Report on the sanitary police of cities : presented to the American Medical Association at its annual session, held at Detroit, May, 1856 / by James M. Newman.

REPORT

ON THE

SANITARY POLICE OF CITIES.

BY

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REPORT.

In the investigations made with a view to the preparation of the report upon the subject confided to the charge of your Committee, an examination of the materials previously collected by others, disclosed the fact, that the subject has already been pretty thoroughly treated in former reports to this Association.

The numerous able and voluminous reports made by the various committees year after year, upon the subjects of epidemics and of hygiene, have aggregated a mass of observations and facts upon all the numerous questions included in the general subject of sanitary reform, so as to leave but little else to be accomplished in the directions to be given the public in the matter of the preservation of the public health.

In the first report of the Committee on Hygiene made to the Association (*Transactions*, vol. ii.) they say: "The facts required by the Committee on Hygiene were for the most part unrecorded; books were silent on the subject; and the data which they sought to possess themselves of, were to flow from careful personal observation."

Most assuredly such cannot be said now. For if the Association has, and should accomplish nothing else, in this department of medical inquiry it has, by the collection of statistics, and the histories of the diseases of our country, with their topographical dependencies, performed a labor of inestimable value. The influence exerted by these labors is being every day more and more fully developed, in the greater attention paid to the collection of vital statistics. The profession is everywhere fully awake to the importance of the subject; and our drowsy legislators are at last beginning to realize that tables and figures may be made able to read of other facts as important as dollars and cents, and that other statistics besides those which treat of the value of lands, houses, and cattle, and of ships and merchandise, may disclose the real elements of a nation's wealth and prosperity.

In view of what has already been accomplished by previous com-

mittees, the range of subjects treated in this report will necessarily be much more circumscribed than would otherwise be proper with a subject so broad as that embraced in the consideration of "THE SANITARY POLICE OF CITIES." It will be the effort to avoid repetition, and consequently the customary considerations of cleanliness, ventilation, sewerage and paving will not be discussed except as they incidentally and necessarily spring up in the consideration of the subjects claiming attention.

This report will be an effort to tabulate the effects of disease, and to exhibit by figures the ravages that *preventable* disease is committing in our midst, and especially in our cities. The havocs of epidemics and the deductions therefrom will occupy less attention than the slow, continuous, unceasing inroads of diseases less rapid and alarming, but as certain and fatal as they are insidious. The public mind has been accustomed to view the matter of sanitary reform too much, if not alone, by the light of epidemics. They lose sight of the less violent, slower, but no less certain causes of sickness and death with which they are continuously surrounded. Death reaps a yearly harvest to the grave, and when it exceeds not the usual annual number, it is not heeded, and the inquiry is not made whether a part of his trophies might not have been snatched from him; it is only when his victims are largely in excess that public attention is arrested and alarm excited. How much permanent good is done sanitarily by the alarm excited by epidemics may admit of a question. Reformations are but seldom the results of violent assaults. The public apprehension is excited at the recital, or witness of some fearful havoc of a pestilence, alarm is felt, and a thrill of horror may pervade the community; but the effect is lost in the tendency to shelter themselves under some assurance that the circumstances surrounding them are very different from those which gave birth to the scourge.

The fact, however, of an effort being made towards the sanitary improvement of our population, whether confined in cities or living in the country, implies also an admission, or at least a belief of the existence of diseases which it is in the power of man to more or less control and modify, and to ameliorate the conditions springing from these causes. Without such a belief, of course such labors would not be undertaken, for there would be the want of those incentives so necessary to the successful accomplishment of any purposes.

As cities have oftentimes been called plague spots in morals and politics, so are they often plague spots of a verity, and the most

favorite haunts for the ravages of epidemics. The aggregation of masses seems to furnish not only the numbers necessary to satiate the rapacity of a pestilence, but the very elements out of which to eliminate the disease itself, or to furnish all the elements to nourish, develop, and perfect its growth until it has fulfilled its mission, or succumbed for a lack of victims susceptible to its attack. It is to our cities that we look for the frequent outbreak of epidemic diseases, and for their sad results. Crowds, poverty, and filth are all there, with their progeny of suffering and disease. And the philanthropist finds there always an ample field for the exercise of his broadest charities, and the most abundant employment for every labor in the behalf of his race.

Life in cities has at all times been regarded of a less average duration than in rural districts. Figures have been compiled and arranged to show the average length of life in town and country. Such presentations are most interesting, and not without the fullest instruction. They teach, too, that cities vary among themselves in their amount of mortality, and in the average duration of life among their inhabitants, and that some other cause than that of mere aggregation is necessary in the work of destruction so constantly going on in their midst; that while each develops its multitudinous sources of disease and death, the intensity of the poisons so developed differs and the fatality varies.

It is assumed by statisticians that a mortality of two per cent., or one death in every fifty individuals, may be fixed upon as a healthy and natural standard of mortality. The ratio of mortality in cities is much above this.

The following statements and figures are given to exhibit the relative proportion of deaths to the population of several of the larger cities. The contrasts thus furnished will the better enable us to judge of the loss of life resulting from causes at work within these crowded haunts of men.

In London, there dies, annually, one in every thirty-nine of the population, making the large number of 50,000 deaths yearly.

But to turn to the ravages of disease in our own country, we find the following statistics on record, declaring, with trumpet tongue, the augmented loss of life from city residence.

The following table exhibits the ratio of deaths to the population of the city of NEW YORK, extending over a period of near half a century :[1]—

[1] City Inspector's Report, N. Y., for 1853.

In 1805, a census period, the ratio of deaths to the population, 1 to 32.98.
" 1810, " " " " " " 1 to 46.49.
" 1815, " " " " " " 1 to 41.83.
" 1820, " " " " " " 1 to 37.19.
" 1825, " " " " " " 1 to 34.78.
" 1830, " " " " " " 1 to 38.97.
" 1835, " " " " " " 1 to 40.87.
" 1840, " " " " " " 1 to 39.74.
" 1845, " " " " " " 1 to 37.75.
" 1850, " " " " " " 1 to 33.52.
" 1853, as computed, " " " " 1 to 33.85.

The annual mortality of PHILADELPHIA, for a period of five years, was as follows :[1]—

Year.	Population.	Total Mortality.	Deaths to Population.
1851	409,000	8,871	1 to every 46.10
1852	415,000	10,258	1 " " 40.45
1853	425,000	9,744	1 " " 43.61
1854	450,000	11,784	1 " " 38.10
1855	500,000	10,458	1 " " 47.81

The deaths in BOSTON :[2]—

In 1850, was 1 to every 37.84 of the population.
" 1855, " 1 " " 39.88 " "

In PROVIDENCE, R. I., the proportionate mortality to population was :[3]—

In 1853, 1 death to every 43.20 of the population.
" 1854, 1 " " 36.67 " "

BALTIMORE.—Deaths, population, and rate per cent. of mortality for thirteen years, 1836 to 1848, inclusive. Exclusive of stillborn.[4]

Year.	Population.	Annual Mortality.	Mortality—1 to every	Per cent. of Mortality.
1836	93,919	2,192	42.75	2.33
1837	95,266	2,518	37.80	2.64
1838	97,547	2,476	39.39	2.53
1839	99,985	2,260	44.23	2.26
1840	102,513	2,045	50.12	1.99
1841	105,087	2,247	46.76	2.14
1842	108,233	2,477	43.29	2.31
1843	112,021	2,333	48.01	2.08
1844	116,501	2,665	43.71	2.28
1845	121,161	2,896	41.81	2.38
1846	127,219	2,996	42.45	2.35
1847	133,579	3,414	39.12	2.58
1848	140,457	3,861	36.19	2.76

[1] For the mortuary statistics of Philadelphia, I acknowledge myself indebted to the courtesy of Dr. Wilson Jewell, of that city.

[2] City Register's Report, Boston, 1855.

[3] Second Rhode Island Registration Report, 1853–54.

[4] Transactions American Medical Association, vol. ii. page 573.

At CHARLESTON, S. C., "from a report of the City Register, of the interments for the eighteen years, from 1828 to 1846, it appears that the annual proportionate mortality averaged 1 in 44.11; whereas, for the last eight years (1849), the average has been but 1 in 52."

In 1836, a cholera year, the mortality was 1 in 25.84.
" 1838, a yellow fever year, the mortality was 1 in 25.05.
" 1839, " " " 1 in 35.38.

Since then, by the sanitary improvement of the city, for a period of eight years previous to 1849, the standard of mortality has been raised to 1 in 52.[1]

At CHICAGO, the comparative mortality for five years was as follows:[2]—

Year.	Population.	Annual mortality.	Mortality—1 in every	Mortality per cent.
1846	14,169	327	43.33	2.30
1847	16,859	487	34.61	2.88
1848	19,724	514	38.37	2.60
[3]1849	23,047	1,223	18.84	5.30
1850	28,620	1,334	21.45	4.66

In NEW ORLEANS, the proportionate mortality, extending over a period of nine years, is as follows:[4]—

Year.	Population.	Mortality.	Deaths to population.
1846	102,070	4,220	1 in every 24.18
1847	108,699	9,043	1 " 12.02
1848	115,503	8,026	1 " 14.39
1849	122,511	9,862	1 " 12.42
1850	129,747	7,819	1 " 16.59
1851	138,599	7,275	1 " 19.05
1852	147,441	8,670	1 " 17.00
1853	154,132	15,787	1 " 10.39
1854	160,823	10,564	1 " 15.22

Proof is found in the foregoing statistics of the greatly augmented loss of human life, consequent upon causes at work within our thickly settled cities. A sort of sliding scale will be noticed in the range of this increased mortality from year to year, even within the

[1] Transactions Amer. Med. Assoc., vol. ii. p. 579.

[2] Ibid., vol. iv. p. 545.

[3] In 1849, 681 deaths were by cholera; and in 1850, 473 deaths were by the same disease.

[4] Barton's Report of the Sanitary Commission of New Orleans. Calculated from Chart A, and "Comparative Tables," p. 461.

same city; and at the same time from the favorable character of location, or from a more strict observance of hygienic laws, that a marked advantage is enjoyed by one town over another in a decreased rate of mortality. But the most highly favored still falls below the healthy average. The elevation of the ratio of mortality to its normal standard anywhere and at any time is a very rare and exceptional occurrence, so seldom as to elicit surprise, and almost suggest doubts of the accuracy of the figures.

If this augmented loss be beyond control and remedy, it is the penalty we pay for our civic enjoyments. If it be controllable by human means, and we leave those means unemployed, the loss is suicidal, and responsibility somewhere attaches.

This waste of life is strongly set forth in the following curious calculations made in reference to London. This metropolis contains about 2,000,000 inhabitants, or about one-eighth of the population of England and Wales. Of this number, according to the Registrar General, more than 50,000, or 1 in 39, die annually.

"But if the rate of mortality were 1 in 50, in place of 1 in 39, as it is in several large towns of England, and in the healthier parts of the metropolis itself, there would be an annual saving of 10,278 lives. In the metropolis there are about 266 deaths every week, nearly 38 deaths a day, or considerably more than one every hour, *over and above* what ought to happen in the common course of nature. Now, it has been calculated that for every death which takes place, there are 28 cases of sickness which do not end fatally. We have, therefore, 387,296 cases of sickness occurring in the metropolis every year which are unnecessary and preventable: 13,832 lives could be saved—more than a third of a million of cases could be prevented."[1]

In our search after the peculiar agencies manifesting themselves with such severity upon our urban populations, and so markedly abridging their span of life, we are almost intuitively led to fasten upon those diseases which are known to be developed by the malign influences resulting from the habits and modes of life to which they are exposed. To those diseases which are propagated from one to the other, or which are engendered by filth, or vitiated air, or both combined, and we encounter that class known by nosologists as *Zymotics*, and which are infectious, or contagious in their character.

[1] Journal of Public Health, vol. ii. p. 225.

Zymotics have been broadly defined as those diseases "which are propagated by emanations, from the ground, from decaying animal or vegetable matter, from cases of previous disease, or from over-crowded human beings, diseases which are, or may be epidemic, endemic, or contagious."[1]

The amount of mortality from this class of diseases, and the proportion borne by them to the entire mortality, are such as to arrest attention, and demand from us more than a passing remark.

The total number of deaths in the United States for the year ending June 1st, 1850, was 323,023. Of which 131,813, or 40.80607 per cent. were zymotics.[2]

If we deduct from the above 31,506 deaths caused by cholera, we have by causes ordinarily in operation 291,517 deaths, and 100,307 deaths, or 34.4086 per cent., or over one-third produced by zymotics.

In MASSACHUSETTS, for thirteen years and eight months, 29.05 per cent. of all diseases from specified causes were from zymotics.[3]

In RHODE ISLAND, from June to December, 1853, 33.194 per cent., and for the year 1854, 37.193 per cent. were produced by the same causes.[4]

In NEW YORK CITY, the deaths resulting from zymotics were in the proportion—

In year	1852	of	30.29 per cent.
" "	1853	"	25.93[5] "
" "	1854	"	35.35[6] "

In BOSTON and LOWELL they bear the following proportionate rate of mortality:—

	Years 1836 to 1840.	1841 to 1845.	1846 to 1848.
In Boston,	26.51 per cent. of all deaths.	28.36 per cent.	29.96 per cent.
" Lowell,	37.94 " "	35.47 "	48.83 "

In BUFFALO, the deaths and proportional mortality were:—

	Total deaths.	By zymotics.	Per cent.
In 1854	2,936	1,321	44.99
" 1855	1,856	559	30.11

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[1] Second Registration Report of Rhode Island, p. 69.

[2] Mortality Statistics of the Census of 1850 of the United States.—By J. D. B. De Bow.

[3] Thirteenth Registration Report, p. 158.

[4] Second Registration Report, Rhode Island, p. 44.

[5] Annual Report of City Inspector, N. Y., for 1853, p. 226.

[6] Annual Report of City Inspector, N. Y., for 1854, p. 232.

[7] Transactions American Medical Association, vol. ii. p. 504.

In BALTIMORE, for thirteen years (1836–1848), the proportionate mortality caused by zymotics was 28.627 per cent. of the whole number of deaths reported, exclusive of stillborn.

The yearly rates for the above period are thus exhibited:[1]—

Year.	Zymotics.	Year.	Zymotics.
1836	25.228 per cent.	1843	23.703 per cent.
1837	30.619 "	1844	30.206 "
1838	26.817 "	1845	31.284 "
1839	26.548 "	1846	29.205 "
1840	20.733 "	1847	31.868 "
1841	24.032 "	1848	34.939 "
1842	28.825 "		

In PHILADELPHIA, for the last quinquennial period, the proportion borne by zymotics to the sum total of the mortality, was as follows:[2]—

Year.	Total mortality.	By zymotics.	Per cent. of zymotics.
1851	8,871	2,213	24.94
1852	10,258	2,785	27.14
1853	9,744	2,422	24.85
1854	11,784	3,306	28.05
1855	10,458	2,460	23.52

Table exhibiting the Comparative Mortality of Zymotics in the several States of the Union, for the year ending June 1, 1850. Calculated from De Bow's "Mortality Statistics of the Census of 1850.

States and territories.	Deaths from all causes.	From zymotic diseases.	Per ct. zymotics.	States and territories.	Deaths from all causes.	From zymotic diseases.	Per ct. zymotics.
Alabama . . .	9,091	3,029	33.31	Missouri . . .	12,292	6,832	55.58
Arkansas . .	3,021	1,358	44.95	New Hampshire	4,231	1,582	37.39
California . .	905	659	72.81	New Jersey . .	6,465	2,512	38.85
Columbia, Dist. of	846	289	34.16	New York . .	45,600	17,976	39.42
Connecticut . .	5,781	1,987	34.37	North Carolina .	10,165	2,495	24.54
Delaware . . .	1,209	461	38.13	Ohio	28,957	16,138	55.73
Florida . . .	931	307	32.98	Pennsylvania .	28,551	11,645	40.78
Georgia . . .	9,925	3,136	31.59	Rhode Island .	2,241	780	34.80
Illinois . . .	11,759	5,858	49.81	South Carolina .	8,047	2,645	32.86
Indiana . . .	12,708	6,331	49.81	Tennessee . .	11,875	4,524	38.09
Iowa	2,044	954	46.67	Texas	3,057	1,285	42.03
Kentucky . .	15,033	6,895	45.86	Vermont . . .	3,129	951	30.39
Louisiana . .	11,956	5,999	50.17	Virginia . . .	19,059	5,190	27.23
Maine	7,584	2,654	34.99	Wisconsin . .	2,903	1,242	42.78
Maryland . .	9,621	3,345	34.76	Minnesota . .	29	12	41.37
Massachusetts .	19,404	7,189	37.04	New Mexico . .	1,157	335	28.96
Michigan . . .	4,515	1,428	31.62	Oregon . . .	47	23	48.93
Mississippi . .	8,721	3,639	41.72	Utah	239	149	62.34

[1] The ratios of Baltimore are calculated from Dr. James Wynne's "Sanitary Report of Baltimore," vol. ii. Trans. Am. Med. Association.

[2] Dr. Wilson Jewell.

We shall find a confirmation in the foregoing figures of the remark frequently made, that the best index to public health may be deduced from the proportion in which these diseases prevail. It is the property of zymotic diseases to prevail more at one season than another; or more in one locality than another; and to become epidemic, endemic, or contagious under certain circumstances.

It is admitted that these diseases, so fatal among us, are those most amenable to hygienic laws. As will a residence without the circle of their influence secure an immunity from attack, so would an entire removal of the causes of their development, of course insure their extirpation. An exemption of the race from the evils of their presence would be procured by the eradication of the elements of these morbid actions.

Upon the power of human agencies to control, limit and prevent those combinations which give birth to, and insure the full development of these diseased actions, hinges, therefore, the whole question of the utility of the labors in the behalf of sanitary reform.

In the class zymotics are grouped, in conformity with the nosological nomenclature adopted by this Association, and now most generally employed in recording American mortuary statistics, sixteen distinct forms of disease, viz: cholera, cholera infantum, croup, diarrhœa, dysentery, erysipelas, intermittent fever, remittent fever, typhus fever, hooping-cough, influenza, measles, scarlatina, smallpox, syphilis, and thrush.

Several subdivisions are employed in most of the State and city mortuary reports for the purposes of more distinctly marking the ravages of some phase of disease, and imparting to them an enhanced local value. We consequently find the above list extended by the additions of cholera morbus, typhoid, ship and yellow fevers.

A separate examination of the prevalence and fatality of several of the most destructive of the diseases embraced in the above classification, will afford us an opportunity to enter into the discussion of the sanitary questions involved in their eradication, and will bring before us those subjects more pertinently applicable to the subject of inquiry intrusted to the Committee.

Upon the very threshold of our subject we are compelled to bow before the hidden mysteries of the causations of disease, and confess the poverty of our knowledge, and the imbecility of our strength.

The investigations of science have yet revealed nothing which enables us to discover the peculiar elements concerned in the pro-

duction of six of the diseases belonging to the class under consideration. Of the etiology of croup, erysipelas, hooping-cough, influenza, measles, scarlatina, we are profoundly ignorant. All we know of them is, that while they perhaps are never absent entirely, they at times assume in the widely spread circle of their influence, and in the intensity of their action, every characteristic of the severest and most fatal epidemics. Four of them are undoubtedly contagious. Three of them secure the system against a repetition of attack. Four of them are pre-eminently diseases of early childhood, and are among the most active agencies in the production of the terrible mortality of infantile life.

The elements concerned in their development seem to be meteorological rather than terrene, depending upon some peculiar atmospheric conditions of which we are yet unable to take cognizance. City life seems to have but little influence in adding to their severity, and the sum total of their mortality is increased only by the greater number exposed. They extend to the remotest bounds of the country, and penetrate the most secluded hamlet with a severity as great, and a tendency as fatal as when developed in a crowded city.

We only know that inasmuch as measles, scarlatina, and hooping-cough are propagated by contagion, that, as a sanitary measure, a removal beyond the sphere of infection would for the time being secure an exemption from attack; but the extreme susceptibility of childhood to the specific contagion of these diseases, renders such a measure of but little avail except in securing a short truce to the attack, since it seems to be almost a law of its nature that it should suffer once an attack of these diseases. Croup and influenza leave us to look to atmospheric changes too occult for us to demonstrate their character, or from whence they emanate.

With the balance of the diseases in our class scientific investigation has grappled, and endeavored to pierce the mysteries which surround them. But even with them, our boastings should be tempered with the greatest humility, as we have too often occasion to discover that our strength is but weakness, and that we can as yet penetrate but a very short distance within the veil which conceals the mysteries of epidemics and endemics from our view.

The first disease in the alphabetical arrangement of our class is CHOLERA, a disease, as it were, of our own day, with whose birth, progress, and fearful march over the face of our globe we are all personally cognizant. Twice has it come up from the land of its birth

and overrun empires and states like a fierce army, and the sound of the footsteps of the last march has not yet died on the ear, and we have no assurance that the invader has yet entirely withdrawn from our shores, or that he may not again return to devastate our towns and cities.

It is not our purpose to enter into discussion upon any of the innumerable theories which have been proposed as to the specific causation of the disease. While the fact is admitted of its epidemic character, and of its having as its remote cause some specific source of infection, which finds means of dissemination in the atmosphere, experience and observation go far to prove, if they do not render the proof certain, that terrene agencies enter largely into the causes which give the necessary intensity to the poison to develop it into action. The nicely poised balance existing between these two elements, the meteorological and terrene, whose equilibrium, when disturbed ever so slightly, is productive of such deplorable results, is the problem now occupying the attention of the meteorologist and the sanitarian.

Cholera is emphatically an epidemic of cities. It hovers about the haunts of men, and riots in the crowd. It dwells with the denizens of the city, and follows them on the travelled highway, and along the frequented watercourse. It lurks in the camp, and marches with the army. It is where man is found in masses, and living under circumstances which in any manner will serve to develop the germ of the disease from a latent to an active state, that we read of the ravages of this pestilence.

Its proclivity for an urban population, and its exemption of the dwellers in the country so constant as to scarce make an exception, points very strongly and forcibly to the hypothesis that with the former are found elements of some character necessary to a full development of the seeds of the disease, be they produced, or borne from what source they may. The pestilence has, too, its favorite haunts even within the town. In the crowded lane, and the filthy, over-populated street, reeking with foul emanations from the soil or neglected pavements, mingled with emanations as foul from the persons of the careless, negligent crowds, the disease reigns in savage triumph, and sways the sceptre of death over the devoted indwellers.

In fact, the discussion of the causations of cholera in their terrene dependencies opens the whole of the oft-repeated stories of the influences which the violations of the most palpable hygienic laws

have upon the development and spread of this epidemic, and I confess that there is no little difficulty in any presentation at this day of these agencies, which will not necessarily involve the repetion of these thrice-told tales.

It is too true, however, that these generally accepted facts are not productive of those results which we would naturally look for as the sequence of truths so readily admitted as to seem to render argument in their behalf unnecessary. It is true that the outburst of the epidemic, or an anticipation of it, will lead to a spasmodic effort at cleanliness, but the spirit of vigilance thus engendered dies too often with the causes which called it forth. There is an absence of a continuous, systematic course of remedial measures calculated to remove at all times the fruitful soil in which the pestilence finds root, and develops itself into a full harvest. A recognition so general as it has become of the influences exerted by the violation of sanitary laws in the development of cholera, and that it is chiefly among those exposed to such contaminations that the disease finds its chief victims, has undoubtedly done much to disarm the epidemic of the terror with which it was once regarded; but this very fact is suggestive of the inquiry, whether it has not begot a false security in the public mind, and may, if it has not already done so, produce an indifference to the ravages it causes. Admit the fact that it pervades the lanes and alleys where poverty and misery hide, that it reigns in the hovel of the intemperate, and makes its home in the abodes of the poor and miserable, and the process is short to connect the causes and the sufferers together, and to argue that they are inseparable, and forgetting the humanity which dwells in the sons and daughters of poverty and misfortune, leave them to their fate, without an effort to alleviate their condition. The not unfrequent outbreaks of the epidemic in districts where, from a casual inspection, we should not look for its advent, however, serves to remind us that the flame which has been lighted in a hovel may spread a conflagration even to the palace. We should remember that the circle of its influence may radiate far from the centre of its birth.

The deaths by cholera in the United States, for the year ending June 1, 1850, and which nearly if not quite covers the epidemic period of its second visitation to our shores in 1849, were 31,506, as returned by the census report of that year. As large as is this aggregate, it is *exceeded* by the sum of the other forms of disease of the alimentary passages.

We gather, from the same source, that during the same period there were from

Cholera infantum	3,960	deaths.
Cholera morbus	1,568	"
Diarrhœa	6,366	"
Dysentery	20,556	"
Thrush	424	"
	32,874	"
Add by cholera	31,506	"
	64,380	"

And it is seen we have a total of 64,380 deaths from diseases of the alimentary passages, being 19.93 per cent. of all the deaths reported for the year.

The prevalence of cholera is well known to add largely to the frequency, and consequently to the mortality of the other diseases of the intestinal canal, and we accordingly find a very large increase from diarrhœa and dysentery. This increase is not only in the immediate circle of the cholera influence, but far beyond it, where the cholera poison seems to have not sufficient intensity to develop itself into this specific form of disease, but is modified into some other variety of intestinal disease. Perhaps, within a cholera district dysentery may be regarded rather as one of the sequelæ of the cholera influence, as one declines the other develops itself, and under such circumstances the severity of the disease and its tendency to a fatal termination is but a little less than cholera itself.

The intimate connection between the causations of cholera and these other forms of disease is not only distinctly marked by the parallelism between the extent to which they prevail, and that diarrhœa is also the uniform precursor, or first stage of cholera, but that precisely the same circumstances by which and under which cholera is developed, are those which develop diarrhœa and dysentery. The same sanitary characteristics of locality may develop one or all of the several forms of disease, being controlled alone by individual susceptibility; or a difference in the moral and physical condition of the parties may so far act as a modifying influence as to cause the substitution of one disease for the other.

Fever, in its varied forms, is also one of the mighty agents in the constant destruction of life witnessed on every side. Too little care, as a general thing, is paid to accuracy of type in diagnosis to insure uniform correctness of classification, and no doubt the name

of one form of the disease is frequently substituted for that of another, and there cannot consequently be that minuteness of detail arrived at, desirable to assign to each distinct type its true percentage of mortality. But enough can be learned to prove the destruction annually caused by the diseases bearing the general names of fevers.

In the "Mortality Statistics of the Census of 1850," we find the number of deaths caused by fever in its various forms, for the year ending June 1, 1850, returned as follows:—

Fever,	18,108
Fever, Intermittent	964
Fever, Remittent	148
Fever, Ship	240
Fever, Typhoid	13,099
Fever, Yellow	785
Total number of deaths by fever	33,344

It will be seen that the number of deaths by fever was greater than those by cholera, during the same year in which the latter raged as an epidemic. It is perhaps not too much to say with these figures before us, that we had two epidemics abroad through the country, doing the work of death side by side. One was spreading consternation and alarm wherever it appeared; the other was silently, unnoticed, and unheeded, but just as certainly, filling the grave as the dreaded cholera.

It is to be regretted that the above classification is not sufficiently specific in the characteristics of the different types of the disease so that each might have exhibited its due proportion in the scale of mortality.

Fever stands prominently forth as one of the zymotics, and perhaps that term alone is the only one sufficiently comprehensive to embrace the conflicting views of the etiology of the various forms of fever. Without stopping to argue any of the theories of contagion, infection, or portability, it is sufficient for our purpose, to raise the inquiry and to arrive at the fact if possible, how far any of the exciting or predisposing causes of fever in any of its forms may be dependent upon and controllable by human agencies.

The fevers of our cities developed apparently in consequence of the violation of sanitary laws, assume generally the distinctive forms of typhus, typhoid, and yellow fevers. But like cholera, closely compact masses anywhere gathered together, and living under circumstances grossly in violation of the laws of health, are

liable to and may at any time develop these forms of disease. We accordingly almost daily hear of the outbreak of fever in some of its forms, upon shipboard, within our jails and almshouses, and in the camp. As we trace it within cities, we find it developed under circumstances very similar to those which give birth to cholera, or which when united to the specific cause of that disease give it such a fearful potency.

Typhus fever is especially rife in the densely populated portions of towns. We have here all the causes most favorable to the development of disease—numbers and the concomitants inseparable from dense crowds, filth, and contaminated air. The effects of density of population in the production of the disease has been made a subject of investigation in London, and the following facts arrived at.

"The effect of crowding is shown by a table exhibiting the mortality, and the number of square yards of space to each person in three groups of metropolitan districts.

	Square yards to each person.	Annual Mortality.	Mortality from Typhus alone.
1st group of ten districts . . .	35	3428	349
2d " " . . .	119	2786	181
3d " " . . .	180	2289	131

"Hence we perceive that typhus is nearly three times as fatal in the first or crowded group as in the third or open one."[1]

In a report upon Public Hygiene, made to this Association by Dr. Joseph M. Smith, in 1850,[2] the subject of the sources of typhus fever was made the theme of the paper. The design was "to show that the disease originates from human excretions." The report is valuable in exhibiting forcibly the sources of contamination existing within the human body, and the mass of effete matters thrown off by the numerous emunctories daily.

Dr. Smith claims, that it is to the excrementitious matters thrown off from the lungs and skin that the poison of typhus is mostly traceable. He assumes as a basis of calculations, that the quantity of pulmonary and cutaneous excretions is 40 oz. daily, and that of this amount 10 dwt. consist of organic or animal matter, and upon these data enters into a number of curious calculations of the amount of effete matters thus thrown off in crowded jails, ships, camps, and badly ventilated houses.

[1] Chambers's Information for the People, vol. ii. p. 551.

[2] Trans. Amer. Med. Assoc., vol. iii.

We make the following extracts from the report: "Let us suppose a family, one, of which there are hundreds of examples, consisting of ten adult persons, dwelling in a small, ill-ventilated house, and negligent of personal and domestic cleanliness; and further, that the time severally passed within doors by the ten individuals, some of whom are constantly at home, while others are temporarily absent, amounts in the aggregate to twelve hours out of every twenty-four. The mass of effete matters thrown out by the lungs and skin, by such a family within their dwelling in one month is 500 lbs., in six months 3033 lbs. 4 oz., and in one year 6083 lbs. 4 oz.[1] Though by far the greater part of these excretions consist of carbonic acid, water, and salts, yet the *quantity of ejected animal matter* is not inconsiderable. It amounts in one month to 6 lbs. 3 oz.; in six months to 37 lbs. 11 oz.; and in one year to 76 lbs. 0 oz. 10 dwt. In such circumstances it is, and especially in seasons in which the prevalence of typhus is favored by an epidemic influence, that the disease often spontaneously originates in the squalid homes of the poor."

These calculations have been extended so as to embrace an entire city, from which we make the following quotation:—

"The inhabitants of a densely populated town may be regarded as a single family, living in contiguous or narrowly separated apartments, any number or the whole of which may as certainly be rendered infectious by overcrowding, as the cells of a prison. In no mode perhaps can the danger from this source of disease be so distinctly impressed on the mind as by estimating the quantity of waste matters eliminated from the bodies of the people of a city in given times. If we assume as a numeral basis a population equal to 200,000 adults, it will be found, if calculated as in former examples, that the entire pulmonary and cutaneous egesta amount in one month to 20,000,000 lbs.; in six months to 121,333,333 lbs. 4 oz.; and in one year to 243,333,333 lbs. 4 oz.; and that the *exhaled animal matter alone* amounts in the first of these periods to 250,000 lbs.; in the second to 1,516,666 lbs. 8 oz.; and in the third to 3,041,666 lbs. 8 oz.

"The health of a city depends in no small degree upon the distribution of the inhabitants over an area of sufficient extent to admit of the free ventilation of every dwelling. When such a distribution obtains, and attention is given to personal and domestic clean-

[1] A month is reckoned as 30 days; six months as 182 days; and one year as 365 days.

liness, a population of 200,000 or any greater number, will be as secure against the invasion of typhus as are the inmates of a commodious, cleanly, and well-aired private dwelling. But populate a town as densely as are the alleys and courts of many cities, and the consequence will be that the whole population will feel the influence of an *idio-miasmatic* atmosphere, and disease be co-extensively produced."

It will be observed that the urinary and fecal excretions are not taken into the account as a source of contamination. These doubtless should not be lost sight of entirely as a means of adding to the impurities and seeds of disease otherwise engendered by crowds, for although generally removed from the dwelling, it is only that they may become festering pestilential pits poisoning the atmosphere and those who breathe it. After making all due allowances for errors almost inseparable from such calculations as have been quoted, I think we all will be willing to admit that Dr. Smith has proved that man may become a very dirty animal, and that we shall be ready most fervently to exclaim, "that cleanliness is next to Godliness."

YELLOW FEVER is also developed under circumstances similar to those which give rise to the several forms of disease we have been considering, but seems to require a much more elevated temperature for the emanation of the poison.

Decaying matters, vegetable or animal, filth of all kinds, exposed to an intense heat, such as is experienced under a southern sun, united to moisture, seem at least to furnish the pabulum for the development of the disease. I shall not stop to inquire whether the disease is ever, under these circumstances, generated *de novo;* or whether it always requires the presence of a specific cause for the production of the disease.

The recent labors of Barton and La Roche, directed toward the development of the etiology of yellow fever, leave but little at present to be added to the literature of the disease; and experience and observation alone, it would seem, must hereafter add to our knowledge of the disease.

We now approach the consideration of those municipal regulations which have for their object the correction of the evils which originate and propagate disease, or are in any ways inimical to the public health. With the masses in our cities, dependence upon

the influence of personal appeals, or a reliance upon simple individual labor, will be ineffectual for the eradication of these evils. Enlightened individual labor, it is true, can accomplish much; but, not to stop to take into consideration the fact that very many are so indifferent to the interests of their neighbors, that provided their own ends are attained, they are heedless of the jeopardy in which the health and lives of others may be placed; the larger part of the work to be performed is too great for personal effort. Concentrated action, backed by *law* and the *public purse*, can alone accomplish the greater part of the labor to be performed.

The regulations of a city which look to the preservation of the health of the citizens are among the most important of all its municipal laws. The defect has always been in the poverty of such existing laws, and the laxity and indifference with which these, feeble as they have been, have been executed. Our health laws would seem, too often, to have had a place upon the statute books simply as a species of solace to the public, and as if in obedience to a sort of a half formed conception that something of the kind was necessary. But they have too generally been permitted to lie hidden from sight, and only been brought to light when some fearful calamity has fallen upon the community, and they have been aroused from their indifference, to make an exertion to correct the evils by which they are surrounded.

Many of the evils from which our communities suffer have their origin deeper than can be reached simply by the broom and shovel, and corrected by the removal of a little filth from the surface of the street, or from the corner of some yard or vacant lot. Many of the evils have their roots in the social and moral position and condition of the citizens. To them they are chained by the force of circumstances, which they cannot control; poverty often binds and confines them within the poisoned circle, and unless relieved by the charities of the public exerted in their behalf, must forever so remain.

All these matters legitimately come under the cognizance of an intelligent and liberal police, directed towards the sanitary improvement of the public health. In the exercise of such authority and supervision, not only the removal of such existing evils as experience has proven to be injurious should be the labor performed, but every effort should be directed to the prevention of the development of these evils. Prevention as well as cure, and

prevention rather than cure, should be the end most earnestly sought after.

Some of the sources of the malign influences existing within our cities, to the prejudice of the health of the indwellers, and resulting in disease and death, will claim our attention. Although necessarily compelled to be brief, we shall give as full consideration as possible to the influences exerted upon the public health by water, sewerage, paving, over-crowded and ill ventilated houses, the removal of the soil, and such other subjects connected with matters under consideration as may present themselves during the discussion.

WATER is among the chief of man's every day's want, and to the dwellers within city walls it is among their greatest necessaries. But pure water, to the great mass, is among the luxuries scarcely attainable. I think I hazard nothing in saying, that in every city in our country the supply of pure water is entirely inadequate to the wants of the inhabitants ; that, to a very large portion of the dwellers of every city, the supply is not only in many instances impure, but entirely inadequate to purposes of domestic and personal use, so as to secure by free application, cleanliness and health. I make this remark, in full view of the numerous corner wells and pumps that grace the waysides, and the lordly reservoirs which are the glories of several of our cities. But the presence of these does not invalidate the statement. They furnish to the wealthy a full supply; but to them only at the price and cost of a luxury; but what city is without its streets and districts of inhabitants to whom their supply is most scanty, and where they are driven to seek for the water they daily use, to some filthy canal or creek, rich in the seeds of disease?

The sources of a city's supply of water are among the most interesting subjects which can present themselves to the consideration of the inhabitants, and is it not true that the matter never receives attention until by the force of circumstances the consideration can no longer be deferred?

A reliance upon wells, which until quite recently has been the chief source, is at best uncertain, and must eventually, in cities, be abandoned, in consequence of the contaminations of the soil inevitable upon causes constantly at work therein. The earth must, earlier or later, depending upon population, become saturated with filth. The contaminations of privies and sewers, and the leakage

of gas-pipes, must sooner or later render every city well a receptacle only for filthy water. A very little exercise of the imagination will suggest how impossible it is to have, or to expect pure water with the close proximity there exists between our wells and the sources of contamination alluded to. The well, sesspool, and privy frequently stand but a few feet apart, and the sewers beneath the streets are abundantly capable of discharging more or less of their contents in addition into the source from whence we derive one of the essentials of life.

Where these sources of pollution do not exist to such a degree as to be a serious difficulty, it is not at all times practicable to obtain water fit for use. Almost every locality furnishes abundant examples of impure waters, dependent upon some peculiarity of soil or rock. Many wells, in consequence of some geological peculiarity, are very evidently nothing more than receptacles for surface water, which has percolated without filtering through fissures in the earth or rock. This difficulty exists especially in a clay formation. Clay is almost as impervious to water as the rock, and where a sufficient superstratum of sand does not exist so as to furnish a filter for the water as it descends from the surface, a well excavated in the dense "hard pan" merely serves to collect the fluid as it descends through and along the crevices which everywhere pervade its substance.

Every city must from necessity look to some source from without the boundaries of infection for a supply of this essential of life, and the earlier it recognizes the fact, and enters upon some provision for a compliance with this inexorable law, the better will it be for the welfare of its population. Health will be preserved and life saved.

The introduction of water from without a city by artificial means of any kind, involves a large expenditure of capital, and consequently the time and manner of supply has been most generally left to private enterprise, the governing question in the undertaking being—"Will it pay, and how much?" So long as the matter of supplying our towns with water is left in the hands of companies, or individuals, just so long will the evils resulting from an insufficient supply of this element be only partially remedied; the sources of disease and the class of persons most in need will never be reached.

In the public park, the fountain may leap joyously upward and flash and sparkle in the sun as if its every drop were a jewel; and

in the houses of the wealthy, water may flow in profusion, and beautify and adorn their grounds, and dispense to them all its blessings; but to the great sources of want and disease it will never flow to wash away the festering impurities. A water company runs its pipes only into those streets which will pay; the poor cannot pay, and no stream flows to gladden their sight, to allay their thirst, or bathe their bodies. Every drop that flows has its price, and as it falls is watched with as jealous an eye as if it were expected that it would congeal into a diamond.

Nor have we any right to charge upon them an excess of cupidity. The only incentive they had for the outlay of their capital in such an enterprise, was the prospect of profit. It is true, they saw and recognized the wants of the public, and out of this necessity sprang the means of a profitable investment of their money; but they have only taken advantage of the market and are selling their wares at the highest price possible, with, however, this powerful advantage in their favor, that they generally have the monopoly of the market, and can use their advantage with cruel power if so disposed.

The great error is, in municipal corporations permitting such a power being vested in individuals or companies. Water is next to air in importance, and they as the legal representatives of *the public*, should reserve to themselves this monopoly, and make the most ample provisions for the supply of every inhabitant, rich and poor, within the boundaries of their government. This principle should be recognized, and no town or city should hereafter permit this right to pass from their control; and every municipal corporation, where this right is already vested in some other party, should seek the earliest opportunity for resuming the same, and becoming, as they rightfully should, the means of dispensing health and happiness among the citizens, without the debasing question of profit entering into every consideration. And then as a sanitary measure, reverse the ordinary course of things, and let the pipes be laid and the water carried first, to the narrow streets and lanes, and to the abodes of the poor. Let the supply be abundant for their every necessary want. If you do not put water in every house, and it is not necessary you should, place it near to the hand of every person. Let the possibility of a wasteful use of it, be a question of secondary importance. Furnish them with the means of cleanliness and health, and then seek the broad avenues and the habitations of the wealthy.

Let the rich remember while they are waiting until their poorer neighbors are served, that their own safety is insured thereby; for while disease, as has been shown, is engendered among the abodes of the poor, the poison may distil over and invade the homes where every comfort that money can purchase is found. If no considerations in behalf of the sufferings of a common humanity are sufficient to dictate a course pointed out so plainly, let the question of personal interest and safety be presented and govern. Let them be humane and just out of pure selfishness, if no higher motive can actuate them.

PURE AIR is another of the essentials of health. As considered in its sanitary relations, it is generally discussed under the head of *Ventilation*. This subject has of late attracted much attention, and its importance is becoming more and more generally recognized. In practice, however, the application of the principles of ventilation is most defective. In our better class of dwellings some attempt is made towards this end; and in our public buildings a show of insuring a change of air for the benefit of the inmates is made; but in both classes of buildings, the results obtained fall far short of the objects sought. The true principles of ventilation are yet but imperfectly understood by the community, and the greater portion of the modes employed are defective, and serve more to amuse than to answer the purposes for which they were really designed. As the attention of the better informed classes of the community is directed to this subject, and as it has become *fashionable* to erect buildings with ventilators and other apparatus for insuring a current of air through the same, it is to be presumed that the evils, so far as they are concerned, will before long be remedied, and we shall not, therefore, devote time to their consideration.

We shall give more particular attention to those dwellings where the influences of fashion and the lights of science do not penetrate, to those habitations where the seeds of disease and death are produced and imbibed by the inhabitants with every breath. We shall not stop to enter into any argument to prove how much breathing space every human being needs; the quantity of oxygen destroyed at each inspiration; or the number of cubic feet necessary to every apartment. We shall assume, as beyond a question, that a *sufficient* supply of pure air is necessary to every human being to insure the highest health; and we shall also assume, as a

fact beyond dispute, that in every town in our land are found buildings which do not furnish these requisites of perfect health.

In every town (the larger it is, of course the more aggravated are the evils likely to be) are to be found habitations overrunning with inmates, apartments filled beyond all limit to their capacity, rooms in which more than one family not unfrequently are found herding together in violation of every law of decency as well as of health; narrow, filthy streets and lanes crowded with high buildings, confined courts, into which the sun never penetrates and the air never circulates, and where dense multitudes live, and breathe continuously an air of pollution, and die a death of slow poison. These facts are too notorious to require at this time the citation of specific examples to prove the assertion. Every sanitary report made to this Association contains abundant proof of the truth of the statement. Our object is simply to point out the manner in which this gross evil and wrong upon society, and the poverty-stricken especially, is to be corrected.

Our suggestion as the means of the sanitary improvement of this condition of things, is found in the single sentence—*that the evils are to be corrected, and to be corrected alone by the strong arm of the law.*

The ignorance of some, and the cupidity of others, will render any other measure ineffectual in correcting the pestilential sources of misery in our midst. Just so long as there are those whose poverty compels them to accept the miserable accommodations to be found in these wretched abodes, so long will there be found those to take advantage of their necessities, and coin money from the sufferings of the poison-breathing inmates. The ingenuity of property holders in those localities where the poor most do congregate, seems taxed to the utmost to crowd the greatest number of human beings into the smallest possible space. Every additional tenant pays full tribute to their purse, and what matters it, if health, decency, and morality, all be corrupted and destroyed, if the poisoned heart's blood is turned into gold to add to their wealth. What wonder is it that such abodes become the home of the pestilence, and that, as if in revenge for their wrongs and sufferings, the plague should propagate itself far and wide throughout the boundaries of the town?

We want a strong municipal law, which shall plainly and distinctly say in what manner our edifices shall be built, especially those which are to be situated under circumstances likely to develop disease, and to be inhabited by those whose pecuniary circumstances

and personal habits are liable to induce conditions from which may arise sources of contamination; a law which will prescribe the number of inmates to a building and to a room; a law which will define and give to each man, woman, and child, a sufficiency of air and breathing space.

To the objection that may be made, that this would be an encroachment upon individual rights, and would interfere with the interests of property holders, and subject them to expenses and untoward hardships, I would reply, that society has assumed to itself this right in other matters; that it has assumed to itself the right of protecting itself against the dangers and risks of conflagrations; that it defines the mode in which our buildings shall be built so as not to hazard the property of others; that it does this at the risk of an increased expenditure to the builder, and a diminution of his profits, nor pays heed to any cry of hardship which may be raised, as it legislates for the safety of the public at large; so, we contend, that the power which defines that our edifices shall be built fire-proof, is equally potential to declare and insist that they shall be built *disease proof*. Law now defines the number of passengers a vessel may carry upon the seas, and sacrifices the profits of the merchant to the safety and welfare of the passenger.

We have an approach to such a law in the authority which is vested in our Boards of Health, to enter in times of epidemics, and thin out an overpopulated house. But, as prevention is better than cure, the evil should be prevented, not simply corrected. No opportunity for the development of disease should be given. After the poison is imbibed, you probably will arrive too late with your prophylactics and antidotes, and death will do its work.

Under the present order of things, a tax is just as effectually laid upon pure air, and its free use prohibited by the narrow, pent-up apartments, ill-supplied with doors and windows as are most generally the dwellings of the poor, as if a tax collector called daily upon the inmates for the price of what they consumed. Air and water are both made a luxury, and sold them at the highest possible price. Epidemics alone do not make their homes in such abodes, but scrofula wastes and deforms and destroys the form of childhood, and gaunt consumption eats out the life of full grown men and women, and death in every form is the companion of the wretched inmates.[1]

[1] See Appendix.

SEWERAGE AND PAVING are undoubtedly among the efficient means of adding to the health of a town. Sewers, if properly constructed, afford the means not only of drainage for the soil and removing all excess of moisture, but they also furnish facilities for disposing of the waste water and fluid filth which must necessarily be the product of a numerous population. If thrown upon the soil or pavement, these matters undergo the process of decomposition and evaporation, filling the air with their mephitic gases, and add their quota to the numerous other sources of contamination.

Among the numerous improvements which constantly demand the attention of the municipal authorities, sewerage and paving should receive their earliest attention, and a plan for reaching the *entire extent of the town* adopted and systematically and vigorously prosecuted. Upon the score of economy, sewers should be laid in the streets before the paving is laid down; both works can in this manner be the most effectually performed.

A great error is generally committed in not constructing the sewers of sufficient capacity for accomplishing the work they have to perform; and, moreover, they frequently have not sufficient depth beneath the surface of the soil to fulfil the objects for which they were designed. They should in every instance be of sufficient depth to insure perfect drainage of the cellars of the buildings upon the street, and remove every opportunity for the accumulation of moisture beneath the floors. Side sewers should emerge in all directions, and furnish the most ample facilities for the inhabitants to employ them for all the purposes for which they are designed.

Every inlet should be guarded by stench traps, and the greatest care taken for the prevention of the escape of any odors or gases from them, back into the streets or houses. The fact should not be lost sight of, that by sewerage you have only removed your filth from the surface to beneath the soil, and that, if improperly constructed, the deleterious influences of the mass of filth accumulated therein may ascend to the surface and exert still its deleterious influences. Provision should consequently be made for the frequent cleansing of the same, by turning into them from time to time a supply of water sufficient to effectually wash them out and remove all impurities. This is especially essential during the droughts and heats of summer. It is seldom during this hot season that there is sufficient rain to keep them clean, and the foul smells which emanate from them can scarcely escape the notice of any

who may be so unfortunate as to come within their vicinity. It is perhaps unnecessary to remark, that the discharge of these underground channels should always be into some watercourse of sufficient capacity and current to remove all the contents far beyond the precincts of the town.

Our sewers undoubtedly furnish the most simple and feasible means of getting rid of that great nuisance of cities, the night soil. The disposition of this material is one of the most perplexing questions that present themselves to the consideration of the municipal authorities. As it usually exists it is a nuisance, it creates a nuisance to remove it, and it forms a nuisance where it is redeposited. With a full supply of water and properly constructed sewers, its accumulation may be prevented, and the evil consequent therein avoided.

I would add, as a conclusion to this branch of our subject, that the superintendence of the construction of all sewers, lateral as well as main, *should be confided to the charge of the health officers of the town.*

The convenience of paved streets generally insures their construction in the business portions of a town, and they are gradually extended with the increase of business and the wealth of the inhabitants; but the importance of pavements to the health of the community is not, I think, generally recognized. Observation has abundantly proved the beneficial influence exerted upon health, by paved streets. Nor can it be otherwise, for in no other manner can a street be kept dry and clean, and all impurities be removed. With a street properly sewered and paved, and a good attention given to the frequent removal of all filth which may gather upon the surface, a most important end will be accomplished towards the preservation of the public health. The importance of paved streets to the comfort, convenience, and health of a community is so apparent as to require no argument, and we shall dismiss the subject with this simple allusion to it.

I wish to call attention to a subject which seems, until quite recently, to have escaped notice. I refer to the influence exerted upon the health of a city by the upturning and removal of the natural soil, especially in times of epidemics. This breaking up of the earth is generally the result of those works of improvement and repair constantly going on in the midst of a city population, such as the preparations for paving, the building of sewers, the laying down of water and gas-pipes, the digging of canals, and

basins, and the innumerable excavations, which are constantly being made. These labors, for convenience, are generally undertaken in the spring, and extended throughout the whole of the heats of summer and autumn, and the fresh earth in this manner exposed to the sun during the warmest part of the year.

The question of the sanitary bearing of such labors upon a population is a most important one, for its definite decision would furnish a rule by which the authorities might be governed in the prosecution of their various enterprises. Since public attention has been called to this subject, it is certainly very important to decide how far such an influence is exerted, and whether such exposures of the soil to the heat of the sun and the influences of the atmosphere have the power, under ordinary circumstances, of generating diseases *de novo*, or whether a malign influence is exerted by them only in seasons of epidemics, when they add another to the numerous terrene agencies concerned in the development of the specific disease.

It would seem hardly possible that the simple disturbance or upheaval of the soil should be productive of serious difficulty, and so long have escaped notice. Intramural excavations have been prosecuted from time immemorial, and such results would undoubtedly long since have been unmistakably recognized, and the consequences have been an abandonment of all such labors, or the depopulation long since of every city on the face of the globe. Perhaps the facts bearing most strongly in favor of the deleterious influences of such causes, is the influence sometimes noticed in the production of malarious diseases in a newly settled country by the ploughing and turning up of the virgin soil; and the production of the same diseases along the lines of the excavations and embankments of a railroad, or canal, which present the most exaggerated examples of earthwork and disturbance of the soil we possess. But in either of these examples the result is not uniformly the development of any such diseases; and it may be well questioned whether in those cases of their production some other element is not also actively employed in the elimination of the malarious manifestations.

In seasons of epidemics the question is not so difficult of solution. I think abundant evidence is already accumulated to fasten conviction of the disastrous influences exerted by the exposure of the upturned earth to the sun and atmosphere, during those months when there is present any epidemic tendency.

Dr. E. H. Barton, in his "Report upon the Sanitary Condition of New Orleans,"[1] remarks: "That since 1796–7 to the present time there has been no great epidemic of yellow fever in this city, without an extensive breaking up, disturbance and exposure of the original soil of the country; that this has consisted in digging canals and basins, or cleaning them out, either in the city or its immediate neighborhood; digging and excavating the streets of the city for the purpose of laying down gas and water-pipes, and relaying the streets; digging and embanking for railroads, and similar purposes in the summer season; and that the extent and malignancy of the disease have been pretty much in proportion to the extent of these exposures."

Dr. Barton gives corroborative testimony in support of this position, occupying in the details some six pages of his report.[2] The histories of the ravages of yellow fever subsequent to extensive excavations in Natches, Memphis, Mobile, Charleston, Natchitoches, and several other less prominent places are given. In all, the close connection existing between the amount of work performed and the extent of the prevalence of the disease is traced.

Although Dr. Barton labors to excite public vigilance in the sanitary government of his city, and endeavors in the plainest and most forcible language to teach the doctrine of the local origin of yellow fever, and prove its home-birth, he does not regard the upheaval of the soil, or any other form of terrene agency alone, sufficient to develop that disease; but that certain meteorological conditions are necessary to propagate the disease.

The distinctive doctrine of the report on the causations of yellow fever is thus enunciated:[3] "That the emanations arising from the upturning and exposure of the original soil in the summer season, together with filth, *under certain determinate atmospheric conditions*, have been the main, if not the special cause of every epidemic yellow fever that has ravaged not only this city, but the south-western part of the United States for more than half a century."

The close connection between severe outbreaks of cholera in localities where there has been much disturbance of the soil, and the persistent sojourn of the disease in such vicinities, seeming often to advance along the lines of the works and follow their progress as they

[1] Report of the Sanitary Commission of New Orleans, p. 312.

[2] Ibid., pp. 315–21.

[3] Page 322.

are extended from day to day, has been noticed. The phenomena witnessed under such circumstances inculcate instructive lessons in the part borne by local causes in the development of this epidemic.

A striking and melancholy example of the ravages of the disease under such circumstances, was witnessed at Buffalo during the epidemic visitation of 1852, upon one of our most cleanly, well built, and respectably inhabited streets. The history of the occurrence was gathered at the time by Prof. F. H. Hamilton, and made the subject of a report to the Buffalo Medical Association. We shall make use of this report, giving its language when convenient.

The street is known as Ellicott Street, is on the east side of Main Street, being the second street distant. The space of epidemic visitation was limited to two squares in length; the north line being Eagle Street, the south line South Division Street; and was crossed at the centre by North Division Street; the entire limit being some five or six hundred feet in length.

The topography of the territory is thus given in the report:—

"Not many years ago a marsh occupied the ground where this street is built, covered with a deep, soft, alluvial mould. The marsh extended from near Washington Street to about where now Michigan Street lies, and from Goodell to Swan. It had its outlet towards the corner of Swan and Michigan, or in that direction. This marsh was the result of a peculiar formation of the clay bed, which to the depth of ten or twenty feet underlies nearly all that portion of the city which is east of Main Street, and below High Street. The strata having a dip from Main and Michigan, from Goodell and Swan towards a common centre. To this clay basin, only partly filled in its deepest portions with sand, there was no actual outlet, except the slight depression towards the southeast; and it remained, therefore, until intersected by ditches, the depot for all the surface drainage of the higher neighborhoods—a general receptacle for water, alluvium, and sewers.

"Upon this soil much of that portion of the town is built; for in paving the streets, with few exceptions, none of the surface earth was removed, but the sand was deposited for pavements above it. The streets thus became higher than the adjoining lots, and the water being thrown back upon them the owners found it necessary to fill them up. So this whole bed of alluvium was at length buried up, and there it has remained to the present time. No less rich and fertile and redolent of disease, however, to day than before

it was inhumed—when it was regarded as unsafe for any family to live within the reach of its miasms.

"Since the pavements were laid, the lots filled up and the sewers made, this part of the town has been as healthy as any of those portions which are underlaid with clay—indeed much more so, I think. Ellicott Street especially, and particularly at this southern extremity, has been regarded as healthy. In 1849, fewer deaths from cholera occurred in this street than in Washington, Elm, Oak, or in any other parallel street of equal length east of Main; and I am informed by a resident that not one death occurred from this cause, in that portion of the street of which we are now speaking. And this fact may be explained by the size and comfort of the dwellings, which are mostly of brick; by the neatness and spaciousness of their yards, which afford them sufficient ventilation; by the cleanliness of their street, and the completeness of their sewerage, which last possesses also, I am told, this remarkable advantage over other sewers, that it has running through it most of the year, if not constantly, a fresh current of water, which finds its supply in springs around the foot of court-house hill, and from other parts of the clay basin.

"In short, for several years the occupants of these houses have enjoyed that immunity from epidemics and other diseases which the science of etiology would have taught us to expect for them, and to which their own diligence in the abatement of the usual causes has eminently entitled them.

"During the present season the reputation of this locality for healthfulness remained unchanged; not even the ordinary diseases of summer were known to have prevailed. The long and persevering drought, with an unusual degree of heat, brought no change.

"On Saturday, July 24th (1852), a ditch was commenced at Eagle Street, four and a half feet deep, and two feet wide, for the purpose of laying water-pipes. The work was regularly carried on through Saturday, Monday, Tuesday, and a part of Wednesday forenoon. On Monday night it was partly open near the corner of North Division and Ellicott. Wednesday morning it was opened to South Division Street.

"The length of the ditch was about 200 yards, and the number of dwellings fronting upon the street, from Eagle to South Division, was twenty.

"The soil through which the ditch was dug, was, directly underneath the pavement, a coarse sand of about one foot in depth, then

a rich loam averaging about one foot also; and underneath this, sand of a reddish or yellow color, either coarse or fine at different points. The clay bed beneath was not reached."

The first case developed itself on Monday evening, July 26th, in a recently built and very comfortably constructed brick house on the northwest corner of Ellicott and North Division Streets. The sufferer was a married lady, who had been in feeble health for some months, but with no intestinal disease, was attacked with a slight diarrhœa. On Tuesday it returned with increased severity, and on Wednesday forenoon cholera was distinctly announced, Friday morning at 2 o'clock she died.

On Tuesday morning it manifested itself in a brick house on the east side of Ellicott Street, three doors north of North Division Street. Mr. W. arose, feeling ill and having a diarrhœa; and his wife awoke with a severe headache, and early in the afternoon was attacked with a diarrhœa, speedily followed with unequivocal symptoms of cholera, and died the afternoon of the next day. An apprentice who lived in the family, and slept in the house on Monday night, went to Niagara Falls on Tuesday morning, returning in the evening feeling as he thought sea-sick. He reached home between 9 and 10, and retired without mentioning his illness. About 11 o'clock his condition was discovered, when he had unequivocal cholera, and he died 10 o'clock the next morning. On Wednesday morning three of the children were attacked with cholera, two of whom died. The servant girl was also attacked Wednesday night or early Thursday morning, and died Thursday afternoon.

On Wednesday, at No. 27 Ellicott Street, east side, two other cases occurred, a man and his wife; both were fatal.

On Thursday, some eight cases more are recorded, none fatal. No new cases were developed after Thursday.

There were in all nineteen cases, of diarrhœa, with manifest cholera tendency, or actual cholera, all being so ill as to require medical attendance; and of these nine died. They all occurred within the distance of a few rods each way from the centre of the ditch, near the intersection of North Division with Ellicott Street. Of twenty families living upon the street, the epidemic showed itself in nine. By one o'clock P. M., of Thursday, the ditch had been completely closed.

Dr. Hamilton declares that, "My conviction is, under all the circumstances, that these cases all had their source, more or less

directly, in the miasms from the ditch. I have no doubt other causes may have concurred and materially promoted the result—eating sour or unripe fruit—alarm—even contagion I admit: yet neither one nor all of these are sufficient to explain many of the cases. They did not all eat fruit—several were attacked simultaneously—children and almost infants were in many instances its subjects.

"The weather was very warm, and immediately when this old bed was opened and brought to the surface, a rapid decomposition and elimination commenced. During the day the heat of the sun so rarified the air, that the mephitic or poisonous gases arose rapidly and were borne off; but during the night, when most of the attacks commenced, these exhalations settled and hung upon the houses and their unsuspecting occupants, like the heavy vapors of a pit."

Dr. Hamilton, in a subsequent report, made as the chairman of a committee, appointed "to investigate the influence of upturning of soils in the causation of Asiatic cholera," collected the statistics of the progress of this epidemic, in 1849, along the line of an extensive ditch dug through Genesee Street, a street running from east to west through the town, and all that portion east of Main, and in which the disease prevailed, is settled exclusively by our German population.

For the purpose of building a sewer, "a ditch was commenced in Genesee Street, at the intersection of Michigan, about July 1, 1849, and it was opened and completed through to Hickory Street, by about the 20th of August; the work of opening, laying the sewer, and refilling being carried on simultaneously—so that it was closed its entire length very soon after the excavation was completed. The excess of earth was, however, not removed until about the 14th of September. The ditch was 1200 feet long, two feet wide, and from eight to ten feet deep.

"The soil through which the ditch was excavated was first, one foot of paving sand, then clay to the depth of two or three feet, and finally hardened quicksand, or clay and sand in mixture."

The entire number of cases of cholera upon the whole length of the street, as accurately as could be ascertained, was, during the season, 97. Whole number of deaths, 41. Of these, 61 cases and 21 deaths were confined to the space from Michigan to Hickory Streets, the line of the sewer. Between Hickory and Pratt Street, the first street east of Hickory, and about three hundred feet distant, and of course the same distance from the eastern termination

of the sewer, there were 32 cases of cholera, and 17 deaths. But one case is recorded further east of this point. Of the cases within the above described and limited territory, 20 cases and 4 deaths occurred previous to July 1st, the period of commencing the labor; and 68 cases and 30 deaths were between July 1st and Sept. 14th. After this period there were but 5 cases and 4 deaths.

"It will not escape your observation, that nearly all the deaths were along the line of the ditch, or within 300 feet of its north-eastern extremity, in which direction our winds would be most likely to carry the miasms. If the watercourses were obstructed, also, the refluence would be in the same direction, as the street has a declination from east to west and south."

The report adds: "Attempting to carry our investigations into other streets, through which ditches were opened during the same season, and in which it had been said that similar consequences had followed, we found our inquiries ending in no satisfactory results, and we therefore soon ceased our examinations. Ditches were made generally for the purpose of removing nuisances, in many streets, and in one instance, at least, by request of the inhabitants. Such was the fact in Cherry Street. The street was covered in various places with stagnant pools of water, and the lots had no means of drainage. In this condition the cholera broke out among the inhabitants, and they soon petitioned the Common Council to have a drain built, in the hope that the disease might be thus arrested—but the cholera continuing to increase in severity after the work was commenced, and the completion being somewhat delayed, they again petitioned hastily to have it closed."

During the cholera visitation of 1854, there were no extensive excavations of any kind in the city, and this page in the history of the experience of the sad effects of the epidemic was left clear from the burthen of such a mournful record.

In the history of the sudden outbreak and fearful ravages of cholera, at Suspension Bridge, below the Falls of Niagara, and at the Falls themselves, during the month of July, 1854, may be found strong corroborative testimony upon the point under consideration.

Niagara Falls and its vicinity had always enjoyed an entire immunity from the visitations of cholera. The only cases ever known, were two, in 1849, a gentleman and his wife from Buffalo, who both died the same night; and in 1852, a young man, also from Buffalo, went down to attend the Scott's celebration, was taken sick on the road, and died a few hours after his arrival; and about a

week later, one of their most respectable citizens died of the same disease. This completes the history of their experience with the epidemic up to the date, July, 1854.

In 1852, the village of Niagara City had its birth, at the end of the Niagara Falls Suspension Bridge, about one and a half miles below the Falls. In 1854, it numbered a population of one thousand.[1]

The soil at this point is chiefly clay, with a thin surface of alluvium. Near the banks of the river, where the ground is somewhat lower, the rock approaches the surface and is in many places uncovered. Situated mostly on high ground, which declines rapidly toward the river, its surface drainage had hitherto been complete, and it has received the benefit, in whatever direction the wind might be, of a pure air.

The first case of cholera which ever occurred in the village among its inhabitants, was on the 17th of July of this year (1854), in the person of an American citizen and a very intemperate man. The second, was on the 19th, an old lady, of excellent habits, also a resident. From this day it increased with terrible rapidity and fatality.

On the 21st, ten died; on the 22d, thirteen died, and it then gradually declined, and the last fatal case occurred on the 31st. Between the first and last dates, a period of fourteen days, about thirty-seven died, and about twenty more were attacked and recovered.

On the 19th of July it also broke out, on the Canada side of the river, at the other end of the bridge. The total number of cases on both sides of the river was ninety, and the number of deaths, seventy.

In consequence of the numerous improvements, public and private, going on at these points, an immense amount of excavation and removal of earth had been performed. The character and extent of these is succinctly set forth in the following extracts from letters descriptive of the ravages of the epidemic, by Dr. R. J. Rogers, the physician of the place:—

"In regard to what our citizens believe to have been the cause of the cholera, I would say there has been no great amount of talk or speculation in regard to it. They are all aware, that ninety per

[1] The account here given is condensed from the history of the epidemic, contained in the "Sanitary Reports of the City of Buffalo, for 1854. By J. M. Newman, M. D."

cent. of the deaths occurred among those who either lived or did business on the low grounds in the vicinity of the bridge. Before the sewer was constructed, the railroad banks had turned off the surface water into unnatural channels; consequently, it flowed over the surface of a great portion of the low land around the bridge. It was "a crying evil" in the spring, and was wet more or less through the month of June. The cellars, too, were not well drained, and many houses had no cellars, yet sufficient excavation to let water and dampness accumulate around and under them.

"The principal excavations here, this summer, have been made by the railroads. A large amount of the natural earth has been removed, and carried down to fill up the grounds in the vicinity of the bridge and the road leading to it.

"The first case was an *imported* one, and occurred on or about the 14th of July. An Irishman came on the Great Western Railroad from Canada, and died the same night.

"The first case on the Canada side occurred on the 19th of July, the patient a female. I cannot ascertain that any but laborers and their wives died in Canada.

"They have excavated a great deal on that side. The Great Western Railroad passes through a deep cut, and the dirt was brought forward to fill up a deep ravine running nearly parallel with the river. A stream of water passes through this ravine, but there are no pools. The embankment is principally dry clay and gravel."

The cholera also prevailed, with more or less severity, at the Falls itself, a mile and a half from the bridge; and, it will be remembered, for the first time, with the exceptions already noticed. There was much reluctance upon the part of the citizens admitting the presence of the epidemic at this time, and full details were not attainable. The following brief sketch of some of the particulars was furnished by Dr. C. S. Ware, a resident physician of the place:[1]—

"The first case was an Irishman, employed in sawing wood for the railroad. He had been exposed to the disease among some Norwegian emigrants at the depot, and also lived in the immediate vicinity of the public works, where a number of cases occurred a few days after.

"I can form no idea of the number of fatal cases this year. The

[1] Sanitary Reports, City of Buffalo, 1854.

epidemic began the first day of July, and ended the last week in August. Probably ninety per cent. of all the victims were Irish laborers, and they for the most part are intemperate, and live in poorly ventilated shanties.

"The laborers' shanties are built along the line of the canal, in three distinct patches. The first patch contains nearly half of all the laborers. Their houses were built in a grove of small hickories, but not very much shaded. The dirt was taken from a part of the canal and spread over the ground, all about the shanties in this grove, *and it was in this patch that at least seventy-five per cent. of the cases occurred.*

"The middle patch was not so much shaded, and not nearly as much of fresh earth was deposited. The cases here *were milder and much less frequent, and but few deaths.*

"At the upper patch, situated on the bank of the river, and where there was *no* fresh earth left, *not a single case occurred during all the summer.* In this patch there were some twenty or thirty shanties, with a proportionate number of occupants, and excepting locality, all lived in the same manner."

Enough I think has been shown to exhibit the dangerous influences exerted by disturbance and exposure of the soil, during the prevalence of any epidemic influence in the atmosphere. In an absence of any such influence, or what perhaps would be popularly called "a time of health," such results would not be looked for.

It is perhaps useless to attempt to inquire what element is contained within the earth, which is capable of being eliminated into such a deadly poison. The agent is doubtless too subtle for our grasp, and if we call it *malaria*, or give it any other name, we shall but employ the drapery of language to conceal the nakedness of our ignorance. It concerns us more to know if we may escape the sad results springing therefrom.

It would seem undoubted, that the emanations of such exposures, under the influence of heat and a humid atmosphere, have the property of giving the most fatal intensity to that form of disease which may be determined by the epidemic constitution of the year. In other words, the meteorological elements are what are wanted, and all that are needed to the production of the epidemic.

The prosecution of this subject would open the whole matter of meteorological influences in the production of epidemics. Heat and humidity undoubtedly play important parts in the production of disease, and when they are united to filth, or foul emanations of

any kind, either from within, or from without the earth, disease may result, so intense in its action and fearful in result that epidemic may be truly written against its name. The prosecution of this subject would, however, be out of place here. It was discussed in a report presented last year to the Association by Dr. S. B. Hunt.

The most important question for us to decide at the present time, is, how far the teachings of meteorology in their connection with hygiene, can be made subservient to the benefit of mankind? If we are able to read the approach of the epidemic in the registration of atmospheric vicissitudes, can we control these "powers of the air" so as to disarm the pestilence of its virulence and save our race from suffering?

Several important lessons may, I think, be learnt from the consideration of this subject. We learn the compound character of the agencies concerned in the elimination of those morbid influences which exert such malign power upon the human system; that for the elimination of these poisons the whole series in the chain of causes and effects are needed, and the absence of one only would defeat the consummation of the event. As in chemistry, all the elements in their precise proportions and order are needed for the production of any given compound, so here the absence of a single element will modify and change the result of the combination.

That if it be admitted that we may not, or cannot know in advance what is to be the epidemic tendency of the year, yet possessing so much knowledge as will enable us to break up the order of secondary causes upon which the manifestations of its power depend, we possess knowledge sufficient and ability abundant for the prevention of the evils which follow in the train of the pestilence.

That if subsequent observation and experience confirm the present theories as to the intimate relation of solar heat and atmospheric humidity in the production of disease, it will be in the power of man from day to day to observe and foretell the advance of an epidemic in the approaching coincidence of the lines of disease upon the thermometer and hygrometer.

I have but little doubt, that when the results of meteorological observations are better understood, and the laws thereof plainly deduced, that it will be made the duty of our Boards of Health to publish from day to day, for the benefit of the public, the changes of the instruments and the deductions to be drawn therefrom. Nor would such publications be devoid of interest, or without their use. Aside from the greater probability that would ensue of increased

vigilance in the preservation of cleanliness, power would be given all to guard against the injurious impressions of atmospheric vicissitudes. While it is admitted that we may not hope to ascend so high as to be able to control the never ceasing changes of aerial temperature and humidity, yet we may guard ourselves against very many of the effects produced by these causes. We can guard our dwellings against dampness, insure perfect drainage, remove all excess of moisture, and prevent those common results of humidity witnessed in our habitations in the form of mould and mildew, by ventilation and artificial heat. This accomplished, and with perfect cleanliness, we have removed two at least of the links in the chain of the causations of disease.

The subject of earth disturbance should not, perhaps, be dismissed, recognizing, as we are compelled to do, its deleterious influences, without the observation, that within cities particularly, and in seasons of any epidemic tendency especially, extensive exposures of the soil are not to be recklessly undertaken; and at all times their prosecution during the extreme heats of summer, is to be avoided as far as possible. And that, in every instance, every excavation should be refilled as speedily as possible, and all superabundant earth is to be removed immediately from the street. That in no instance is the drainage of the surface to be obstructed, nor any watercourse made to overflow the surface, or the waters turned into unnatural channels; that, previous to the prosecution of the work, provision for perfect drainage should be provided, and, during its progress, faithfully maintained.

I have deferred to this place the consideration of one of the zymotic diseases, as its causes, modes of propagation, and means of sanitary control are so entirely different from any other disease of its class, that its consideration could, with the greatest propriety, be separated entirely from the balance of the series.

I refer to SMALLPOX. I apprehend that but few persons are aware of the actual extent of the disease in the land. Vaccination has done so much to control the disease, and has it in its power undoubtedly to entirely eradicate it, that we have accepted its ability to accomplish, for the actual accomplishment of the result.

The "Mortality Statistics of the Census of 1850," give the number of deaths in the United States for the year, from smallpox, as 2352. Of these, 2057 *were born within* the United States, so that, unlike some other diseases, we cannot shelter ourselves under the so-frequent plea, that it is our careless, newly-arrived emigrant population

who suffer as a consequence of their peculiarities of habits and excessive exposures.

In Massachusetts, for 13 years and 8 months, ending December 31, 1854, the number of deaths from this cause was . . 976
The total for the last five years was 729
The yearly average for the last five years was 145
The number for 1854 was 207
Being 1 per cent. of all the deaths for the year.
In Rhode Island, for the year 1854, the deaths from the same cause were 11
All being in the City of Providence, and furnishing 0.61 per cent. of all the deaths from specified causes in the state.
In Kentucky, the deaths from the same cause in 1852 were . 14
" " " 1853 " . 8
" " " 1854 " . 26
In Boston, in 1854, the deaths were 118
" 1855, " 182
"With the exception of 1850, when there were 192 deaths from this cause, it has been more fatal the past year than it has been for the last five years."
In New York City, in 1853, the deaths were, including varioloid 681
" 1854, " " . 624

The various mortuary reports of the country speak of the prevalence of this loathsome disease, and the almost uniform language is, that it is on the increase. And our daily papers have of late frequently alluded to the augmented frequency of the disease in various sections of our country. Indeed, there would seem to be no little cause of apprehension of its extensive prevalence in country as well as town.

Such facts may well excite our surprise. An explanation can alone be found in the ignorance, or, what is worse, the carelessness of the public.

There are probably but very few to be found who do not know of the inestimable value of vaccination, but many carelessly defer the operation from time to time until it is entirely forgotten, and they are aroused only to a full sense of their imprudence by an attack of the disease. More, perhaps, are ignorant of what constitutes a genuine vaccination, and have the operation imperfectly performed. Others are unacquainted with the necessity there frequently occurs of more than one vaccination being required to render the system fully protected against the variolous influence, and that, under this semi-protected state, the individual is susceptible to the contagion, and liable to an attack of variola, though

probably in a modified form. The knowledge of an *apparent* failure in the protective power of vaccination, perhaps, begets distrust of its real value in the minds of some, and serves to add to the sum of fatal results.

The public should be thoroughly assured of the absolute power there is in vaccination to protect the human system against the contagion of smallpox, but that this immunity is purchased by *thorough vaccination alone*, a condition of the system which may not be obtained by a *single* vaccination, but *only after a frequent repetition* of the operation.

The report of the Committee on Medical Sciences for 1850,[1] contains a series of propositions upon the subject of vaccination, the results of the observations of the late Dr. Fisher, of Boston, which are so applicable to this subject that I deem no apology necessary for reproducing the following from the series, as containing, upon this subject, truths of the most vital importance for the public:—

"1. That one single and perfect vaccination does not, for all time, in all cases, deprive the system of its susceptibility of variolous disease.

"2. That one or more revaccinations *do;* and that consequently, a physician should recommend revaccination, when questioned as to its necessity.

"3. A portion of vaccinated persons are protected from smallpox through life by one vaccination.

"4. An indefinite number are protected only for a certain period of time.

"5. The length of time they are thus protected is undetermined.

"6. Some individuals require to be vaccinated a number of times during life.

"7. The system is protected from variolous contagion, *when it is no longer susceptible of vaccine influence, as tested by revaccination.*

"8. The appearances of vaccine cicatrices furnish no indication that the system may or may not be again influenced by repeated vaccination.

"9. The lapse of time from the period of primary vaccination to that of revaccination has some, though but little, effect in preparing the system to be further influenced by the vaccine virus.

"10. The age of puberty tends in a degree to destroy the effects of primary vaccination."

[1] Trans. Amer. Med. Assoc., vol. iii. p. 73.

The manner of abating the ravages of this loathsome disease is self-evident—*effectual vaccination of the entire population.*

But experience has proved that there is but little probability of such an event being brought about, if the matter is left to individual action. Ignorance, carelessness, recklessness, all serve to overcome the sense of self-protection, so powerful generally in the human breast, and to preserve a very large portion of every community constantly liable to the attacks of the disease, and render certain an abundant supply of virus actively at work among the people.

Compulsory vaccination can alone reach and remove the evil. It is the right of the community, as well as a duty it owes itself, to protect itself from the evils of such a contagion, and destroy the sources from which they spring. This is a matter in which our rural population is as much interested as those who dwell in cities. They are liable, if unprotected, to experience the full severity of an attack, and the inquiry is pertinent, whether they do not suffer *more* than the citizen, in consequence of the greater alarm and excitement it produces when it makes its appearance in the country.

By the law of the land, for municipal laws alone will only partially remove the danger, every person should be compelled to be perfectly vaccinated, and the requirement should commence at the earliest infancy. Some penalty should be inflicted for a neglect of this duty.

It should be made a prerequisite for admission into any public school; and one of the sanitary rules of every public institution, educational, penal, or charitable should be the assurance of safety against this contagion, by vaccination.

Physicians should be appointed at the public expense at convenient points, for the gratuitous vaccination of all those whose poverty might otherwise deter them from a compliance with the law.

Prussia has long had such a law in force, and England has recently enacted statutes designed for the general vaccination of the people. Boston, in our own country, has, I believe, similar municipal regulations, and perhaps other of our cities may also have. To be really effectual it must be apparent, that such laws should extend over every State in our Union.

In concluding this report, I wish, not only for the benefit of the public, but as an act of justice to our profession, to advocate the appointment of medical men upon our local Boards of Health, and confiding the matters appertaining to the execution of Sanitary Police Regulations, to the hands of the profession. I advocate this

not only as a measure for the benefit of the public, and from which they would be actually the greater gainer, for the studies, and pursuits of the physician are such as must eminently qualify him over any other class of our citizens for the discharge of such duties; but as an act of simple justice and as a recognition upon the part of the public of the value of the services daily rendered by the profession and directed toward the preservation of the health of the people. From medical men are expected to emanate every measure designed to prevent, as well as cure disease, and their labors are constantly as much directed toward this end, as to the cure of a malady when once developed.

These labors are too often unrequited except by empty thanks, and these too often are forgotten to be bestowed. The public is too well satisfied to accept these labors as a gratuitous—matter-of-course; and occupy every post of profit, though they legitimately belong to those who so freely labor in their behalf.

The liberality of the profession is proverbial, and regardless of self, they cheerfully labor in every department which may assuage human suffering and dry up the sources of disease and death; still physicians are not exempt from the commonest wants of humanity, and are as much dependent upon their labors for their support as any other portion of the community.

I boldly contend that to the physician belong the posts of honor and of profit conferred by the constitution of any Sanitary Commission, Board of Health, or any other office which is designed to devise and execute hygienic laws.

These posts are now too frequently given merely as the rewards of party service to men no way qualified by habits of observation and study for the positions they occupy. And the indifference with which our present laws are executed in reference to health matters, springs in a great measure from the ill-adaptedness of the officers to the duties they have assumed to perform.

Let men be selected from the ranks of the profession for these posts who will bring to the exercise of their duties a laudable professional ambition, and work from a love for their labors, and be actuated by the true spirit of the sanitary physician.

APPENDIX.

SHORTLY after the completion of this portion of my report, the subjoined report of a committee appointed by the Legislature of New York, at its late session, was published.

The resolution under which the Committee was appointed, fully explains the object, and the report itself most completely indorses every position we have assumed.

This legislative report is short, but exhibits the horrors of the situation of the poor in New York and Brooklyn. The subject is thus invested with all the authority of legislative sanction, and perhaps the details will more readily be accepted as true than would individual reports.

The importance of the investigation, and the intimate connection it has with the subjects discussed in our report, are the only apology we offer for its insertion in this place.

IN ASSEMBLY, April 4, 1856.

Report of the Special Committee on Tenement Houses, in New York and Brooklyn.

The Special Committee appointed under the following resolution—

"*Resolved*, That a committee consisting of five members of this House, be appointed to make an examination of the manner in which tenant houses are constructed in the city of New York, and report the same to this Legislature; and also, if any, what legislation is requisite and necessary in order to remedy the evils, and afford full protection to the lives and health of the occupants of such buildings," submit the following report:—

That in accordance with the above resolution, they proceeded to New York on the 14th day of March, and again on the 25th day of March, and spent on the first visit three days and on the last four days, in a personal inspection of some of the best known of

the tenant houses in the city, and in receiving from the proper authorities such information connected therewith, as it was in their power to furnish. In the brief space of time allowed them for the investigation, your Committee have been enabled to do no more than glance at evils of such magnitude, as to imperatively demand a thorough and searching scrutiny; and they are sensible that their labors will be unattended by any practical result, unless they succeed in impressing upon your honorable body a conviction of the necessity that exists for an extension of their powers, with a view to perfecting some plan of reform upon which future legislation may be based.

At this late period of the session, and when legislative action cannot be taken, it would be a needless encroachment upon your time, should the Committee lay before you in detail all the facts they have elicited and all the sights they have witnessed in the exploration of the haunts of misery, poverty, and vice in the metropolis. They deem it sufficient for their present purpose to state generally, that the examination they have made has convinced them that the evils sought to be remedied are of a serious nature, requiring the attention of the State Legislature, and demanding such action at the hands of the present Assembly as will secure their ultimate removal.

In order, however, that your honorable body may appreciate the magnitude of these evils, and the injurious influence they must exert upon the prosperity, health, and happiness of the community, your Committee deem it expedient to set before you the following condensed facts.

Partial returns, made up hurriedly by the captains of the police for the use of the Committee, show that in *twenty-two* districts there are over *one thousand two hundred* tenement houses of the very lowest description, occupied by not less than *ten families* each. In some of these as many as *seventy* different families reside, and into a few over *one hundred* families are crowded. A number of these dwellings were visited by your Committee. In one building one hundred and twelve families are residing, some of them numbering eight or ten members, occupying one close, unventilated apartment; and others huddled indiscriminately in damp, foul cellars, to breathe the air of which is to inhale disease. Here, in its very worst aspect, are to be seen the horrors of such a mode of living. Here are to be found drunken and diseased men and women, lying in the midst of their impurity and filth; idiotic and crippled children,

suffering from neglect and ill-treatment; girls just springing into womanhood, living indiscriminately in the same department with men of all ages and of all colors; babes left so destitute of care and nourishment as to be fitted only for a jail or a hospital in after years, if they escape the blessing of an early grave. Indeed, no language could faithfully depict the suffering and misery witnessed even in the hurried visit paid by the Committee to these hotbeds of immorality, drunkenness, and disease.

In the ninth district, out of seventy houses reported by the captains of police as being let in tenements to not less than ten families, forty are designated as "*in a very filthy condition, unfit for human habitation*," and all of these are occupied by from *sixteen* to *thirty-five* families each. In the 10th district, out of *seventy-six* houses, a majority are occupied by as many as *seventy* distinct families, and are reported as in a filthy condition, without ventilation, and destitute of the accommodations necessary for the use of civilized beings. In the 11th district, in which are some seventy houses of a like description, the report says: "Of all the tenement houses in the district, 'Folsom barracks' and 'the cottages,' are the most wretched and filthy, alike disgraceful to the owners of the property, and the city that tolerates such nuisances. It could not fail to be a matter of surprise to any one who would go through and examine them, that the occupants did not all die of pestilence generated by their unspeakable filth and dissolute habits of living." In this and other localities, your Committee found many of the apartments so destitute even of light as to render it an impossibility to read a newspaper within them at noonday.

In the 13th ward, in a building known as Manhattan Place, there are *ninety-six* separate apartments. These are inhabited by *one hundred and forty-six* families—or more than one family and a half, on an average, to each room—numbering in all *five hundred and seventy-seven* persons, or about six individuals to each single room. The health warden, in his report setting forth these facts, says: "These premises are three stories high, the cellars are in a bad condition, the sinks filthy, and the ventilation poor. In the summer season these premises are known to be very filthy, and not the least attention is paid to them whatever by either owner or agent; their sole aim, apparently, being to make money; exhibiting in the same an entire disregard to all law whatever."

In the houses visited by your Committee, sights were presented to them alike startling and painful to behold. In many, whites

and blacks were living indiscriminately together; negro men with white women, and white men with negro women. Young faces, haggard with want and sickness, and bearing that peculiar look of premature old age imparted by early sin, gazed at them from every corner; misery and vice in their most repulsive features met them at every step. Scarcely an apartment was free from sickness and disease, and the blighting curse of drunkenness had fallen upon almost every family. Here and there might be found, it is true, some attempt at cleanliness, some display of a love of home, some evidences of industry and sobriety, with their natural accompaniments, cheerfulness and good health. But these, your Committee found, were in most instances families that had not long been inhabitants of the neighborhoods in which they lived. The demoralization and ruin apparent all around had not had time to do their work on them. It is to be feared that too soon the miasmal air will creep into their systems, undermining the sturdy constitution, and prostrating its victims on a bed of sickness. Health failing them, want will follow; and then must come crowding rapidly upon them, neglect of home, neglect of children, uncleanliness, drunkenness, and crime. This is no fancy sketch, no picture of the imagination. It is a stern reality, enacted every day in the midst of luxury and wealth, the natural and fearful result of the rapacity of landlords in an overcrowed city, unrestrained by conscience, and wholly unchecked by legislation.

Many of the buildings that are thus rented to the poor, realize for their owners *larger* annual incomes than do the first class dwelling houses in the best parts of the city. And yet they are estimated by the assessors as almost valueless, and escape anything like a fair taxation, notwithstanding they are the principal cause of the heavy burdens imposed upon the citizens of New York for the support of the criminal and the poor. This is, of itself, a forcible argument in favor of some active legislation upon the subject of tenement houses.

In these buildings, thus crowded with human beings, there is, with scarcely an exception, but one narrow stairway; and egress to the multitude inside, in case of fire, is an impossibility. Common humanity demands some law against this evil.

Every underground cellar in these tenement buildings, that is not absolutely flooded by water and filth, is made a lodging room for one or more wretched families. All of these are destitute of any species of ventilation; in most of them the floors are thick

with putrid mud, and the pipes and sinks communicating with them from the upper apartments give out their offensive and deadly gas, and pollute the air of the whole neighborhood. One of the provisions of a law regulating these matters should be directed against permitting an underground apartment of any description to be rented or used as a tenement.

It would be an unnecessary encroachment upon your time, to present in detail the numerous suggestions made by practical builders, and by the police and health officers of New York, who appeared before your Committee, in reference to the best mode of effecting the much desired reform in the construction and management of tenement houses, with a view to removing the evils resulting from their present filthy and dangerous condition. It is sufficient to say, that in every instance they concurred in recommending legislative action at the earliest possible moment, and that they were unanimous in the opinion that only through the interference of the Assembly, and the passage of some law regulating the style of tenement buildings, and providing for their management, could the existing evils be properly reached or effectually remedied. In the views of these parties the entire New York press has concurred; for there is not a paper published in the city that has not warmly approved of the objects for the attainment of which the Committee was formed, and urgently recommended a continuance of its powers during the recess of the Legislature, and until some definite plan of reform has been perfected, to be submitted to the next Legislature for action.

The remarks that have been made with reference to the tenement houses in New York apply with equal force to similar buildings in Brooklyn; and attached to this report will be found a statement of the number of houses and of the families occupying them in that city.

The members of the Legislature, very probably desirous of protecting the State against needless expenditures, are in general apt to oppose the extension of a committee's powers after the adjournment; but your Committee would be remiss in their duty, did they fail to urge upon you honorable body the necessity that exists for such action in the present instance. That the evils complained of in reality exist, no person will deny; that they need the interference of the Legislature for their removal, all will admit. If the matter should be now ended for the present year, the expenditure that has been thus far incurred would be comparatively wasted; and the

Legislature would doubtless appoint a new committee, who would be compelled to commence the work anew, and would in all probability be unable to accomplish any result during the brief space of time they would be able to devote to the subject during the session. The expense that would attend the probably fruitless labors of a new committee, appointed next year, would suffice to enable the present Committee, during the recess, to make a thorough investigation of the matter, to mature a well considered plan of reform, and to prepare a bill upon which the succeeding Legislature will be able to act.

Indeed, no expenditure that could be incurred in securing the removal of the evils complained of, could be at all commensurate with the benefits and the saving that would result therefrom. To the wretched condition of the dwellings of the poor of New York, can be traced an enormous proportion of the burdens imposed upon the property-holders of the city, and upon the State at large, for the support of paupers and criminals. From the foul atmosphere of the tenement houses spring the infectious diseases that so frequently spread through the city, sweeping away their thousands of victims, and not confining their depredations to the class with which they originate, but penetrating into the localities occupied by the wealthy, and rendering desolate many a happy household. Hundreds upon hundreds of paupers pour into the hospitals, stricken by disease contracted in those hotbeds of pestilence, the tenement houses. From them, drunkenness mainly receives its victims; for what will sooner drive man to the intoxicating cup than an absence of all attraction and all comfort from his home? From them, the brothels of the city are peopled; for there the female is early taught to forget all womanly feeling and inured to a life of shame. From them, the jails are supplied; for they are the natural haunt of felons. It is no idle assertion to say that a reform by which the condition of the homes of the poor could be improved would remove a large proportion of the criminals from our prisons and the paupers from our almshouses. In London, since the model lodging-houses have been in existence, together with baths and wash-houses for the poor, the mortality has decreased 31 per cent., and pauperism 39 per cent. A similar result would attend a similar reform in New York.

The practical results which your Committee will endeavor to secure through legislative action, and to which their inquiries will be directed, are—

Ventilation and cleanliness in tenement houses—so that the public health may be protected, the spread of infectious diseases checked, and the expenses of public hospitals and almshouses decreased.

An enactment against permitting the renting of underground apartments, or cellars, as tenements.

Regulations as to the building of halls and stairways in houses occupied by more than three families, so as to insure easy egress in case of fire.

The prevention of prostitution and incest, by providing that only a sufficient number of rooms, or a room properly divided into separate departments, shall be rented to families, and by prohibiting sub-letting.

The prevention of drunkenness, by providing to every man a clean and comfortable home.

In conclusion, your Committee would state, that as they are all residents of New York or its immediate neighborhood, the expenses attending their labors during the recess would be comparatively trifling, and they therefore beg respectfully to submit for the consideration of the House the following resolution:—

Resolved, That the Special Committee appointed to examine into the condition of the tenement houses in New York and Brooklyn, have power to extend their operations during the recess of the Legislature, so far as is necessary to enable them to perfect some plan of reform, and to prepare a bill for the consideration of the next House of Assembly, and that they be required to present their report and bill to the next Legislature some time during the first week of January, 1857.

JOHN M. REED,
ELI CURTIS,
WILLIAM J. SHEA,
SAMUEL BREVOORT,
A. J. H. DUGANNE.

Report of Tenant Houses in the City of Brooklyn, with the Number of Families in each.

Ward.	No. of houses.				Families.	Average No. of persons in each family.
1	50,	of which 11	contain each	. . . . .	5	4
		" 14	"	. . . . .	6	
		" 8	"	. . . . .	7	
		" 7	"	. . . . .	8	

Ward.	No. of houses.				Families.	Average No. of persons in each family.
1	50,	of which	5	contain each	9	
		"	4	"	10	
		"	1	"	14	
2	59,	"	2	"	4	4 is the average to each family in the ward.
		"	20	"	5	
		"	18	"	6	
		"	11	"	7	
		"	4	"	8	
		"	1	"	9	
		"	1	"	11	
		"	2	"	12	
3	5,	"	1	"	5	3
		"	2	"	6	3
		"	1	"	7	4
		"	1	"	9	4
4	19,	"	4	"	5	4
		"	8	"	6	4
		"	2	"	7	3
		"	4	"	8	4
		"	1	"	10	4
5	115,	"	35	"	5	4 persons in each family is the average of the ward.
		"	32	"	6	
		"	29	"	7	
		"	11	"	8	
		"	3	"	9	
		"	2	"	10	
						Remarks.
		"	1	"	12	14 rooms, each 10 by 12; 49 persons.
		"	1	"	15	18 rooms, each 10 by 12; 72 persons.
		"	1	"	16	16 rooms, each 10 by 12; 69 persons.
6	99,	"	17	"	5	
		"	24	"	6	
		"	21	"	7	
		"	12	"	8	
		"	6	"	9	
		"	11	"	11	
		"	2	"	14	1, 25 by 40 ft., 4 story; 1, 35 by 38 ft., 3 story.
		"	1	"	15	100 by 100 ft., 4 story.
		"	2	"	16	25 by 40 ft., 4 story.
		"	2	"	20	Brick, 25 by 50 ft., 1 ent.
		"	1	"	21	Brick, 24 by 40 ft., 1 ent.
		"	1	"	30	Brick, 30 by 50 ft., 1 ent.
		"	1	"	32	Brick, 80 by 36 ft., 4 ents.
		"	1	"	36	Brick, 88 by 38 ft., 2 ents.

Ward.	No. of houses.				Families.	Average No. of persons in each family.	
7	29,	of which 11	contain each	. . . . .	4	5	
		" 6	"	. . . . .	6	5	
		" 7	"	. . . . .	7	3	
		" 2	"	. . . . .	9	4	
		" 3	"	. . . . .	8	4	
8	6,	" 4	"	. . . . .	5	3	
		" 1	"	. . . . .	10	4	
		" 1	"	. . . . .	20	4	
9	6,	" 4	"	. . . . .	4	4	
		" 1	"	. . . . .	5	3	
		" 1	"	. . . . .	6	4	
10	81,	" 19	"	. . . . .	5		
		" 25	"	. . . . .	6		
		" 16	"	. . . . .	7		
		" 12	"	. . . . .	8		
		" 4	"	. . . . .	9		
		" 2	"	. . . . .	10		
		" 1	"	. . . . .	12		
		" 1	"	. . . . .	17		
		" 1	"	. . . . .	18		
11	25,	" 3	"	. . . . .	4	4	
		" 6	"	. . . . .	5	4	
		" 7	"	. . . . .	6	4	
		" 6	"	. . . . .	8	4	
		" 1	"	. . . . .	10	4	
		" 1	"	. . . . .	12	4	
		" 1	"	. . . . .	16	4	
12	40,	" 21	"	. . . . .	5		
		" 13	"	. . . . .	6		
		" 2	"	. . . . .	7		
		" 2	"	. . . . .	8		
		" 1	"	. . . . .	12		
		" 1	"	. . . . .	20	(20 by 40 ft., 3 stories.)	
13	39,	" 7	"	. . . . .	6		
		" 8	"	. . . . .	7		
		" 12	"	. . . . .	8		
		" 4	"	. . . . .	11		
		" 4	"	. . . . .	16		
		" 4	"	. . . . .	20		
14	66,	" 18	"	. . . . .	5		
		" 29	"	. . . . .	6		
		" 9	"	. . . . .	7		
		" 7	"	. . . . .	8		
		" 1	"	. . . . .	10		
		" 1	"	. . . . .	12		
		" 1	"	. . . . .	18		
17	10,	" 2	"	. . . . .	5		
		" 5	"	. . . . .	6		
		" 3	"	. . . . .	7		

REPORT

ON THE

SANITARY POLICE OF CITIES.

BY

JAMES M. NEWMAN, M. D.,

BUFFALO, N. Y.

PRESENTED TO THE AMERICAN MEDICAL ASSOCIATION AT ITS ANNUAL SESSION, HELD AT DETROIT, MAY, 1856

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