of the water supply, at about the interval required for the incubation of typhoid.

With regard to such intermissions as causes of water pollution, he observes: "It is evident that whilst the pressure was continuous there could be only leakage *outwardly*, and no impure water or foul air could find entrance into the fully charged water pipes; but the moment the pressure was removed, there was no longer pressure from within." "Wherever, therefore, there were defects in the services, or faults in the construction of the taps, so that leakage occurred, then at the moment when the supply which was intended for constant service became intermitted" (that is, the pipes became empty or only partially filled) "contamination became possible and even certain." The "screw down taps" for water closets "delivering directly from the service pipe into the pan, which were largely in use in the poorer class of houses, he condemned especially in connection with an intermittent water supply. But both plumbers and householders combined to resist any innovation in this particular. Another cause of trouble," he says, "was the persistent refusal of plumbers to loyally carry out the regulations of the board. Every kind of subterfuge was employed to defeat the object; *dummy pipes were put up*, so as to *apparently* comply with the by-laws. When in real communication, the ventilators were often twisted and turned about at any and every kind of angle, so as to be perfectly useless for purposes of ventilation." As time wore on all these causes began to work their legitimate result; zymotic disease became more frequent until in February, 1875, three cases of typhoid were reported. These swelled by the first of April to upwards of four hundred, the water committee having most unwisely taken just the time when there were imported cases of typhoid in the place, to produce an intermittent water-supply in order to repair an engine. Dr. Carpenter protested, but the authorities would not hear to the epidemic being due to the water. He was "assailed in the most virulent manner as a public enemy for the course he took in the matter. His arguments were not listened to, and ultimately he was refused a hearing by the

local board; because it was said that his statements tended to bring the town into disrepute, did harm to its trade and damaged its property. One portion of the local press contained virulent attacks, with not a single line of regret for those who were victims of the disease." This is only a picture of what every one must expect to go through with who interests himself in the public health, and advocates the means essential to its preservation. The labor must be one of love. It will certainly never be one leading either to profit or to fame. But this history carries its encouragement as well as its warning. We must congratulate both ourselves and Dr. Carpenter that the "local authority has at last determined to follow advice, and to determine that in the future the channels by which contamination is possible shall not be allowed to remain." "This was resolved on," says Dr. C., "Nov. 2d, and that which I tried very hard to effect ten years ago, is now accomplished at a cost of nearly a hundred lives, and very much suffering to many hundred others."

This is, however, but one of many triumphs which his earnest, self-denying labors have resulted in. Look with me for a moment on this smiling English landscape. It is an afternoon in leafy June just a year ago. A broad domain of five hundred fertile acres stretches out in gentle undulations under our pleased gaze, while here and there the bright sheen of a meadow brook gives expression to the otherwise slightly monotonous expanse of luxuriant green—*green* as we never see it in our dry, over-stimulating climate.

About one-third of the wide expanse rolls in verdant billows under the gentle breeze, betraying the cereal growth which covers it. A tenth, or fifty acres, affords pasturage for herds of choice cattle, which dot the meadows here and there, adding the element of animal life to the otherwise motionless prospect.

Here and there are large variegated surfaces of brown and green, covering altogether not less than eight acres, bearing a generous burden of peas and beans, of beets and cabbage and vegetable marrow, of all the vegetables which the somewhat limited schedule of the English market-gardener can furnish, while immense fields of turnips and mangel wurtzels, sweet to the ruminating palate when winter has pinched off the tender grass and left no green thing for it to appropriate. Neat farm-houses, with their symmetrical groups of outspreading chimneys (you may see their counterparts by strolling through the grounds of our glorious Centennial Exhibition, to which England, let me say in passing, has contributed an elder brother's share with the fond pride of a great-souled mother)—such pleasant farm-houses, I say, crown the slight eminence

which we are approaching, and afford an easy and complete survey of the entire farm. As we near the gate we find that we are not alone: for here are gathered men of note from every department of science, from every learned profession. Jurists and divines, physicians and scientists, are here assembled with a common purpose. We are met at the entrance by our friend Dr. Carpenter, whose acquaintance we have already made, who gives us a hearty, informal English welcome, without any attempt at speech making or bombast, and places in our hands a little printed slip. From this we gather that we, in common with the large assemblage of distinguished men whom we have remarked, are visiting the Croydon Sewage Farm at the Hamlet of Beddington.

We are also informed by the same means that our host desires to make this visit the occasion for dispelling certain erroneous notions which have been industriously circulated with regard to sewage farms, by those who are opposed to this method of disposing of the refuse of our cities. Among these are, first, the prevalent impression that a sewage farm is necessarily a low, swampy marsh; second, that it injures the health of the neighborhood; third, that it damages property contiguous so far as residences are concerned. He also wishes to demonstrate the fact that sewage irrigation converts poor into rich and fertile lands, capable of yielding food both for man and beast, supporting cattle in themselves healthy and affording wholesome meat. Finally, he calls attention to the fact that an experience of full fifteen years has fully demonstrated that to make such an experiment a grand success financially, it simply needs that it should be gone into on a sufficiently ample scale. The larger the outlay the greater the proportional return. But we are not left to mere vague, unsubstantial theories and statements. Our host invites us indoors, and there, around a board groaning with viands to which fish, flesh and fowl, uniting with the vegetable world, all contribute their quota, we have practical demonstration, an *argumentum ad hominem* which none of us can resist, of the truths of the good doctor's assertions, at least as far as the sapid qualities of the articles *before* us, and shortly to be *within* us, are concerned—of their healthfulness we must be willing to accept his voucher and eat in faith, nothing doubting.

Try this delicious trout *enmayonnaise*. It was taken with a gaudy fly this very morning from the stream which you saw meandering among the meadows as we entered. Would that dainty fish, think you, deign to inhabit polluted waters? You are even asked to partake of the water itself. You,

absent-mindedly, perhaps, add a corrective, but you are assured that *Nessler* pronounces it free from *ammonia*, and declares the Wandle, though it does receive the effluent waters from the sewage irrigated slopes, to be as pure as the streams which feed Loch Katrine or peaceful Windermere. After having done full justice to the ample luncheon, we stroll through the grounds, and are surprised to notice the entire absence of all unpleasant odor, although the liquid sewage has been applied to the surface in a perfectly fresh state. The solid particles have previously been strained out in the course of its passage through the sewers, mixed with dry straw and the contents of dust-bins, and the surplus sold as manure to market-gardeners at two and six pence (between fifty and sixty cents) per yard.

Heartily pleased with all that we have seen, as well as tasted, convinced that we have seen the solution of one of the most difficult of our modern sanitary problems, we congratulate our hospitable entertainer on the success of his hazardous undertaking and take our leave, wondering when the day will come when the authorities of our own cities will be able to comprehend that what is now only a source of expense, and, too often, of disease, might be made to yield them instead a handsome revenue.—*Sanitarian*.

INFANT DIET;

A CURSORY VIEW OF THE SUBJECT.

By J. H. Hobart Burge, M.D., Surgeon to L. I. College Hospital, Consulting Physician to Sheltering Arms Nursery, etc., Brooklyn.

(Concluded.)

It has happened to me again and again to meet with infants who would constantly eject from the stomach any of the forms or combinations of milk yet mentioned, and who would show by intestinal irritation, colic, diarrhœa, or constipation, that these articles of food were not to be tolerated. In such cases, after any special indication for medical treatment has been met, recourse must be had to a change of diet.

It has been highly recommended to allow milk to stand a while till the cream has risen, and then to use only the upper two-thirds—stirring the cream again into this portion. I have had no experience with this method. It has doubtless some advantages, but it specially exposes the milk to some of the evil influences already referred to.

In some morbid states of the digestive apparatus, apparently produced by improper alimentation, I have found it service-

able to give for several days one part of pure cream and one part of limewater to four parts of water pleasantly sweetened.

When a physician is called for the first time to see a child who is bottle-fed, he will often find himself obliged by the circumstances to *allow, condemn, or endorse* an experiment already well under way with one of the forty foods now in the market. Unhappily the profession is very much divided in its practice. Some physicians condemn them all, some allow them all, and some discriminate; and, again, unhappily, the question of their excellence or worthlessness is so unsettled that this discrimination is made upon no sure basis, and confusion becomes worse confounded.

In the paper by Professor Chapman (*Sanitarian*, October, November and December, 1875), I notice the following: "The hue and cry thus raised against starchy food is encouraged by some physicians." Now I am gratified to know, since the class of physicians referred to includes all those who have both education and experience, that my friend Dr. Chapman is one of the number; for, only seven lines farther on, he uses this strong language: "Twenty years ago * * * the little sufferers were slowly but surely *starved to death* by gum, gelatine, starch, etc." The "hue and cry" which the doctor refers to, and which I think he wisely "encourages," at least twenty-five years ago caused the whole profession—Professor Chapman included, as he here admits—to lay aside the pernicious practice of which he speaks in the next paragraph, viz., that of "taking a child, when ill, from the breast for a day or two, and feeding it upon soothing, demulcent, unstimulating articles, such as gum arabic, Iceland moss, gelatine, arrow-root, and the like."

It is true that the market is heavily stocked with starchy articles highly recommended for the nutrition of infants, and that some of these articles are so nearly all starch that not to join in the "hue and cry" against them, is to become *particeps criminis* with those who live by starving the rising generation. Under these circumstances it is obviously the duty of every physician to discriminate between those articles which are entirely unsuitable to be used as nutrients, and those which may safely be used; and it is clearly his duty to make this distinction as absolute as his means of information will admit of. I have come deliberately to the conclusion that no one article used as a substitute for mother's milk can safely be recommended to the exclusion of all others. If a child is taking one of the amylaceous compounds, of which there are so many in use, and with it milk enough to supply all the tissues, and is thriving withal, I think it prudent to let well-enough alone, and

yet I would discourage the use of the same article in another case. The preparations the proprietors of which profess to make by some wonderful process known only to themselves, I class among the secret nostrums, and a careful examination of them has shown that they belong to that category. It is only necessary to read the labels accompanying them to distinguish them from all others.

Liebig's Food has certainly the endorsement of high authority, but the original directions for its preparation were so troublesome that practically they were never followed. Dr. Hawley prepares an article under this name which is without doubt just what he represents it to be and which is more manageable. I regard it as one of the foods that may safely be tried when seeking for something to take the place of any aliment which cannot be borne.

One of my experiments has been to feed infants with a cereal compound representing as nearly as possible the proportions of carbonates, nitrates and phosphates in healthy human milk. This was produced by carefully selecting a superior sample of wheat—scouring it—grinding, and then abstracting between thirty and forty per cent. of its starch. It was then made up into a dough and baked, after which it was re-ground and twenty-five per cent. of sugar added, and one-fourth of one per cent. of common salt. This comparison of carbonates, nitrates and phosphates in grain with the carbonates, nitrates and phosphates in milk, is, I know, the roughest kind of chemistry, and involves certain fallacies which must be apparent to any one upon the slightest reflection. Nevertheless, if we try to find a nutrient for our babes, let us see to it that it contains all the elements which we know are required to build up the animal tissues. The article with which I made the experiment alluded to is Jewell's Baby's Food. With it I gave only milk enough to impart a slight flavor. Practically the dependence was upon the cereal. It was generally well borne. I have one patient now three years old, who from his second week till he was over a year old had tasted nothing but "Jewell's Baby's Food," and almost without milk. He was well, but lacking in adipose tissue. The theory upon which this trial was made was that the food contained all the carbonates as well as nitrates and phosphates that the system required, and it is interesting to note that during this long period—a whole year—the child did not suffer in any way, he was well and muscular, and as soon as a more milky diet was given he became more obese. A younger brother of this boy is now fed entirely upon "Jewell's Baby's Food" with the full proportion of milk directed to be used, and nothing could be more satisfactory.

When I gave this food with little or no milk my patients were *lean*. This led me to reflect on the great contrast between the hydrocarbon which we have in milk in the form of butter and the carbonates which are furnished by the cereals.

Some experiment with oleo-margarin added to "Jewell's Baby's Food" gave promise of success in supplying the fattening element, but the number of healthy babes to whom I could administer it was too small for any reliable deductions, and I only mention it because it seems to me a thought in the right direction, which, when further elaborated, may result in something valuable. I am using "Jewell's Baby's Food" with satisfaction in many cases, adding the full amount of milk directed. It has not occurred to me to try it with the addition of cream only, but I shall do so, for theoretically it is all it lacks to enable it to answer every indication and nourish every tissue.

One of the most pernicious things which has ever been endorsed by respectable authority is the general direction to the poor to give brandy and whiskey to their infants habitually through the hot weather with their food.

If there is any medicine which needs to be carefully administered, and immediately stopped when it has answered its purpose, it is alcohol. Nevertheless there is no medicine more worthy of special notice in this connection, none better calculated to spur the flagging powers of digestion and stay the wasting of ill-nourished babes. If I have occasion to give stimulants I write for them by their officinal title, generally sweeten them with glycerine and direct them to be given in water between the feedings.

ON PYÆMIA IN HOSPITAL PRACTICE, the *British Medical Journal* says, the mere details of hospital construction—cubic space, pavilion system, shape and size of wards, etc.—are of less importance in the prevention of hospital diseases than the observance of a scrupulous and exact cleanliness—a cleanliness extending to everything from the bedding and person of the patient to the person and dress of every one of his attendants, and which should banish from them all "matter in the wrong place," whether that matter be recognized as infectious, such as putrefying discharges, or the more "honest dirt." Cleanliness so thorough and exact as this would, we doubt not, banish pyæmia and erysipelas from our hospitals, and would incidentally indoctrinate our poor in that virtue which is proverbially said to be "next to godliness," and the want of which so offends the eyes and nose of their medical attendants at present.

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THE STAFF OF LIFE.

Very little attention comparatively has yet been given by Sanitarians to the composition and manufacture of bread; which is indeed the "staff of life" of the masses. The purity and wholesomeness of bread is consequently a matter of very great importance. We have this upon what we believe to be very reliable authority, that many of the baking apartments or "cells," would perhaps be a more appropriate name, in this city, and Toronto is probably not an exception, are permitted to remain in a most filthy and disgusting condition. We endeavored last year in this journal to draw attention to the subject of good Bread. We believe thorough inspection is urgently called for in bread manufacture. The matter of *light weight* is *comparatively* of little importance. The incidents of the dough being mixed in a dirty underground cell, by the bare arms of perspiring men, is not pleasant to contemplate, nor is the thought of it calculated to aid in the digestion of the bread by increasing the relish for it. But when we are reminded that the skin of the bare perspiring arms, may be and sometimes is, in a diseased state, giving off disease germs, and even possibly, fully developed animals, which mingle with the "staff of life," the appetite for it is liable to almost permanent destruction. "A case for Sanitarians," as it is termed, is noticed in a recent number of the *British Medical Journal*. A baker's lad, aged 17, with well marked *scabies* or "Scotch fiddle," applied to Dr. Yates, of Perth, for a remedy. The eruption was in an active state, between and on the fingers, on the hands, wrists, arms and legs, accompanied with "excoriations from scratching." He had had the disease four weeks, and had "taken" it from the foreman baker. Both had continued baking steadily, supplying all and sundry with bread.

The present "primitive, dirty, and uncertain system of bread making," is indeed a disgrace to our civilization, and it is strange that machinery for its manufacture has not been brought into more general use. Aerated bread is, it appears, much more easily manufactured by machinery than fermented bread, and it is gratifying to find at least one enterprising baker in Toronto has commenced to manufacture the former, entirely by machinery. We have long believed in the superiority of this bread as compared with the fermented article. Not only is a portion of the most nutritious constituents of the latter destroyed, but the fermenting process is one of disintegration and decay, and its application to the preparation of the staff of life is seemingly very questionable. There may not be close analogy between the formation of ordinary bread and beer, but both are the result of a like process. The injurious effects upon the constitution—its *stamina*, or power of endurance, and vigor, of the constant use of beer are well known. We shall hope there will soon be a radical change in bread-making.

MILK AND CONTAGION AND MILK INSPECTION.

It is surprising that in view of the many outbreaks of diseases owing to impure milk, reported from time to time, and in consideration of the fact, which must be patent to every intelligent observer, who gives the subject any thought, that many diseased conditions of which we can have no positive knowledge, no doubt arise through bad milk, it is surprising that no provision is yet made for the inspection of milk, and of the dairies supplying it. Not only will milk, like water, convey and spread the germs of disease, but it is strongly suspected by many, and with good reasons, though it has not been positively demonstrated, that the highly complex organic constituents, so closely analogous to those of the fluids of the body, which are present in it, serve as palulum or food for the development and indefinite multiplication of disease germs. Epidemics arising and spreading through the agency of milk, are known to be particularly virulent in character; this so far strongly favors this theory. Thorough inspection of this im-

portant and universally used fluid, would we believe lessen the number of cases of typhoid and kindred diseases. It can hardly be doubted, indeed it is becoming evident, that milk is responsible for many more cases of disease of this sort than is commonly supposed. But the mere supervision of milk will be comparatively useless unless provision is made for the inspection of the cows—the manner in which they are kept, fed, &c.—upon which the quality of milk depends. At the late meeting (June 6), in Philadelphia, of the American Medical Association, the subject of impure drinking water for cattle was discussed, and it was urged that the drinking of impure water by cows was not an uncommon cause of unwholesome milk, and consequently of disease in man. We would urge strongly upon the authorities, not only of this city, but of all cities and towns in the Dominion, to arrange as far as possible for some plan of inspection for the approaching winter, when cows must be housed and are deprived of the green fields and green food, and when the danger of disease in the cows is much greater than during the summer; and too when milk is less plentiful and more costly, and the temptation to adulterate is proportionately greater. We have been eye-witness ourselves to enough dirt, of the most disgusting character, in the milking yards set apart from the fields and on the udders of the cows, in the summer, to prove the necessity for inspection at this season, but for obvious reasons there is much greater danger of milk contamination during the seven or eight months of the cold season.

A NEW SOURCE OF DISEASE.—Dr. Grant, of Ottawa, whose letter on Pullman car-ventilation we give elsewhere, is we think entitled to the credit of being the first to draw attention to this new and hitherto overlooked source of disease, and very possible cause of the spread of contagion. Were it enough in most or even in a few cases to simply draw public attention to causes of disease in order to secure their removal, we should have hope that this would receive at once the attention its importance demands, and that the suggested or some other remedy would soon be adopted. But we are hardly so hopeful. Dr. Grant is one who might most effectually press the matter upon those in whose hands the remedy

lies, and we trust he will do so, while we will cheerfully aid him in any possible way. The cause is both apparent and real. The remedy seemingly not difficult of practical application. The doctor while suggesting a remedy gives rise to thoughts not of a soporific character, but which may on the contrary so disturb the repose of some who commit themselves to a "sleeping car" at night as to make them instrumental in producing a change in the car construction.

LIFE INSURANCE PROLONGING LIFE.—Perhaps no one thing tends more to shorten life than anxiety about the future. Any man with a family who has not provided in some manner for that family, in case death, possible at all times, should deprive the wife and children of husband, father, and protection, has a natural and abiding cause for anxiety. Consequently we look upon life insurance as an actual means of prolonging life. In another page we give Dr. Theodore Parker's Limit Table of weights and measurements, which will be interesting at least to all readers of this JOURNAL, and highly useful to medical examiners. Dr. Parker has been connected with the Globe Mutual Life of New York for seven years as its Medical Director, and takes a deep interest in life insurance generally. The Globe Mutual we may add is one of the strongest competitors of our local Companies, and its President, Pliny Freeman, from his long connection with the business, about 30 years, is considered a veteran in Life Insurance, and is said to have inaugurated some of the most valuable reforms on behalf of policy-holders. We believe he originated the non-forfeiture policy.

Annotations.

BACK VERSUS FRONT HOUSE DRAINAGE.

Much has been said and written about the mode of draining houses. While some advocate what they call independent drains—namely, those which are laid through and under each house to a front main sewer—others prefer the system which drains each house backward to a tubular sub-main running behind them, receiving the sewage of each by a short branch. Some lay great stress on the first plan, saying, in effect, that it secures independence to each house-owner, who has his own drain only to look after and to keep clear at his own risk. On the other hand, it is contended that this independence is illusory; that the large street-sewer is really a cesspool, where the sewage stagnates, and that a stoppage of any house-drain

beneath a house causes great inconvenience to the houses on this side. The back-yards have, it is true, to be invaded sometimes by workmen; but this evil has to be weighed against another—namely, the breaking up of the street, the stoppage of traffic, and, worse than all, the tearing up of basement floors to inspect and clear foul drains which traverse beneath them, often imperfectly jointed, and laid without due precaution. The Board of Health, in 1854, says *Public Health*, Lon., published some important illustrations and showed pretty strongly the economy of the “back-drainage” method as compared with the other. We may briefly refer to some of the relative merits of the systems. The Sewer Commissioners construct large brick sewers in the street at a considerable depth below the surface of ground in front; for it must be remembered the street levels and roads are generally higher than the ground in the rear, to give easy access to the ground-floors of houses. It necessarily follows a drain passing from the back of each house to the sewer level, must be of great length, and consequently little fall, requiring a 6in. drain-pipe at least, and necessitating a considerable cutting to each house-drain. This length and cutting is an item of expense; but the builders who have to lay these drains are not very particular. A false step is, perhaps, made at the beginning, and the pipe, after traversing at a slight inclination, is made suddenly to dip in front. The socketing at these points is left to chance, or the pipes are cut by the jobbing bricklayer to make the junctions fit; and we have seen some cruel cobbling in this way. Another source of mischief is the settlement of the building or ground causing a breakage of the pipes, or oftener an opening of the joints, which are usually put together with a little mortar or cement. The Commissioners forbid more than two houses to run into one drain-pipe, and thereby the expense is increased in a ratio which places this system on a very favourable footing compared with the “back” drainage plan. The latter system while obviating all these defects, is less expensive; and it has been calculated that the cost of the former system is eight times as great. We have only to compare the extra lengths of the house-drains required, the greater cutting of ground, the junctions with the brick sewer, and the latter’s construction. We have not space here to go into the details of cost, though this may easily be done, and we have no doubt the relative advantage of the “back system” will, sooner or later, become a recognized condition to a healthy town. The system which invites the excrementitious matter to travel beneath our kitchens and breakfast-parlours, which, in untold cases, are at this moment

polluting the soil under our basements and creating an atmosphere laden with pestilential germs which defies inspection and courts scamping and all its attendant evils, is certainly, to our mind, its own condemnation, and needs no further discussion.

A DECENNIAL MORTALITY AND THE CONDITION OF LIFE.

In the June number we drew attention to Dr. Farr's highly interesting supplement to the British Registrar-General's Annual Report, giving comments thereon, chiefly from *Public Health*, and promised to continue the notice.

Most interesting to the readers of this JOURNAL are Dr. Farr's final observations on medicine. He points out how the ignorance and indifference of public opinion in England, with respect to matters connected with civil hygiene, was broken in upon by the first eruption of Asiatic cholera in 1831-2. Inquiries by Boards of Health and Royal Commissions were instituted in hot haste; a staff of Medical Officers was appointed under the New Poor Law; the Registration Act was passed in 1836, and since July 1st, 1837, the causes of death have been published annually, quarterly, or weekly, by the Registrar-General. Successive Boards of Health were called into existence; and under the recent Sanitary Acts, a Staff of Medical Health Officers has been created in 1,558 jurisdictions, a certain number of them more or less under the control of the Local Government Board. But much more yet remains to be done. Public Hygiene has to be perfected by the publication of returns of sickness of the civil population as complete and trustworthy as those now procured from the army, and by the employment, at adequate salaries, of the ablest men in the profession; and private hygiene has to be placed on a better basis of recognition by the substitution of some more equitable relation between the afflicted and the physician than that which at present prevails. Such an improved system already receives recognition in the case of Princes, and we see at once how absurd it would be to make the physician's pay dependent on the King's illness. "The same regimen," says Dr. Farr, "that suits the King should suit all his people, who would derive more benefit from a medical man specially engaged as adviser of the family at an annual stipend, than from a medical attendant merely resorted to in illness. Service would be greater; pay higher and easier; while consulting practice would remain as at present. Hygiene, as at present taught, requires extension, which it can only obtain when its pro-

fessors are entirely devoted to its practice and study." "The health of an existing generation may, no doubt, be raised to a high standard by a hygienic regimen complete as Roger Bacon insists from infancy. But a higher hygienic goes further back, guided by physiology: it seeks to influence the child unborn in its aquatic life, by placing the mother in favorable conditions; and, not resting there, it extends its view to the life of both parents, and to the foundation itself of families—Marriage. Hygiene has something to say to that besides proscribing close consanguinity. Civilisation is to man what domestication is to the inferior animals; and history and analogy justify us in believing that the highest race admits of development by some of the means that have been found efficacious in the lowest, and by others that scientific biology can invent. The hygienic problem is, how to free the English people from hereditary disease—hereditary consumption, cancer, syphilis, gout; hereditary insanity; hereditary vagrancy; hereditary criminality—and to develop in the mass the athletic, intellectual, æsthetic, moral, and religious qualities which have already distinguished some of the breed. There is a Divine Image in the future to which the nation must aspire. The first step towards it is to improve the health of the present generation; and improvement, if as persistently pursued as it is in the cultivation of inferior species, will be felt by their children, and their children's children. A slight development for the better, in each generation, implies progress in a geometrical progression—which yields results in an indefinite time that, if suddenly manifested, would appear miraculous."

COUNTERACTING HEREDITARY TENDENCIES TO DISEASE.—

After a lecture delivered by Dr. Samuel Wilkes, of Guy's Hospital, London, Eng., before the National Health Society, extracts from which will be published in our next issue, Mr. H. C. Bartlett, F.C.S., made the following very instructive and interesting observations:—In assenting to the general propositions laid down in the lecture, he would take leave to point out that if the hereditary tendency to disease transmitted the worst features of human imperfection, so also the progressive tendency of nature served to ameliorate these evils by elimination. By counteracting abnormal tendencies by the marriage of persons of different idiosyncrasies, and particularly by changing the condition of nourishment and exercise, and substituting healthy for unhealthy influences over the descendants of unhealthy parents, much might be done to improve the stamina, vigour, and general health. If

it were admitted that the protoplasm of the original germ was imbued with the tendencies of both parents, it must also be borne in mind that its contents could not be supposed to be replete with all the atoms derived from every principle to be found in the mature tissues of the human body. For instance, it was not proved that the newly-born infant was furnished with dentine, or, indeed, with all the other constituents of the osseous tissues necessary to form teeth. He had recently proved in the case of a child three years old, that the improper feeding of a child accounted for this want, and it was astonishing to observe, when proper food was given, how rapidly the teeth demonstrated the assimilation on their surfaces. If it were taken that the protoplasm, however related to the tendencies of progeneration, was rather disposed to accept the necessary increments for mature life during the various stages of its existence and reproduction, then we must be prepared to believe that external influences were at least as much concerned in the development as hereditary tendencies. Purity of the air, ventilation, warmth, suitable food, and judicious exercise of mind and body might not only reduce morbid tendencies when inherited, but actually eradicate, in one or more generations, the seeds of disease. The natural selection of reproductive life being beneficent, we had only to encourage healthy conditions to encounter or destroy that portion of hereditary tendency which inclined to reproduce disease. This, it was evident, was the text and instruction conveyed in the lecture delivered, which, reduced to a proverb, was contained in the aphorism 'Prevention is better than cure.'

ON THE PRESERVATION OF ICE.—Dr. Gamgee, F.R.S., &c., in a communication to the *Lancet*, gives the following method for preserving ice at the bedside during the night; which method may be found useful under other circumstances in the very warm season for keeping this summer luxury. My practice for some years has been to cut a piece of flannel, about nine inches square, and secure it by ligature round the mouth of an ordinary tumbler, so as to leave a cup-shaped depression of flannel within the tumbler to about half its depth. In the flannel cup so constructed pieces of ice may be preserved many hours, all the longer if a piece of flannel from four to five inches square be used as a loose cover to the ice-cup. Cheap flannel, with comparatively open meshes, is preferable, as the water easily drains through it and the ice is thus kept quite dry. When good flannel with close texture is employed, a small hole must be made in the bottom of the flannel cup,

otherwise it holds the water, and facilitates the melting of the ice, which is, nevertheless, preserved much longer than in the naked cup or tumbler. In a room 60° F., I made the following experiment with four tumblers, placing in each two ounces of ice broken into pieces of the average size for sucking. In tumbler No. 1 the ice was loose. It had all melted in two hours and fifty-five minutes. In tumbler No. 2, the ice was suspended in the tumbler in a cup made as above described of good Welsh flannel. In five hours and a quarter the flannel cup was more than half filled with water, with some pieces of ice floating in it; in another hour and a quarter (six hours and a half from the commencement of the experiment) the flannel cup was nearly filled with water, and no ice remained. In tumbler No. 3 the ice was suspended in a flannel cup made in the same manner and of the same material as in No. 2, but in No. 3 a hole capable of admitting a quill pen, had been made in the bottom of the flannel cup, with the effect of protracting the total liquefaction of the two ounces of ice to a period of eight hours and three-quarters. In tumbler No. 4, two ounces of ice were placed in a flannel cup made as above described, of cheap open flannel (10d. per yard), which allowed the water to drain through very readily. Ten hours and ten minutes had elapsed before all this ice had melted.

SPREAD OF INFECTION.—The *Lancet* in urging the wisdom of providing institutions to which servants and children might be removed at the outset of any anomalous illness likely to spread to others in the household, and in which such patients might remain under the care of the regular family physician, speaks as follows on the spread of contagion: Servants are, without doubt, ceaseless contagion-carriers. They spend on an average two or three hours a week in the worst of crowded tenements and vitiated atmospheres. They return after their "Sunday out" from nests of fever, exanthemata, whooping-cough, infection, and filth of every kind. How to deal with this evil practically is a social problem of great perplexity. It is idle to decree that servants shall not visit their friends or families. If nurses can be prevented from taking the children of their employers into the thick of the danger when they are sent out in their charge, that is probably as much as will be accomplished. Perhaps once in every twelve times a child is taken out by its nurse for the sake of health it is carelessly or wantonly exposed to the chance of infection.

THE *London Lancet* says it is to the scandal of the Medical Council that public health and hygiene does not yet form a necessary part of Medical Education.

THE SUBJECT OF NEEDLESS NOISES is being discussed by some of our English exchanges. Says one of them, only the sick know the wearing injury inflicted on the nervous system by needless noises. Among the worst of these nuisances are the monotonous sounds produced by traffic in the streets, by road-paving, stone-breaking, &c. After a few doses of this brain-irritant have been exhibited the effect proves cumulative and almost maddening. Can nothing be done to mitigate at least the most manageable forms of this evil? Surely something might be accomplished by noiseless paving and other improvements to reduce the number and variety of inflictions under which the sick labour, and by which their chances of recovery are not infrequently seriously reduced. Laying down tan or straw is a device practicable only in extreme cases. The ceaseless wear and tear of brain and nervous system among the weakly and irritable should count for something, and receive the consideration it demands and deserves. It argues defective knowledge of pathological fact, or lack of carefulness, to treat so fruitful a cause of nervous and even mental weakness with indifference.

THE LATE DR. PARKES' DEFINITION OF HYGIENE.—“Taking the word Hygiene in the largest sense, it signifies rules for perfect culture of mind and body. It is impossible to dissociate the two. The body is affected by every mental and moral action; the mind is profoundly influenced by bodily conditions. For a perfect system of hygiene we must combine the knowledge of the physician, the schoolmaster, and the priest, and must train the body, the intellect, and moral soul in a perfect and balanced order. Then, if our knowledge were exact, and our means of application adequate, we should see the human being in his perfect beauty, as Providence perhaps intended him to be; in the harmonious proportions and complete balance of all parts in which he came out of his Maker's hands, in whose divine image we are told he was in the beginning made.”

INEFFICIENT VACCINATION appears, from hospital experience to confer considerable protection from the *fatal* effects of small-pox, (*Brit. Med. Jour.*) But, compared with efficient vaccination, it affords but a delusive immunity either from an attack or from its fatal results. During the past year or two, no small-pox patient bearing “good” or even “moderate” vaccination-marks has died in the Stockwell small-pox hospital; and the mortality among the unvaccinated was nearly three times as high as among those patients bearing “bad” marks.

ASPHALT DRAIN AND SOIL PIPES.—The *Sanitarian*, N.Y., draws attention to a new and important step in the right direction which has been made by the "Asphalt Pipe Co.," Holyoke, Mass.—A drain and soil pipe, light, elastic, impervious to moisture and gases, improving and getting stronger and harder by time and wear.

The components used in the manufacture of this pipe possess antiseptic properties which exercise a salutary influence on the excreta and refuse passing through them by hindering decomposition. The comparatively small weight of the pipe does away with the settling of the line and the breakage of joints, so common to heavier material, whereby breakages are but too often overlooked, and the subtle sewer gas escapes and causes sickness and death. Another use to which the compound is applied is to imperishable stop-cock and street-washer boxes, whereby the wooden contrivances which have to be renewed at considerable annoyance and expense every year or two may be permanently superseded. At present the pipes are being submitted to a series of careful and severe experiments to test durability under the combined influence of acids and heat.

IN A LECTURE ON SEPTICÆMIA, recently delivered by S. M. Bradley, F.R.C.S., Royal Infirmary, the lecturer concluded as follows: I have endeavoured to show that pyæmia, septicæmia, and puerperal peritonitis (all varieties of one disease, which may be generally termed septicæmia) are associated with the development of organic germs, "bacteria," which act either as carriers of the poison or as the poison itself; that septicæmia may be, and is, carried in a hospital from one patient to another by surgeon or nurse; that all cases of septicæmia occurring in a hospital should be at once removed and effectually isolated from contact with the other cases; that as ozone destroys the vitality of bacteria, ozone should be employed to purify our wards when septicæmia has appeared in them.

IN A PAPER ON ARSENICAL PAPER-HANGINGS by Dr. Brown, surgeon to the Children's Hospital, Boston, he writes (*Boston Med. and Surg. Jour.*), during the past year I have had occasion to give advice in a number of cases involving grave symptoms, of long and persistent continuance, and of a nature so masked as to puzzle, for a time, both friends and physicians; but which, from the history and symptoms, joined with the surroundings which I found in each case, I believe to have been due to arsenical poisoning from wall-papers on living or sleeping-rooms, which the patients had occupied for a longer or shorter time.

THE AMERICAN MEDICAL ASSOCIATION, at its last meeting, June 9, adopted the following resolutions:—"That there be appointed a committee of three persons, members of the Association, in each of those States where there has been no action taken for the establishment of boards of health, to urge upon those States the necessity of the establishment of such boards. When will like action be taken in Ontario? When shall Provincial boards be established in Canada? Hundreds and thousands of lives are yearly sacrificed, which might be saved by active Provincial Boards of Health.

COOLING THE AIR OF ROOMS.—To cool the air of rooms, especially of those of the sick, M. Martin adopted the following plan with success. Open the windows widely and hang wet clothes before them. The water evaporates and absorbs the heat, lowering the temperature of the apartment several degrees; while the humidity renders the warmth more supportable. The atmosphere of the room becomes analogous to that which prevails after a storm.

NOTES, QUERIES AND REPLIES.

SPOTTED VEILS.—Besides the disadvantage of making young ladies look as though they were just recovering from the small-pox, spotted veils may exercise an injurious influence on the sight. If the veil retains its position steadily, there must be a perpetually unconscious endeavour to avoid the interposing obstacle to sight offered by spots immediately in the line of vision. If these move the result is a ceaseless flickering of opaque points before the retina in a manner, whether or not distressing, certainly injurious.

CRETINISM.—Dr. W. Twining paid considerable attention to this affection, and wrote a book on it. It was first discovered and noticed by Plater over two centuries ago. In the deep, dark, Alpine gorges, where the direct rays of the sun never reached, this hideous disease is prevalent, and is thought to be caused chiefly by want of sunlight.

STUDENT.—The peculiar odor of sea-air is now thought to be due to ozone and not to sea-weed. The density of ozone, according to Soret, is about 1.65.

ERRATA.—At page 184, "A decennial mortality," etc., third line of article, for two years read ten years. Typographical errors occur in the word "meteorology," in first article.

SUBSCRIPTIONS RECEIVED: From Hon. Justice Patterson, Dr. H. H. Wright, Dr. A. J. Johnson, Jas. Metcalf, M.P., E. M. Morphy, F. F. Passmore, P.L.S., J. N. Garrod, R. W. Doane, Toronto; Dr. Yates, John Carruthers, Alex. Gunn, Kingston; V. Cronyn, Dr. J. Cattermole, London; Charles Alexander, Montreal; And. Drummond, T. Ross, Reading-room, H. Com, Ottawa; Dr. McMahon, M.P.P., Dundas; E. A. MacNachton, Cobourg; Dr. R. J. Johnstone, Thorold; Dr. S. Richardson, Galt; Dr. M. S. Langs, Niagara Falls; G. Soules; John Gillies, M.P., Paisley; Dr. Sinclair, Dr. McMurchie, Smith; J. R. Arnold, W. French, Richmond Hill.

PUBLIC HEALTH MAGAZINE, Montreal, G. A. Baynes, M.D., Ed.; we congratulate our contemporary on the completion of the first volume, which ends with the June number. In the next volume is promised not only sanitary, but scientific and literary matter, reviews, &c. Terms, \$2 per annum.

THE NEW FIRM OF FAHEY BROTHERS, Cor. King and Yonge Sts. promise in their advertisement, on page of cover, a choice lot of ladies' and gentlemen's furnishing goods, at lowest prices, give them a call.

A NEW INVENTION.—The Ely Sewer Stench Trap. A pamphlet on this, with illustrations, has been received. It claims that this is the most complete trap ever made.

THE SUPERIOR SPRING WINES, especially adapted for medicinal purposes, of Messrs. Quetton St. George & Co., have arrived, see the new advertisement on 2nd page of cover.

COMMENDATORY LETTERS TO THE EDITOR.

The following are copies of, and extracts from, a few of the many letters to the Editor, received from time to time, from medical men and others, regarding the SANITARY JOURNAL, unsolicited, of course, and, with two or three exceptions, the writers being personally quite unknown to the Editor:

TORONTO, December 7th, 1875.

DEAR DR. PLAYTER:— . . . Please send me your receipt for the enclosed two dollars, for your valuable Journal. I wish all in the profession valued it as I do.

Very truly,

JOSEPH WORKMAN, M.D.
(Late Supt. Toronto Lunatic Asylum.)

BOWMANVILLE, June, 1875.

DEAR SIR:—I am much pleased with your Journal . . . I look upon it as one of the most useful periodicals with which I am acquainted, and especially to the medical practitioner, who wishes to keep pace with the advancements of science.

Yours truly,

W. ALLISON, M.D.
(Member Medical Council, Ont.)

GLANFORD, ONT., November 22nd, 1875.

DEAR SIR:—Enclosed you will find \$2, to be applied to SANITARY JOURNAL. . . . I think your journal is doing a good work, and that such a magazine was much needed in Ontario. Wishing it every success,

I remain, yours truly,

ALEX. BETHUNE, M.D.
(Member Medical Council, Ontario.)

THE SANITARY JOURNAL.

OAKVILLE, March 18th, 1875.

MY DEAR DOCTOR :—Enclosed please find one dollar for your really valuable Journal. . . . Accept my best wishes for the success of your new enterprise.
Yours faithfully,
D. D. WRIGHT, M.D

DUNDAS, September 10th, 1875.

MY DEAR SIR :—Please receive the enclosed \$2 for the SANITARY JOURNAL. Your moderately-priced monthly contains much that is of interest to the reading public of all classes. . . . Much valuable information as well fitted for the general reader as for the professional student. It ought to receive a large measure of support, and I heartily wish it every success.

I am, my dear sir, yours truly,
JAMES HAMILTON, M.D.,
(Late Member Medical Council, Ont.)

LANSING, MICH., August, 12th, 1875.

DEAR DOCTOR :—I am much pleased with your Journal. . . . I read it with interest, and satisfaction, and sincerely hope its circulation may be increased, believing, as I do, that the interests of public health will be advanced thereby.

Very respectfully,
H. B. BAKER, M.D.
(Sec'y Michigan State Board of Health.)

TORONTO, December 13th, 1875.

Dr. PLAYTER,—*Dear Sir* :—Enclosed find amount of subscription to the SANITARY JOURNAL. I am much pleased with it, and feel that I cannot say too much in its behalf. . . . I hope the publication will receive the support its merits deserve ; it should be carefully studied by every man, woman and child.

Yours very truly,
DONALD McDONALD.
(Senator Dom. Can.)

WARKWORTH, November 17th, 1875.

DEAR SIR :—I appreciate your Journal very much. It contains information but little understood by the mass of the profession. I give you my best wishes.

Yours truly,
P. D. GOLDSMITH, M.D.

TORONTO, February 9th, 1876.

To E. PLAYTER, ESQ., M.D.

DEAR SIR :—I am much obliged to you for sending me your very useful, much needed, and thoroughly practical Journal. I gladly enclose you my subscription.

Truly yours,
S. H. BLAKE.
(Vice-Chancellor.)

The following are Notices of the Sanitary Journal by the Press.

THE CANADA LANCET says :—“The SANITARY JOURNAL is very well got up and contains good articles on Public Health. We wish our contemporary every success.”

PENINSULAR JOURNAL OF MEDICINE.—“We welcome to our list of exchanges the SANITARY JOURNAL. It presents a very neat appearance, its selections are well made, and its editorials exhibit an ability competent to the consideration of this important branch of science.”

POPULAR SCIENCE MONTHLY, New York, “THE SANITARY JOURNAL, edited by Edward Playter, M.D., Toronto, both in its editorial and its selected matter, gives evidence of being conducted with ability. It is to be hoped that the enterprise will be sustained by the Canadian public.”

MEDICAL TIMES AND GAZETTE, LONDON.—“The July number of ‘The Sanitary Journal,’ . . . contains some original communications on lead-poisoning, vaccination, sanitary legislation, water supply, etc. . . . The matter is well written.”

NEW YORK SANITARIAN.—“We welcome the first number of this effort to popularize Sanitary Science. It indicates a manly grasp of the enemies of human health, and we hope for it a long life and a vigorous contest.”