Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for scanning. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of scanning are checked below.

L'Institut a numérisé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de numérisation sont indiqués ci-dessous.

- ☐ Coloured covers / Couverture de couleur
- ☐ Covers damaged / Couverture endommagée
- ☐ Covers restored and/or laminated / Couverture restaurée et/ou pelliculée
- ☐ Cover title missing / Le titre de couverture manque
- ☐ Coloured maps / Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black) / Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations / Planches et/ou illustrations en couleur
- ☐ Bound with other material / Relié avec d'autres documents
- ☐ Only edition available / Seule édition disponible
- ☐ Tight binding may cause shadows or distortion along interior margin / La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure.

- ☐ Coloured pages / Pages de couleur
- ☐ Pages damaged / Pages endommagées
- ☐ Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached / Pages détachées
- ☑ Showthrough / Transparence
- ☑ Quality of print varies / Qualité inégale de l'impression
- ☐ Includes supplementary materials / Comprend du matériel supplémentaire
- ☐ Blank leaves added during restorations may appear within the text. Whenever possible, these have been omitted from scanning / Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été numérisées.

☑ Additional comments / Commentaires supplémentaires: Continuous pagination.

PUBLIC HEALTH MAGAZINE.

VOL. I.] MARCH, 1876. [No. 9.

Original Communications.

SEWER VENTILATION.

Paper read before the Public Health Association, Friday, Dec. 10th,
BY DR. F. ROURK.

Mr. President and Gentlemen:—

The subject I propose to introduce to you to-night, is one that has occupied the attention of the scientific world for many years, and one whose extreme importance has forced itself upon the thinking minds of this community, namely:

SEWER VENTILATION.

The evil effects of sewer gas are so patent to every novice in sanitary science, that it would be superfluous to refer to them. My object is to expose to you a plan of *sewer ventilation*, which, I dare believe, is an improvement on any of the systems already tried in Europe; and which have been so productive of good in the saving of human life. To render this improvement intelligible, and capable of being estimated, it is necessary to refer briefly to some of these schemes of which I have just spoken. Nearly all these projects had for their basis the traction, or the vacuum principle. The ventilating shaft, with or without fire; the furnace; the Archimedian screw with the revolving cowl; the chimneys of factories; the clock-tower of the house of parliament, the street lamps; the rain water pipes from the eaves of houses, Mr. P. Spencer's system of combining sewers and flues,

by which smoke from houses might be carried through the sewers to some gigantic chimneys; Sir. G. Gourney's steam jet principle of condensation—all these have had their advocates, and, in time, none have been found adequate, and some have been considered little better than worthless.

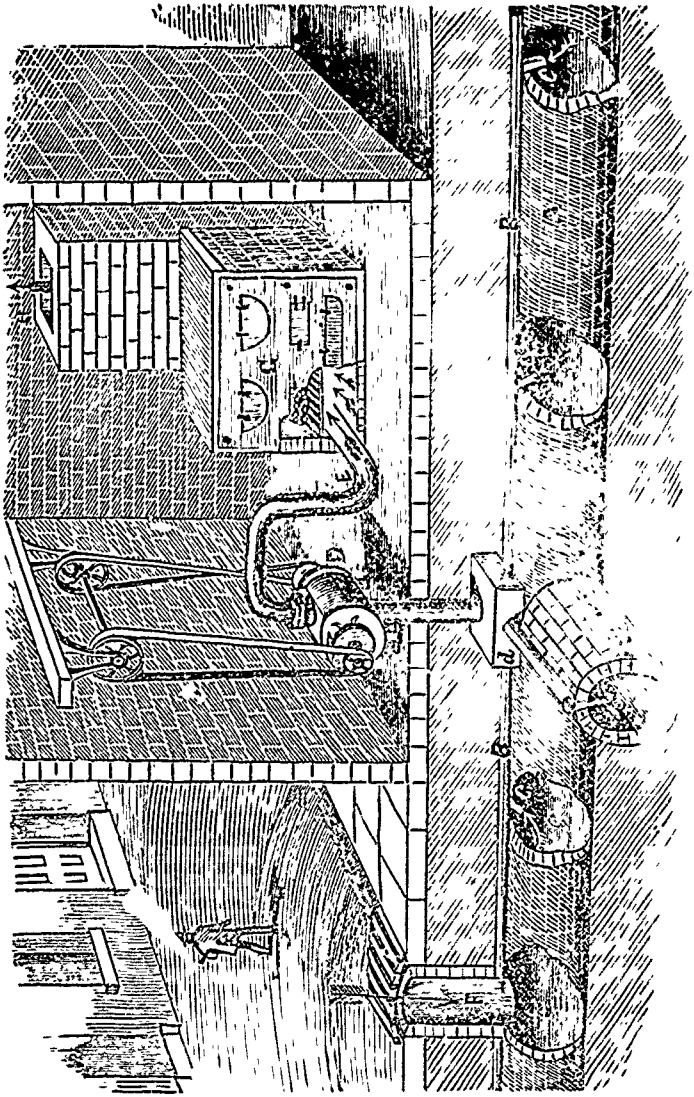
The ventilating shaft has its imperfections. In summer, when ventilation is so much required, the temperature within and without the shaft, is oftentimes so nearly equal, that little ventilation can be effected; and even in winter, when these conditions are so favorable to ventilation, the aqueous portion of the sewer gas, meeting with the cold air and the cold surface of the pipes, becomes condensed, and is again returned to the sewer. The chimneys of factories were condemned, on account of their not being available except on working days, and, moreover, as their efficiency as chimneys would be affected. The furnace was disapproved of, on account of its enormous expense, and its influence being limited to a short distance. The Archimedian screw attached to the revolving cowl, removed only twenty per cent. sewer gas, and, according to Baldwin Latham, is more of an impediment than assistance in this respect. Sir G. Gourney's steam jet condensing principle, was tested by Mr. Nicholas Wood, who found it inferior to the furnace. The terrible mortality of Croyden* illustrated the dangerous effects of using the rain-water pipes for ventilating purposes. But since it has been demonstrated that the power resulting from the combustion of one pound of coal, would give more ventilation than thirty-eight or fifty pounds consumed in the ordinary way, the mechanical means should be preferred. The use of exhausters, driven by steam power, for the ventilation of sewers, was first tried in Paris and Antwerp, and thought worthy of a Parliamentary investigation. This contrivance consisted in placing large fans as exhausts within the main sewer itself at its outlet, the drains and gratings being all trapped, and having merely openings at the extreme ends for the admission of fresh air. This proved unsuccessful, as was shown by the evidence of Mr. G. W. Bazalgette, C B., and Mr. Haywood, before the Parliamentary Committee. First, on account of their not being able to render the sewers air tight, because the opening of a house trap, the putting in of a

drain, or the accidental openings of a thousand kinds, which may occur in a large city, would render them unable to exhaust beyond these openings. But, supposing that the sewers were all tight, and that they were not liable to any of these accidents mentioned, the area of the main sewer from which they exhausted, was a hundred times less than the areas of the branch sewers connected with it, so that the velocity of 100 miles an hour, in the main sewer, would not secure a current of air a mile an hour in the branches. But there is another objection to this system, viz., that after a certain velocity was reached, the portions of traps within the sewers were relieved of a pressure of the atmospheric air, and the outside pressure caused them to untrap themselves, or in other words, the drag was so great, that it would force open any drain or house trap.

The plan proposed will obviate these objections. It consists of an exhaust connected with a pipe which passes through, or above the sewer which is to be ventilated as its size may determine through which pipe are openings for the admission of sewer gas at sufficient distances, for the ventilation of a given length of sewer, the openings near the exhaust being smaller than those more remote—care, however, having been taken that the areas of these openings are not in excess of the area of the tube itself, except the necessary allowance in area being made for friction:

For example, in the profile drawing,* the letters A represent the sewer to be ventilated, and B exhaust pipe above it, with the small tubular openings, C, entering the sewer and through which the sewer-gas is conducted through the exhaust pipe to the receiver, *d*, and thence to the exhaust D. F represents a gully with grating of suitable size for the admission of atmospheric air, which would have its purifying or oxidizing effect on the decomposing organic substances and reduce them to their simplest compounds. It is evident that, when a partial vacuum is produced in the pipe B, by the exhaust D, a current of sewer gas is drawn to the tubular openings C, in the exhaust pipe, and also a current of atmospheric air is directed from the grating to fill the partial vacuum there produced. The sewer gas having been

*See next page.



A a sewer. B the exhaust pipe. C the small tubular openings from the sewer to the exhaust pipe, *d*, the receiver. D the exhaust. G a furnace. F an open gully.

conveyed into the pipe is carried to the receiver and exhaust and finally forced into the furnace G, to be destroyed. Thus is the sewer air removed and destroyed as it is continually diluted and the sewers ventilated and purified. Atmospheric air travels with a velocity of 1,330 feet per second in vacuo, and dense air will travel with a proportionate velocity into rare air: thus we speak of so many pounds vacuum pressure, meaning the outside atmospheric pressure, or a partial vacuum.

Roots' Rotary exhauster is estimated the most perfect machine of that nature known, being positive in blast and in many respects superior to the air pump.

A No 7 Roots' Rotary discharges 65 cubic feet per revolution and makes 150 revolutions per minute, consequently discharges 9,750 cubic feet per minute and gives an exhaust power of three pounds to the square inch. Let us assume a section for an approximation (making no allowance for friction) say 28 miles of sewers, draining 14 streets on either side into a tunnel which measuring a mile long, makes in all 29 miles of sewers. Twenty-eight miles of these sewers are 2 feet in diameter, the area of which is 3.1416, and the cubic contents is 464,450 feet. But these two feet sewers connect with a tunnel, say 3 feet by 4 feet, a mile long, the area of which is 9.4248, and cubic contents 49,767 feet; the total contents is 514,217 cubic feet. But we have seen that Root's Rotary can discharge 9,750 cubic feet per minute, therefore it can discharge the whole contents in 54.45 minutes, and would require 26¾ horse power.

Let a main pipe 15 inches in diameter, or about 1 foot square, be laid in connection with the tunnel in the same manner as before described To this let there be connected 4-inch branch pipes which connect with the two foot drain. These pipes will permit of openings at intervals of 220 feet. There would be 23 openings per mile, or 644 openings of 1 $\frac{1}{16}$ size in these four inch pipes, each opening receiving about 737 cubic feet per hour.

In the 15 inch pipes there would be 23 openings of 3$\frac{5}{8}$ diameter connecting with the main tunnel. Through each of these openings would pass 2,164 cubic feet per hour. The combined areas of the openings are in excess of that of the pipes, to make the necessary allowance for friction.

It may reasonably be asked is this system feasible? Can sewer air be drawn through so many openings? Well, it is evident that air can be exhausted through a single pipe a very great distance; if then the remote end of this pipe is closed and small openings made through it, so that their areas will not exceed that of the original opening, it is clear that these openings will all contribute air to the exhaust. However, I have consulted some of the first engineers, civil and mechanical, some of the first architects here in this city, and some others whose reputation stands high abroad, and they have declared it feasible, and one stated that he judged it *the only feasible manner of effectually removing sewer gas.* But some may say, is it possible to exhaust sewer air at such a distance as necessarily exists in a large city? Yes, the same power that is used in the Pneumatic telegraph—that conducts letters, papers, and packages through a net work of tubing over a large city—the same power that enables Capt. Liernur, as stated in the *London Health Journal*, treating of the sewerage system in Holland, to exhaust fecal matter through five inch pipes at intervals of 4,800, 8,600, and 12,000 feet, (and now at Amsterdam they have laid tubing 27,900 feet), yes, the same power should be able, if judiciously used, to remove sewer gas with ease from any distance in a city.

Next comes the important question of cost, which should not be considered alone without comparing it with the enormous expenses attending the other systems to which I have above referred.

Any estimate of the actual cost without measurements, must be defective; however, it is not necessary to enter here into a detailed account of the expenses — this is more the duty of contractors. It is sufficient for practical purposes to say, that asphaltite tubing is the most suitable for this plan, and may be manufactured and purchased if required at lower prices than tile piping; that the qualities of the asphaltum are maintained in the tubing, namely, that it is durable, non-corroding, and impervious to water; that in laying these pipes a general excavation is not necessary, for, where the sewers are not too small, these pipes can be laid within the sewer. The first cost would be the principal, viz., engine, boiler, furnace and piping, with the exhaust. The expense of maintenance would be trifling.

At first sight the amount required may appear very large, but how trifling when we consider the great benefit that would result. Think of what we are losing every year by preventible diseases; what we have lost, and what we may lose, from this source of disease, which seems not to diminish—say from small-pox alone. Let us examine how they compute their losses in another city that suffered during one winter as we have suffered during the last five years:—

THE FINANCIAL EQUIVALENT OF DISEASE IN PHILADELPHIA IN DOLLARS THROUGH THE EPIDEMIC OF SMALL-POX DURING THE WINTER OF 1871-72.

Dr. Lee calculates the loss by diminution of travel and traffic on the railways, loss to hotels, to merchants, to business generally. He computes the loss due to sickness and diminished production and death. He sums up as follows:—Expenses in care of sick, $203,879; loss by sickness, (time), $1,072,065; loss by disability, (time and expenses), $10,000,000; loss by death, based on the estimate of life to society, $5,013,000; burial expenses, $74,420—total, $16,363,364. As the disease was due to neglect of sanitary precautions, and might have been prevented by judicious sanitary legislation, the above represents, in cash, the money equivalent of the disease, which was wholly lost to the community. If we were to reckon our losses here during the years 1872-73 and '74 in like manner, what would the figures be? Have not our finances suffered? Has the maintenance of a small-pox hospital and sanitary police cost nothing? Have not our merchants suffered, their goods not wanted, and their travellers almost quarantined? I have been informed, by persons capable of judging, that a large portion of trade that naturally belonged to Montreal has been turned to another course. And you know, gentlemen, that trade, once diverted from its natural channel, is slow to return. What has been the condition of traffic on our steamboats and railways? Where are the thousand tourists that thronged our hotels? If it be true that we have suffered in the falling off of trade and traffic, I think it may be attributed, in a great degree, to our blackened reputation abroad, as a plague stricken city. And terrible as has been our mortality in the past, can we expect the nature of things

to improve in the future? With opposition to vaccination, divisions in our Council as to sanitary measures, our Legislature is powerless to do anything, and, falling from bad to worse, it is fearful to contemplate the future. In the face of these truths, I might ask, where would the expense be in applying a principle which will effectually remove this sewer effluvia which science declares to be the all powerful source of disease?

Before concluding, I might speak of the two systems now being tried in Europe, viz., the open sewer system, and the deodorizing system with the charcoal traps. The first we have had opportunities of judging in our narrow streets and lanes, and to which our mortality can bear too true a testimony. Of the second, we cannot speak from experience. I might state that it is admitted that sewer gas on the whole is heavier than atmospheric air, and, like carbonic acid gas in cisterns, is slowly diluted with air, unless assisted by currents, or its own expansion through heat, or its displacement by water. I might cite Dr. Burden-Saunders to prove the tardiness of the diffusibility of sewer gas, giving his experiments in twenty-three observations of the Liverpool sewers, where shafts had been erected for ventilation, but where there was an indraft into the sewers, or, in other words, an indraft into the basements of the heated houses, the shafts serving as so many open dampers. I might cite Dr. Parks, in reference to the uselessness of making openings into sewers with any regular plan in view to direct the current of sewer air. I might cite Mr. Willson, in reference to the charcoal traps, how, often they should be renewed in case of moisture, and the care required in preparing the trays, that they should never be over three inches deep, otherwise the sewer gas would be retarded. I might cite Mr. Miller in the *Chemical News*, who says that every square inch of surface outlet should have 50 square inches of charcoal trays, and Sir Robert Rawlinson's statement, that every 100 yards of main sewer should have its ventilator, and, in fine, the admission of the inventor of the best charcoal trap, of its failure to be an efficient ventilator and deodorizer. I might cite these authorities to show that these systems are not without expense, but are much more expensive, being inefficient. But I seek no verdict at your hands by such means. My plan can stand on its own merits. It is simple in

operation, and not likely to get out of order; it provides capacity for a continued ventilation, at uniform speed, from all parts of a city; it does not necessarily require the trapping of gullies; it admits of the expulsion of sewer air and the supply of fresh air, at all seasons It does not impede natural ventilation. Opening of sewers or choking will not interfere with its efficiency, and in cases of flooding, it will drain itself. The escaping sewer air is so diluted with fresh air as to render it harmless, and the cost of maintenance is trifling.

This, Gentlemen, concludes my paper. I have said nothing of the pecuniary gain that would result to the city, or of my readiness to grant it gratuitously. I have said nothing of the terrible mortality from preventible diseases in our midst, the palpability of which has been shown by statistics. I have said nothing of the sacrifices that are daily made from indifference to, or ignorance of, the laws of nature, from sanitary stand points. I know I speak to practical men—I have said nothing of the lassitude, dullness, and sickness that incapacitates the strong, that robs life of its enjoyment, or of the wan cheek, the bloom of health having faded from the less vigorous and weak. I have said nothing of the social circle broken, the stricken home deprived of its first support, of the deserted hearth which was the centre of many a happy family gathering, of the father deploring the loss of a promising son, or a fond mother that of a fair daughter, the idol of admiring friends. Who has not felt the bereavement as, in taking the last farewell, they saw the iron door of the tomb locked forever on a dear friend? Alas! orphanage and widowhood have been too common in this city. The hecatombs that are raised at Mount Royal and Côte des Neiges are appalling. Gentlemen, I will ask you who have suffered—*you* who have realized the heartaches and mournings—*you* again, of the medical profession, who can thoroughly appreciate the value of human life, to enlist yourselves in this service—"man's humanity to man," and, if the principle I have explained here to-night is approved of by you and to your minds is feasible, give it the benefit of your intelligence, and your impartial criticism.

NOTE.—Since the reading of this paper before the Public Health Association, Alderman McLaren has proposed a plan for sewer ventilation, and, at the same time, for flushing the drains with the water from the roofs of the houses, not unlike, in principle, that which was carried out in Croydon, with such baneful effects. His

plan consists in prolonging the house-drains by tubing to the centre of the house, and then carrying them up to the roof, which roof being flat, or slightly inclining to the centre, would receive the accumulation of water from the rain, melting ice and snow, and thus act as a flusher, and, at the same time, serving as a ventilator for the sewers. To this tubing he would have connected, by syphon traps, the closets, the sinks, the baths, wash-basins, &c. That such a plan might, in winter, be serviceable in preventing accidents from snow-slides or ice-falls, there is but little doubt, and some such means might be used in summer, to serve as a flusher for house-drains; but under no circumstances could these pipes act as sewer ventilators. Without referring to the objections drawn from the experience of Croydon, we may question whether such a system would be suitable to our climate. Would not these pipes freeze? We have been answered dogmatically, "No." However, declining to accept dogmas in science, without reason or proof, we will examine for ourselves. Then, why will these pipes not freeze? Either the heat of the house, or that of the sewer-gas, will prevent them. But in two instances within our knowledge, one where pipes were so connected within a foundry, and the other where they were connected with the eaves of a house, in both instances, I say, the descending water froze, bursting the pipes. We must, therefore, conclude that sewer-gas alone will not prevent these pipes from freezing, and we arrive immediately at an inference, viz: that if this system were in vogue this winter of 1876, when so many houses are uninhabited, and, consequently, without proper heat, there would be great demand by next spring for disinfectants, deodorizers, and cologne, by intending tenants.

Granted, however, for the sake of reasoning, that these pipes would not freeze. In summer, when the heat on the roofs of our houses is often times very great, and, consequently, greater than that in our sewers, could these pipes act as ventilators? The first principles of ventilation, the expansion and contraction of air, on which ventilation depends, show plainly that these tubes cannot, under such circumstances, serve as ventilators, more especially as their position deprives them of any aspirating power. Again, granting that these pipes will ventilate under such adverse circumstances, let us suppose a rain-storm, and these pipes receiving the accumulated water from the roofs of the houses, and the absurd assertion, contrary to reason and common sense, that they are ventilating at the same time. How may it be in reference to these syphon-traps, in connection with our water-closets, sinks, baths, &c., for "the first object to be attained is the prevention of sewer-gas from entering the buildings connected with the sewers" by the above? Well, we know by actual experiment, that

water so descending, either in a constant stream or in waves, will produce a vacuum, which will cause all such syphon-traps to be untrapped, leaving a passage clear for the free advent of sewer-gas. But we may be answered, that compound traps may be used. But would compound traps be used for the sinks, the baths, wash-bowls, &c ?—and, if possible, would landlords bear the expense? Again, supposing that this descending water should meet with the sewer gas in its escape, what would be its action? This, I may answer, in the words of Dr. Carpenter, of Croydon Speaking of water pipes surcharged with water, he says: "There was no room for the exit of the foul air from the sewers, which, therefore, was forced through the traps of the water-closets with, at times, the force of steam through the safety valve of a steam engine." What provision has the worthy Alderman made to meet this emergency? Probably our worthy Chairman of the Health Committee, who, we would infer, has given this subject considerable study, may assist him out of the dilemma.

Again, allow, for the sake of argument, that all these objections can be remedied; that the pipes will not burst in winter; that these pipes, without any aspirating power, would ventilate in summer, when the outer heat is greater than that in the sewers; that the descending water would not untrap the sinks, closets, &c.; and that the descending water, meeting with the sewer-gas, would not, as Dr Carpenter, of Croydon, experienced, force the traps of the closets, &c.. with the force of steam through a safety valve of a steam engine; and that the irregular height of buildings, and the spread of the germs of disease over the community, would not be attended with any detriment to the community. Will it then ventilate our sewers? It is painful to say no, it will not; but we must say so. Our sewers are of egg shape, the smaller ends down, the lower fourth of which is occupied by sewage At about the middle fourth, the house-drains enter the sewer. Now, an ordinary shower of rain will raise the water over the opening of the house-drain, and just when ventilation is so much required, the means of ventilation is shut off.

We are told that this system will cost very little. We will see. Let us examine the distance of one block, measuring 480 ft., having thereon 20 houses, with a frontage of 24 ft. Allow these houses to be four storeys, which would cause them to be at least 48 ft. high. Now, the required length of tubing, to extend to the top of the roof from the house-drain of any of these houses, would, at the least, measure 80 ft.; but there are 20 houses, which would require 1,600 ft. of piping. But this is only for one side of the street; if we included the houses on the other side, the quantity of piping will be 3,200 ft.; therefore, the piping required

for the length of one block, would be 3,200 ft., or nearly two-thirds of a mile; whereas, in my plan, which was admitted to be feasible, and considered a very excellent system by Drs. Baker Edwards, Godfrey and others, and was disapproved of only on account of its expense, it would not require over 480 ft. in the same distance, or near one-seventh the number of feet of tubing required by Mr. McLaren's plan. From this I maintain that this very cheap plan of the worthy Alderman is a very expensive plan, and exceeds by many times in actual cost a system that was admitted to be "unquestionably scientific."

I make no petty objections to the plan of the worthy Alderman; to the distasteful sight of a sewer-pipe running through the centre of one's domicile; to the everlasting cost of tinkering and fixing; to the general dissatisfaction with the flat roof, or to the despotic revolution in buildings it entails, for the worthy Alderman stated that he had no promptings, but the general good of the city. I will, therefore, claim from him due consideration of this paper, and, as a citizen, the same zeal as formerly for the well-being and benefit of the community.

———o———

THE FOOT-AND-MOUTH DISEASE.—The following letter has been forwarded to us, and as the subject is one of considerable interest in connection with the questions of food supply and wholesome milk, we readily give it insertion:—"To the Editor of *Public Health*—Sir,—We are permitted by Lord Arundell of Wardour to enclose you an extract from a letter from Mr. Losh, of Woodside, in Cumberland, to his lordship, having reference to the prevention of the infection of foot-and-mouth disease by hypo-sulphite of soda. Mr. Losh says:—'At the commencement of the cattle plague it was suggested by Dr. Wilkinson, of Sydenham, that hypo-sulphite of soda might be found useful as a prevention of infection. He recommended that one ounce per day might safely be given to each animal dissolved in their water. I advised all my farmers also. Ten farmers used it, and not one animal took the complaint, whereas every other farmer that I had spoken to, and who declined it, lost all their cattle. One of our own farmers lost 32, and a neighbour 70. Since then it has been used, and so far no animal taking it has had the foot-and-mouth complaint. My son, in Somersetshire, has 20 or 30 cattle, and has been using it; all his cattle are so far well, and round him (even in the next fields) the cattle are suffering from foot-and-mouth complaint.' Lord Arundell has tested this remedy with his own cows, which, though surrounded last summer with animals affected with the foot-and-mouth disease, have so far entirely escaped. We may add that the price of hypo-sulphite is about 15s. or 16s. per cwt., that it is readily soluble in water, may be mixed with dry food, and does not appear to be distasteful to the animals. It is only a proper tribute to Mr. Losh to say that through an invention of his the hypo-sulphite of soda was reduced in price from 3s. per pound down to about 2d. per pound, through the application of a residuum or waste in alkali works. It is right, however, to add that Mr. Losh has no interest whatever in the present application of his valuable invention.—We are, Sir, yours, etc., RAWLENCE AND SQUAREY.—Salisbury, December 24th, 1875."—*Public Health.*

Sanitary Reports.

MORTALITY OF THE CITY AND SUBURBS OF MONTREAL, FOR JANUARY, 1876.

Class.	Order.		Diseases.	Total by Sex. Male.	Female.	Total both Sexes.
I. Zymotic.	I. Miasmatic.	1.	Small Pox	20	24	44
		2.	Measles	1	1	2
		3.	Scarlatina	2	5	7
		4.	Diphtheria	6	4	10
		5.	Quinsy			
		6.	Croup	2	10	12
		7.	Whooping Cough		2	2
		8.	Typhoid Fever, (Infantile Remittent Fever)	2	5	7
		9.	Typhus, and Infantile Fever			
		10.	Relapsing Fever			
		11.	Continued Fever	6	3	9
		12.	Erysipelas		1	1
		13.	Metria, (Puerperal Fever)		1	1
		14.	Carbuncle			
		15.	Influenza	1		1
		16.	Dysentery		1	1
		17.	Diarrhœa	1	3	4
		18.	Cholera Infantum	1		1
		19.	Cholera			
		20.	Ague			
		21.	Remittent Fever			
		22.	Cerebro-Spinal Meningitis		2	2
	II. Enthetic.	1.	Syphilis			
		2.	Hydrophobia			
		3.	Glanders			
	III. Dietetic.	1.	Privation			
		2.	Purpura and Scurvy		1	1
		3.	Delirium Tremens } Alcoholism			
		4.	Intemperance }			
	IV.—Parasitic.	1.	Thrush			
		2.	Worms, &c.			
II. Constitutional.	I. Diathetic.	1.	Gout			
		2.	Rheumatism		1	1
		3.	Dropsy and Anæmia	3	4	7
		4.	Cancer	1	1	2
		5.	Noma (or Canker)			
		6.	Mortification			
	II.—Tubercular.	1.	Scrofula	3	2	5
		2.	Tabes Mesenterica			
		3.	Phthisis (Cons. of Lungs)	19	29	48
		4.	Hydrocephalus	4	2	6
			Carried forward	72	102	174

MORTALITY OF THE CITY AND SUBURBS OF MONTREAL.—(*Con*).

Class.	Order.	Diseases.	Total by Sex. Male.	Female.	Total both Sexes.
		Brought forward	72	102	174
III. LOCAL.	I. Brain and Nervous System.	1. Cephalitis	7	3	10
		2. Apoplexy	2	1	3
		3. Paralysis	2	2	4
		4. Insanity			
		5. Chorea			
		6. Epilespsy		2	2
		7. Tetanus			
		8. Convulsions	13	6	19
		9. Other Brain diseases, &c.	10	4	14
	II. Organs Circulation.	1. Carditis, Pericarditis and Endo Carditis	1	2	3
		2. Aneurism			
		3. Other Heart diseases, &c	10	14	24
	III. Respiratory Organs.	1. Epistaxis			
		2. Laryngitis and Tracheitis			
		3. Bronchitis	10	6	16
		4. Pleurisy			
		5. Pneumonia	8	12	20
		6. Asthma	2		2
		7. Other Lung diseases, &c.	5	5	10
	IV. Organs of Digestion.	1. Gastritis			
		2. Enteritis	5	2	7
		3. Peritonitis	1	2	3
		4. Ascites		1	1
		5. Ulceration of Intestines			
		6. Hernia			
		7. Ileus and Intussusception			
		8. Stricture of Intestines			
		9. Fistula			
		10. Stomach Diseases, &c.	2		2
		11. Pancreas Diseases, &c.			
		12. Hepatitis			
		13. Jaundice	2	3	5
		14. Liver Disease, &c	2	1	3
		15. Spleen Disease, &c.			
	V. Urinary Organs.	1. Nephritis			
		2. Ischuria			
		3. Nephria (Bright's Disease)	2	1	3
		4. Diabetes			
		5. Calculus, (Gravel &c)	1		1
		6. Cystitis and Cystorrhœa	4		4
		7. Stricture	1		1
		8. Kidney Disease, &c.			
	VI. Generative Organs	1. Ovarian Disease			
		2. Disease of Uterus, &c			
	VII. Organs of Locomotion	1. Arthritis			
		2. Joint Disease, &c			
		Carried over	162	169	328

MORTALITY OF THE CITY AND SUBURBS OF MONTREAL.—(*Con*).

Class.	Order.		Diseases.	Total by Sex. Male.	Female.	Total both Sexes.
			Brought over.....	162	169	328
V. VIOLENT DEATHS.—IV. Developmental Diseases	VIII, Integumenta'y System.	1.	Phelgmon.....		1	1
		2.	Ulcer.....			
		3.	Skin Diseases, &c.....			
	I. Of Children.	1.	Stillborn.....	4		4
		2.	Premature Birth.....	10	5	15
		3.	Infantile Debility.....	55	64	119
		4.	Cyanosis.....		1	1
		5.	Spina Bifida and other Malformation....			
		6.	During Dentition.....	5	1	6
	II. Of Wom'n	1.	Paramenia.....			
		2.	Childbirth		1	1
	III Old People.	1.	Old Age	4	9	13
	IV. Of Nutrition.	2.	Atrophy and Debility.....	4	4	8
	I. Accident or Negligence.	1.	Fractures, Contusions, Wounds.....			
		2.	Burns and Scalds.....			
		3.	Poison....			
		4.	Drowning.....			
		5.	Otherwise	4	1	5
	II Homicide.	1.	Murder, Manslaughter....			
		2.	Execution.....			
	III. Suicide.	1.	Wounds			
		2.	Poison.....			
		3.	Drowning.....			
		4.	Otherwise.....			
	IV.	1.	Chirurgici.....	1		1
		1.	Pyæmia.....	1		1
		2.	Not mentioned	4	2	6
			Total.....	254	258	512

FOREIGN HEALTH STATISTICS.

United Kingdom of Great Britain, during four weeks, ending Dec. 11th, 21,500 births, and 15,325 deaths were registered in London and twenty other large towns, and the natural increase of the population was 6,175. The mortality from all causes was, per 1,000: In London, 24.9; Edinburgh, 25.7; Glasgow, 28.2; Dublin, 30; Portsmouth, 18.2; Norwich, 21; Wolverhampton, 25; Sunderland, 19.2; Sheffield, 24.7; Birmrngham, 25; Bristol, 30.2; Liverpool, 28.50; Salford, 33.25; Oldham, 32.50; Bradford, 26; Leeds, 26.50; Hull, 21.50; Newcastle-upon-Tyne, 27.25; Leicester, 25.25; Manchester, 27.50; Nottingham, 27. Other foreign cities at most recent dates, per 1,000: Paris, 23.50; Rome, 35.25; Vienna, 24.75; Brussels, 21.25; Berlin, 25; Hamburg, 23.75; Calcutta, 38.75; Bombay, 24.50; Madras, 38.50; Amsterdam, 32.50; Rotterdam, 26; The Hague, 23.75; Christiana, 29; Breslau, 24.50; Buda Pesth, 35.50; Turin, 27.75; Alexandria, 40.25; Florence, 28; Copenhagen, 19; Munich, 32; Naples, 26.

SYNOPSIS RAIN AND SNOW FALL FOR 1875.

McGILL COLLEGE OBSERVATORY.

MONTH.	Inches of rain.	No. of days rain.	Inches of snow.	No. of days snow	No. of days on which rain and snow fell.
January	.....	.....	35.0	19	..
February	0.42	3	12.9	12	1
March	0.80	2	14.6	18	2
April	1.18	6	7.3	3	2
May	5.13	16	.....	.....	..
June	3.26	12	.....	.....	..
July	3.64	14	.....	.....	..
August	2.59	14	.....	.....	..
September	5.18	15	5	1	1
October	4.74	20	5	1	1
November	0.50	2	21.7	16	2
December	0.68	8	24.2	18	3

Total rainfall during year was 28.12 inches.
Total snowfall during year was 115.7 inches.
Total rain and melted snow was 39.69 inches.
Total number of days on which rain fell, 112.
Total number of days on which snow fell, 88.
Total number of days on which rain and snow fell, 12.
Total number of days on which rain or snow fell, 188.

Barometer readings reduced to sea level and to temperature of 32° Fahrenheit. Pressure of vapor in inch of mercury. Humidity relative saturation being 100. Observed, 10 inches of snow are taken as equal to 1 inch of water. Greatest heat was 87.0, on the 29th of August; greatest cold 24.0 on February 8th, giving a range of temperature for the year of 111.0 degrees. Greatest range of the thermometer in one month was 76.5, in December. Greatest barometer was 30.688, on November 22nd; lowest was 28.952, on December 13th; range for year 1.736 inches. Least relative humidity was 34, on the 11th of April. Rain fell on 112 days. Snow fell on 88 days. Rain or snow fell on 188 days. Total fall of rain 28.12 inches. Total fall of snow 115.7 inches. Total precipitation in inches water 39.69 inches.

Correspondence.

FROM LONDON CORRESPONDENCE.

TRAPPING OF CLOSETS, SEWERS, &c.—THE D TRAP.

To the Editor of Public Health Magazine:

I have been much surprised lately, in noticing that several sanitary reformers have strongly advocated the use of the D trap; also that this so-called safeguard is in such general use. Little do the fathers of families know that this pet trap, in lieu of being a means of safety, is, in fact, a source of danger; and I think I may, without exaggeration, say that this trap is one of the most fertile sources of bad smells, with its consequent morning headache, lassitude, and even fevers and death.

The principle of the D trap is good in theory, but in actual practice is a total failure, as I shall endeavor to point out.

Of course the idea that, in containing water, it prevents gases, &c., from passing into the house, is not far amiss; but when we have that water (our supposed safeguard) itself becoming the source of pollution and danger, our case is indeed sad—our much-vaunted friend is our bitter enemy, and, worse still, an unsuspected enemy.

I suppose no one will venture to deny that sewage, stagnating in an imperfectly closed cesspool, must be a source of noxious gases, and their consequent train of ills.

Now, what is the D trap? Simply a depression, or rather a bend in the pipe, which ought to be filled with water, and which ought to be air-tight, and which, as a rule, is neither the one nor the other. Hence, in not fulfilling the *sine qua non* of a trap, it fails in being a trap, and results in being always a cesspool, even under the most favorable circumstances.

Why do I call it a cesspool? Because it always contains soil or excreta in different stages of decomposition. You may per-

haps say: "Oh! I have a high fall for the water, and surely it must flush the trap, as it has, owing to its length of fall, great force." In reply, I say the fall is a remarkably short one, a few inches at the most. Allow that your cistern is 50 feet above the trap, and that therefore the pipe gives a fall of 50 feet into the closet; does that give a fall of 50 feet into the trap? No. The water has its force broken first by the basin, and then by the container, and we have now left a mere dribble, with a two-inch fall or so, to flush our trap—a very likely event, especially if we take into consideration its shape.

The trap is not, cannot be, thoroughly flushed, and therefore must contain soil to a greater or less extent. We have now, as a result, the water becoming contaminated, and instead of being a safeguard, it becomes itself a source of danger, a generator of noxious gases, &c.

We have, in fact, a cesspool containing all sorts of sewage in a greater or less degree of putrefaction, and each time the closet is used, up comes a rush of foul air, which is soon disseminated throughout the house. Of course, the larger the trap, the larger the cesspool, and therefore the greater the danger.

In addition, we have another evil, at least so I am told, namely: plumbers, to prevent syphoning, to a small extent perforate the upper side of the D trap. You can easily see the result of this proceeding. A continuous outlet into the house of all the gases generated in the trap, or rather cesspool, to say nothing of those from the drain itself. How often is the main sewer blamed, when the real source of annoyance is in the D trap.

How continually the trap gets choked, and we are obliged to go to the expense and annoyance of having it cleaned out—a proceeding both disagreeable of itself and trying to the temper of paterfamilias, who has to foot the bill. To those who are unfortunate enough to have a D trap in their houses, I would say replace them by one that can be depended upon, or else have the trap fitted with a proper ventilating shaft and cowl. For a description of a safe and reliable trap, also of a good and efficient ventilating shaft and cowl, I must wait for a future number.

For a more complete description of the above trap and its dangers, I would refer you to the various useful papers on that subject, by R. Barnes Austin, Esq., Sanitary Inspector, Banbury Rural District.

D. B.

MONTREAL, Feb. 19th, 1876.

DEAR SIR,—As your valuable journal is devoted to the most important interests of the human race: viz., the preservation of health, and the prevention of the introduction of air unfit for respiration into our dwellings, I request you will allow me space in your widely distributed journal to call the attention of your readers to the reports of Prof. Croft, of the University of Toronto. and Prof. Girdwood, of McGill University, who have during the past week examined the gas works recently erected by the Canadian Gas Lighting Co. of this city, in the city of Dundas, for the manufacture of gas from crude petroleum, under Rigby's patented process.

Prof. Girdwood writes:—

To the Directors of the Canadian Gas Lighting Co.,

GENTLEMEN,—Having at your request, examined the gas works lately erected by your Company at Dundas, Ont., I have to report as follows:—

That they were in perfect working order, and are supplying the Town of Dundas to the satisfaction of the citizens.

That the gas made from crude petroleum, by the Rigby Excelsior Gas Works, is better than the Standard 14 Candle Coal Gas by 50 per cent. in lighting quality. That it is perfectly free from sulphur compounds, and consequently the products of combustion will not be so injurious to the consumers as the products of combustion of coal gas.

The simplicity of the works is such that any man of any average intelligence can attend the works and produce the gas.

I thing you have every reason to be satisfied with the Rigby works, as a cheap, simple means of producing gas of a high illuminating power and a gas preferable to the ordinary coal gas; not only as a light, but on the score of health, it may be recommended to your friends.

(Signed.) G. P. GIRDWOOD.

Professor Croft, after fully corroborating Prof. Girdwood's report as to the illuminating quality of the gas as produced by these works, adds,—"The gas derived from the holder was tested for sulphur (as sulphuretted hydrogen), and found perfectly free from that impurity.

"The gas was tested for sulphur (as sulphide of carbon) after burning, and found perfectly free from that impurity.

"The gas was tested for ammonia or its salts; a slight trace was detected; but this is, in all probability, derived from the impure water in the holder tank," which he recommended to be immediately changed for fresh.

After enumerating the advantages under five distinct heads, he concludes:—

"On these accounts, I believe the process well fitted for supplying good, excellent gas to small towns, hotels and large private residences. I also see no reason why it should not be equally applicable to large establishments or towns of large requirements.

"(Signed,) HENRY H. CROFT.

"Feb. 15th, 1876."

You will see by this, that the desideratum so long and arduously sought after to produce light free from the deleterious combination of the various impurities incident to all other illuminating gases has been thus attained, and we may safely congratulate ourselves that we are not far off from obtaining a cheaper, a better and a healthier light.

Your Obt. Servt.,

DUNCAN MCMARTIN,

Engineer, C. G. L. Co.

———o———

A meeting of the Citizens' Public Health Association will be held in the rooms of the Natural History Society, on Friday, the 3rd of March. The public and all friends to sanitary science are cordially invited. Subject, "House and Sewer Ventilation."

Reviews.

BOOKS AND PAMPHLETS RECEIVED.

CANADIAN ILLUSTRATED NEWS for February 19th.

This contains a good illustration of Alderman McLaren's proposed plan of Sewer Ventilation. We consider the plan good, but we consider Dr. Rourk's plan better for that purpose. We consider Alderman McLaren's plan would be improved if he would introduce two shafts, one for the exit of the gases, and the other for carrying off the solid matter—the one for the gases fitted with a proper cowl, so as to obtain the full aspirating power of the air, as described by us in a previous number.

THE MONTHLY ABSTRACT OF MEDICAL SCIENCE. A digest of the Progress of Medicine, and the Collateral Sciences.

An admirable digest of the conclusions arrived at by the International Medical Congress, as to the *Prevention* of *Cholera*, will be found in the January number.

L'UNION MEDICALE DU CANADA.

This, the only French Medical Journal of Canada, has begun its fifth volume We wish it continued success, and congratulate Dr. George Grenier upon the able manner in which it is conducted.

Dr. Ralph Walsh, of Washington, D.C., has forwarded to us a copy of his new "Physicians' Combined Call Book and Tablet." It has many advantages which are wanting in other Memoranda Books for the same purpose. It is more convenient in form, not being so thick and short; it is bound in leather 7¼ inches long, 4 wide and only *three-eighths* thick. The plan of the book makes it good for any year or any time of the year, and need not be thrown aside till filled. It enables the Physician to write the

name, address, and the number of visits paid each patient per week on one page and line. It accommodates 35 patients per week, or, by using additional pages, as many more as may be desired. Two more particular features which may be mentioned besides the following contents are,—an Erasable Tablet bound on the inside of the front cover, and a large and commodious pocket for bills or prescription blanks, etc.; Calendar, Sign Table, Graduated Table for Administering Laudanum, Table of Drops to the Fluid Drachm, Table of Abbreviations, Table for Regulating Doses of Medicine for Children, Table for ascertaining the Duration of Pregnancy, List and Doses of Important Remedies, List and Doses of New Remedies, Poisons and their Antidotes, Formulæ and Doses of Medicines for Hypodermic Injections, Formulæ and Doses of Medicine for Inhalation, Formulæ for Suppositories, Formulæ for Medicated Pessaries, Blanks for Obstetrical Engagements, Blanks for Vaccination Engagements, Blanks for Nurse's Addresses, Blanks for Cash Received.

Mailed, prepaid, for $1.50. Interleaved copies, $2.00. We heartily recommend it to our confrères as superior to any of those in use at present. Address Dr. Ralph Walsh, 324 Four-and-half Street, Washington, D. C.

QUININE WINE.

We have much pleasure in recommending Messrs. Evans, Mercer & Co.'s Quinine Wine. We have carefully examined it, and find it contains 1 grain of Quinine in every wine glassfull. It will be found an excellent tonic and stomachic. We have tried it in several cases of dyspepsia and general malaise with undoubted benefit. It is a very excellent and elegant preparation, and we have every confidence in placing it before the public.—*Advertisement.*

PUBLIC HEALTH MAGAZINE.

MARCH, 1876.

SEWER VENTILATION.

We draw the attention of our readers and aldermen to the plan of sewer ventilation, as proposed by Dr. Rourk, and read, in the form of a paper, before the Citizens' Public Health Association, in December last. The Doctor proposes to have, at a given point, an exhaust power worked by an engine; and from this centre he throws out a ramification of small piping along the top of the present sewers. At stated intervals, there are minute openings. As the exhaust causes a vacuum in the small piping, it is replaced by sewer-gas through the above-named openings, and as the gas is thus abstracted from the sewers, it is replaced by fresh air through the usual street gratings. The Doctor alleges that it is much cheaper in the end than Alderman McLaren's proposed plan, by a shaft thrown up through the centre of every house, and doubly as efficacious for the removal of sewer-gas, to which latter conclusion we are decidedly inclined. As to the expense, we will not attempt discussion. Suffice it to say that the Doctor's conclusions, in that respect, *seem* logical enough.

In Dr Rourk's plan, we see three great principles which should never be lost sight of when we attempt ventilation—1st. There is the abundant admission of fresh air into the sewers. 2nd.—The extraction of the foul gases; and 3rd.—The final destruction of them by being passed through the furnace. Captain Liernur has, by exhaust power, drawn solid sewage matter great distances most successfully, and how much easier would it be to dispose of the gases in a similar manner. We certainly recommend the earnest consideration of this plan to our readers and aldermen. In a future number we will again speak of it. Space will not allow of longer notice this month.

We are in receipt of a letter from Mr. Alderman McCord. It is one of great importance; we heartily endorse the plain and pertinent matter therein contained, and consider the thanks of the community are due to the energetic Chairman of the Health Committee for giving publicity by means of his circular to the ways and means of mitigating the evils of that fell disease, small-pox.

Without further preface, we give Mr. McCord's circular, earnestly recommending it to the serious attention of all:

City Hall, Feb. 1st, 1876.

My Dear Sir,—As you are aware, the City has provided accommodation in the Civic Hospitals for its citizens suffering from small-pox. The Roman Catholic patients are received in the new building on the Hall property, attended by the Ladies of the Providence, and the Protestant patients, in the stone house on the same property, in charge of a lady of experience, assisted by a competent staff; and both hospitals are attended by Dr. Larocque, one of the Medical Health Officers, and every care and attention paid to the comfort of the patients. These hospitals are very favorably situated with a view to the recovery of the patients and, in the new building especially, the wards are very large and well ventilated. It is very desirable that citizens suffering from small-pox should avail themselves of the advantages thus placed at their disposal by the city, and by going to hospital, and thereby isolating themselves, limit, as far as possible, the chance of communicating the disease to others. We have scarcely a doubt that patients are daily recovering in the Civic Hospitals who should have succumbed to small-pox had they remained in their crowded homes. Accommodation is also provided for a limited number of pay patients in private wards, who may be visited by their own medical attendants or by the health officer at their option. For terms in private wards, kindly communicate with Dr. Dugdale, No. 645 Lagauchetiere street. You are earnestly requested to advise your patients who may contract small-pox to go into the Civic Hospitals in cases where isolation cannot be obtained in their residences, or when in your judgment it be desirable to do so. The Health Committee, in its endeavors to diminish small-pox in the City, desire the kind co-operation of the medical profession, as it is conscious that any success achieved will be very largely due to such co-operation.

You are, of course, aware that the Hotel Dieu and the Montreal General Hospital have been obliged to decline small-pox patients.

I am, dear sir, your ob't servant,

DAVID R. McCORD,

Chairman Health Committee.

HEALTH OF OTTAWA.

Through the courtesy of Dr James P. Lynn, City Medical Health Officer, we are indebted for the annual health report of the city of Ottawa. This being our capital, we all naturally feel much interest in its healthfulness. Unfortunately, we see that small-pox has found victims—would to heaven we had as few. In all there were 124 cases—43 deaths, and 81 recovered. The greatest number of persons attacked were those who had not been previously vaccinated, and the doctor says it is from persons of this class that the death list is mainly recruited. Typhoid fever has been epidemic, and the health officer attributes it to the defective drainage of Ottawa, and gives some admirable advice to prevent its spread. He also recommends immediate action as to the disposal of horse offal and garbage. The slaughter houses seem to be very primitive, and therefore defective, and many of them throw all the blood and refuse into Rideau River, at the foot of St. Andrew street, making the water unfit for domestic use and offensive. From this river, also, the ice supply is obtained We quite agree with Dr. Lynn that serious and immediate measures should be taken, or Ottawa will lose many of its citizens. He also recommends the Council to take measures for the registration of deaths.

———o———

We have much pleasure in announcing the addition to our Editorial Staff of Dr. Donald Baynes, late attending Physician to the Metropolitan Ear and Throat Infirmary, London, Eng., who has had the advantage of being for some time in partnership with the well known sanitarian Dr. Abbotts Smith, Editor of *Public Health Journal*, London.

Having entered into partnership with his brother, he will in future, besides acting as co-editor of the Magazine, assist him in his general practice.

Miscellaneous Selections.

COOKING FOR THE POOR.

(*Continued from page 255.*)

The last we spoke of were the breakfast soups, recommended by us for the working classes in preference to any tropical beverages like tea and coffee. Soups satisfy and are a stay; tea and even coffee are no good without other nourishment, and if that is to be bought the breakfast becomes an expensive affair. For the working classes with small incomes all depends on how the day is begun. Begun wrongly it drags on its whole length with lessened vitality and occasional replenishing of alcohol—if the money *can* be obtained. Begun rightly, a longing for that is not even felt; can we sufficiently imbue our readers, who have the well-being of those classes at heart, with the fact, to teach them once for all the remodelling of their breakfast? We gave:—

1. Potato soup.

2. Pork-rind Soup. These soups will be continued. If a strong boy, going to work for his ten hours, has eaten a good soup and a hunch of brown bread, even with a bit of cheese, he'll not feel faint till dinner time, and if we only knew how faint growing boys *do* feel, we would pity them and do our best to help them to sustain life better.

3. Onion Porridge. Boil several onions till nearly done; mix coarse oatmeal with cold water and add the boiled onions, flavor with a piece of butter or dripping, and pepper or salt, and simmer till done. This makes, with a piece of brown bread, an excellent breakfast.

Dinners.—The poor cannot afford luncheon and ought to calculate well from meal to meal. A dinner for five to cost sixteen pence.

Take a piece of breast of mutton or pickled pork, costing 8d; place in saucepan and add two onions for ½d.; stew together for twenty minutes and stir in a very little flour. Now cut up a head of savoy, 1½d., and put on with of 3lb. of peeled potatoes and salt and pepper. If you stew gently the potatoes will remain whole and be more sightly than broken up. The expense is 1s. 1d.

Make dumplings with 1½d. of flour and a 1d. of suet: boil, and let the children have them with treacle, ½d. The cost 3d. Whole dinner 1s. 4d.

Now we wish here to draw attention to a new phase of workman's life. Many are now said to live out of town, anyhow near London, and go backward and forward with workman's trains; where they can have a small plot and grow a few vegetables, it may be done, but else there is a serious drawback to this. The family have no dinner together, the husband gets a poor and expensive meal in town, the wife and children have to put up with anything at home Together, a moderate sum *may* make a good meal; separate, neither can get properly nourished, and though we may not regard it, though it may be covered up, we do say and maintain that the great outcry of insufficient nourishment will overwhelm the nation in time. There is much talk about the working classes living better, but it is all deception; they may live finer, have more tea and sugar, rice, &c., but as for downright good English fare, it is getting scarcer every day.

To see a workman pull out his cold, meagre, dried-up midday meal away from home is a pitiable sight—one that will one day cost the country dear.—*The Housekeeper.*

LONGEVITY OF THE JEWISH RACE.

The *Jewish Chronicle* of this week contains an article on this subject from the pen of Dr. Maurice Davis:—

"The marked and unvarying peculiarity of the Jewish race is a larger proportion of boys among the births than among Christians in the same places. This may be in some degree influenced by the age of parents at the time of marriage, as Jews marry younger than Christians. What is most remarkable in

reference to the proportion of sexes is the fact (if a fact), as stated by Lévy, of there being a smaller proportion of males of all ages among the Jews than among the general population, the former having uniformly such a large excess of male births, amounting to nearly 18 per cent., while the general population have only 6½ per cent. Yet, notwithstanding this, if all ages be taken in the same proportion, Jews have 3.25 per cent. fewer males, while the general population have only 8 per cent. fewer males than females. This difference is certainly greater than could be accounted for by a difference of emigrants in favor of males, and is probably due either to a greater proportionate mortality among Jewish male infants, or a greater longevity of their females; probably the latter. Professor Waitz gives—100 female to 208 male births among the Jews in Berlin; 100 to 120 in Livorno; 100 to 111 in the Prussian dominions generally.

"Immunity from disease is one of the most characteristic and valuable properties of this pure and favored race. Not long ago a paragraph appeared in the *Times*, stating that the Jews of Roumania escaped all the local diseases by which other immigrants were attacked, and attributed this freedom, like Dr. Hough and Dr. Mapother, to their peculiar habits, omitting to take into consideration what, in our opinion, is a most important element—and in this we are supported by the foregoing authorities—namely, the well preserved qualities of an unmixed race.

"Dr. Mapother, of Dublin, in his lectures on public health, says: "The striking immunity of the Whitechapel Jews in the last as well as all former epidemics (cholera) was due to their timely distribution of animal food, and to their excellent hygienic observances, which have made the longevity of this race one-third greater than that of most European peoples." Dr. Hough says, "They have had in recent times so very marked an immunity from plague that it was the motive of odious persecutions." Tschudi, in speaking of the plague of 1346, says that this malady did not affect the Jews of any country. Frascati mentions the fact that the Jews escaped completely the epidemic of typhus in 1505. Rau mentions the same immunity from typhus observed at Langeons in 1824. Ramazzi insisted upon the immunity of Jews from the intermittent fevers observed at Rome in 1691.

Degner says the Jews escaped in 1736 the epidemic of dysentery in Nimeguen. Michael Lévy remarked that the immunity was common to the French and the Israelite. M. Eisenmann insists on the extreme rarity of croup in Jewish children. Dr. Glatter, in his paper on "The influence of race on the duration of life," gives the following table, showing the relative frequency of disease among different races in the same locality :—

	Number ill.	Number to 1000 inhabitants.
Magyars.....	6,034	534
Germans	3,808	223
Sclavonians	1,522	183
Servians.....	1252	28
Jews	1,540	32

"Jews suffer little from intermittent fevers, convulsions, mesenteric wasting of children, and inflammations of the respiratory organs. On the other hand, they suffer frequently from non-inflammatory skin diseases, internal stomach affections, and ruptures. Dr. Stallard, in his work on "London Pauperism," says that Jewish children are free from certain hereditary diseases, and have scarcely any scrofula. "Their greater tenacity of life is therefore due not only to better maternal care and nursing, but to the inheritance of a better physical constitution than the Christian child." M. Lévy estimates that the mean average duration of life exceeds that among Christians by about five years. In 1849 Prussia computed 1 death for—Evangelists (Protestants), 34 35 inhabitants; Catholics, 30.18; Jews, 40.69. According to Stallard, the mortality among Jewish children in London from one to five years of age is only 10 per cent., while among the Christians it is 14 per cent. The average duration of life of the Christian in London is 37 years; of the Jew 49 years. Lévy states that they lose fewer children than other religionists. From 1859 to 1861 we find in Prussia, for 100 births, the proportion of mortality which follows :—Evangelists, 66.37; Catholics, 65.94; Phillipos, 56.04; German Catholics, 56.77; Mennonites, 86.66; Jews, 48.11.

"SUICIDE.—Statistics show that Jews commit suicide much less frequently than other religionists.

"CRIMINALITY.—The Prussian judiciary statistics, as those of other countries, indicate among the Israelites fewer infractions of the penal code than among the Christians. The Jews have fewer illegitimate children.

"James Parton, the historian, says of the Jews, 'At the present hour they are probably the chastest seven millions of people under the sun.' Dr. Hough now proceeds to suggest the causes of longevity, and to offer other observations—among these the fact of Jews being obliged to keep two days of rest in one week, besides Jewish, Christian, and political holidays, which give them twice as many days of leisure as Christians. They do not engage in mining and other hazardous occupations. The Biblical and traditional prohibitions of certain aliments are favorable to longevity. The last of the summary of causes to which M. Lêgoyt attributes the greatest mean average duration of life of this people is that "*le sentiment de la famille*," more developed in them than in Christians, assures to their children, to their aged and infirm parents, a solicitude more active, to the new-born the mother's nursing, to the poor an assistance more efficacious. Their charity is unequalled; their morality is demonstrated by judicial statistics; firmness and serenity of spirit are the most marked traits of their character, and proceed from a profound faith, from an unalterable confidence in Providence.' They rarely use alcoholic liquors, and almost never to excess; this is universally conceded. They seldom marry out of their own race, and have little hereditary disease. Parton, who quotes from the organ of the London Society for the Conversion of Jews, confesses, 'As to their moral qualities, the evidence seems to show that the lower class of Jews is decidedly superior to the same class amoung ourselves. They are far less given to drinking; their religious customs enforce a certain amount of cleanliness, both personal and in their dwellings; and two families are never found inhabiting the same apartment. . . . . Among the conditions unfavorable to longevity we may mention their almost universal habit of residence in large cities; and the rarity of their engagement in agricultural pursuits." Dr. Glatter concludes from all this, that "under the relation of duration of life the Jews are in a condition much more advantageous than Christians. In effect, the more the mean duration of life augments in a people, as is the case with the Jews, the more it diminishes

the number of widows and orphans, the more numerous the active and productive class, the more it diminishes the class of pure consumers..... It is evident from all we have here shown that the numerical increase of a race depends more on the conservation of those already born than in a great fecundity, with less conservation of the issue. The Jews have always taken every precaution to preserve the life of every individual born. The Mosaic laws prescribe most of these measures—even to the construction of their houses, requiring balustrades about the roofs to keep children from falling from them. Ancient Rome, with all the jealous care she exercised in the conservation of her citizens, did not approach the excellence of the Mosaic dispensation in these matters. Jewish subjects would, therefore, appear to be much more advantageous risks for life companies than other races." Many of our readers probably learn for the first time the degree of their organic greatness, a treasure which posterity claims as its right to have transmitted to it, unimpared as the present generation enjoys it. Few would have imagined how great and marked are the physical qualities of the race, yet few can doubt their existence when advanced upon the testimony of the army of independent philosophers whose genius, penetration, industry, and zeal here combine to raise the cloud which has shrouded from the eye of the Jew the rare qualities with which he is endowed. Apart altogether from any spiritual bearing the Jew is shown to possess grave and substantial reasons for guarding with wonted persistence and jealousy his pure inheritance from alloy. Dr. Hough has given as one of the causes of Jewish longevity the possession of two Sabbaths in seven days. With the loss of a sixth portion of time for work and study the Jew ought to be poorer and more ignorant than his neighbors. Yet the prizes in the race of life, as well as the prizes at school and college, fall at least as plentifully into the hands of the Jew as into those of his fellow-laborers. If, then, the additional rest gives additional life and health without the loss of wealth and knowledge, long may the Jew preserve his Sabbath with antique sanctity, even as a physical duty, as an offering to his advanced development, and long may the double Sabbath give greater "density" to his nerve, and help to maintain the vigor of his perfect organisation. Other suggestions are offered to account for the longevity and greater proportionate number in the Jewish population, such as the absence of dangerous occupations; but this explanation cannot be accepted in the face of statistics which indicate so great a saving of life in early childhood. The Jew knows no caste, he feels himself destined for a high place, and as soon as the incubus of poverty or intolerance is removed, rises with better fate to a higher grade, even as in many cases before

improved manners and more extended education (for which he evinces, as a rule, a remarkable aptitude) have qualified him for the more advanced status for which he pines, and to which industry and laudable ambition shall have carried him. Hence the Jew occasionally suffers because tested by a standard unfairly high; such a man working on the committees of charities, mixing in society, and zealous as the Jew always is in works of utility, is quoted by his colleagues as a specimen of a Jewish gentleman, instead of a noble example of irrepressible power and elasticity just emerged from the chrysalis of a small trader. The son of such a man will stand the test of his due gauge, for with fair play it requires but one Jewish generation to slough the *exuviæ* of transition and reach the higher grades of rank and knowledge. The time when the Jew was first admitted to practise at the bar of England is within the easy memory of a middle-aged man, yet in these 30 years last he has sprung to the front ranks even to occupy the bench. The Jew of Spain, persecuted, oppressed at times and denied all rights, yet served the state in posts of learning and preserved the literature of Europe. Seven millions of men, a mere drop in the ocean of mankind, who can make themselves seen, felt, and heard, wherever civilised man is known, and even farther, who in spite of the dark cloud of oppression have far and wide filled the professorial chairs even in places where the cold fog has been darkest, and have come forth as painters, poets, physicians, philosophers, lawyers, statesmen, and musicians, may be considered to have fulfilled many of the high duties implied in the foregoing statistics and observations. The Jew appears to have intuitively applied himself to a passing servitude only to last out the short reign of intolerance or misfortune, which he can shed as easily as the snake casts its skin, a task not to be accomplished had he tied himself to the soil in tilling its surface or groping beneath it. It is his mission to be harnessed and ready to march forward to works of usefulness in whatever direction his qualities may tend, not only as an obedient instrument in mighty hands but as a volunteer champion. When even handed justice shall everywhere prevail, and it is everywhere growing, then the perturbations will soon cease, and the winnowing process of society will determine who among the Jews shall crop up to the surface, who shall subside to the lower strata, and who shall follow the plough. In the short interval let him extract courage from past evil, looking on his misfortunes as so many fires by which he has been tested and hardened, and remember, in the words of his distinguished brother—

> "Wine oozes from the trodden grape,
> Iron's blistered into steel."