

SEVENTEENTH ANNUAL REPORT

OFFICE OF
STATE BOARD OF HEALTH,
OF THE
TRENTON, N. J.

Board of Health

OF THE

STATE OF NEW JERSEY

AND REPORT OF THE

Bureau of Vital Statistics

1893.

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1893.

PROPERTY
of the
STATE BOARD OF HEALTH
OF
NEW JERSEY.

The State Board of Health.

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OFFICE OF
STATE BOARD OF HEALTH,
TRENTON, N. J.

Secretary's Report.

To His Excellency George T. Werts :

GOVERNOR—I have the honor, on behalf of the State Board of Health, to transmit to Your Excellency the seventeenth report of this Board and the fifteenth report of the Bureau of Vital Statistics.

Each of these departments has its distinct line of work and of study, yet they are so related to each other and have alike such relation to the health welfare of the people and to a study of the causes and the courses of disease as to need a common oversight.

The year has been one of preparatory expectancy, and of an anxiety modified by confidence in the protection afforded by thorough sanitary administration. Cholera, typhus fever, small-pox and diphtheria were the threatening enemies as to which it seemed especially necessary to be forewarned and forearmed. The two former, as foreign diseases, had found lodgment in New York city, and the two latter were prevalent to an unusual degree.

With a single exception, this State escaped the two former, although some suspected cases of each required sanitary guard and careful diagnosis.

As to the other two, our experience has not been so fortunate. Small-pox has occurred in more localities than for a score of years before. It has been met for the most part by isolation, vaccination and prompt sanitary administration. The result has been that, with a single exception, it has not reached the extent of an epidemic, that the deaths from it have been few in proportion to the cases, and that often it has been confined to one or two families or houses.

The same is mostly true as to diphtheria. It continues to be a great scourge, but the number of cases that occur in any one place, in proportion to the population, continues to illustrate the

difference between effective sanitary organization and service, quick dealing with first cases, and that carelessness of sanitary police and tardiness in isolation which usually result in a greater spread of the disease.

Under the pressure of prevalent or threatened disease, well-organized Local Boards have been stimulated into new activity, while others, which had been too neglectful, have been more fully organized and entered upon more systematic and effective methods of work.

The State by judicious laws, and the State Board of Health by readiness to provide full directions and to assist in those details of instruction and guidance which are usually needed by local authorities, have been able to meet these various needs. It can be said with confidence that no previous year has so illustrated the importance of this great work or has so shown the wisdom of a system which secures adequate legal authority, and which enables this Board to be of much service in the literature and information which it quickly supplies, and in the inspection and assistance which it furnishes.

We have reason to rejoice that we are now much more ably sustained in our defenses against disease by the General Government. Congress, in February last, passed a quarantine law which, although not perfect in all its details, was broad enough to mark an epoch of progress in American methods of dealing with epidemics.

The national supervision was so extended as to secure primary authority at most ports and power to supplement defects where State quarantines existed. All our Consular representatives were given most careful and thorough directions and with great promptness nine physicians of the Marine Hospital Service were stationed on a four years' service at Liverpool, Southampton, Rotterdam, Antwerp, Hamburg, Havre, Marseilles, Naples and Genoa, with such directions and such powers as accomplished more than had ever been done before in emigration from foreign ports.

So early as May, 1893, we were able to have in actual operation the closest examination of steerage passengers and their baggage and of vessels and their crews.

The Sanitarians, and especially the State Boards of Health,

who had long been urgent for such action, were rejoiced to read in the official abstracts of sanitary reports, statements from medical officers stationed abroad, which showed that we already had protection against cholera, typhus fever, small-pox and other diseases such as had long been desired.

We could read in the weekly bulletin of the Marine Hospital Service as follows:

To the SUPERVISING SURGEON-GENERAL M. H. S.

Inspection of Emigrants at Rotterdam.

ROTTERDAM, NETHERLANDS, May 29, 1893.

"During the week, 1 case of measles appeared in the emigrant hospital. The child was at once sent to the city hospital, the other children of the family and the mother isolated in the company's hospital, and the room cleared and disinfected. No new cases have appeared.

From the number about to embark on the steamer *Rotterdam*, I detained 3 cases of favus, and the company, at my suggestion, rejected a female syphilitic, with mucous patches in her mouth. The lot was much cleaner than those at Amsterdam.

All of these vessels touch at Boulogne-sur-Mer, France, en route to America, and there take on 200 or more emigrants. The company informs me that they have employed there two local physicians to examine all such passengers.

I have notified the company that all emigrants arriving from Russia, Hungary, Galicia, France, and the city of Antwerp, would, until further notice, be detained five days for observation, and their baggage disinfected.

Very respectfully,

R. M. WOODWARD,

Passed Assistant Surgeon, M. H. S.

Abstract from report of Surgeon W. A. Wheeler, May 29th, 1893:

"At present the steerage passengers are inspected by the United States inspector on the day preceding the sailing of the ship, which sailing is usually at 6 or 7 P. M. They are collected outside of a small building on the water front, admitted to the building a few at a time, inspected by the medical officer, their passports and inspection cards stamped, and then passed to another room, where they are vaccinated by an assistant and their inspection cards again stamped. They then go for their baggage and with it are carried in the small boats to the vessel. As they board the ship their baggage is opened and examined and, if passed, a proper tag affixed by two other assistants of the United States inspector. The next day the crew of the vessel is mustered and inspected and the ship examined, when, if found clean, a bill of health is given her."

This work of foreign inspection is being constantly improved as to details and the various structural conveniences needed for examination, inspection, bathing and disinfection are being provided. The arrival of a suspected vessel at the Port of New York early in August gave full opportunity to illustrate the great advantage of this system.

In order that preparation in our ports at home and in our lake, river and internal defences might be duly provided for, Surgeon Walter Wyman, S. S. General of the Marine Hospital Service, early called a conference of twenty of the port physicians and health officers of seaport States, at which definite questions of local sanitation were discussed. This State was duly represented. Soon after, at special request of this Board, examination was made of the port of Perth Amboy in reference to quarantine protection, and an additional officer appointed to guard this, our most exposed point.

While we are largely protected by the New York Quarantine, yet as vessels from Hamburg and other points land at Hoboken and Jersey City, we need special care of these localities. At the instance of Superintendent Jackson, of the Pennsylvania R. R. Co., conference was had as to the transportation of immigrants and their baggage by rail.

We were assured that if necessary, in addition to the guard of State and local authorities and railroad officials, there would be, on the part of the Marine Hospital service, special oversight of the immigrant service, and that, in the event of the occurrence of cholera, immigrants would be carried only on special trains and in charge of a detailed medical officer.

If there is failure hereafter in the guard against cholera and other imported diseases it will not be from the lack of organized methods, but in the minute carrying out of details by local authorities, or by the lack of cleanliness and house-to-house inspection and other duties of anticipative local administration.

Nor can we too forcibly emphasize the importance of inter-state guard against those diseases which arise in neighboring territory and which are spread by land travel.

While awaiting the possible invasion of cholera during the late fall of 1892, a somewhat serious outbreak of typhus fever occurred in New York city. This seemed traceable to a foreign

source. Although guarded with diligence by the New York City Board, it has shown great persistence in recurrence. It has existed as a very serious epidemic in the City of Mexico and in some of the Mexican provinces, and from thence also was introduced into New York city.

This Board had an important experience with some fatal cases of fever that occurred in a rural village in Mercer county. These were seen by several other physicians as well as by representatives of the State Board and were pronounced to be typhus by some practitioners of experience. The first case had come from a Water street boarding-hotel of New York city. It was only by a careful tracing of the history, as well as by a study of the several cases that occurred, that the conclusion was reached by all but one of the physicians seeing the cases that they were a very low form of typhoid fever.

The cases were of great interest as showing the importance of Local Boards and of State co-operation in such an emergency. Our Township Boards have not ready at hand facilities for dealing with such cases, and often not the knowledge of what is necessary to be done. Yet as having, through law, the power and, through relation to the Township Committee, the necessary funds, it is delightful to see how, as a rule, some one is found on such Boards who will execute the law. In this case, after some little delay, at his own peril, one non-medical member of the Board enforced the law, isolated the cases, provided a day and night guard and greatly aided in preventing the extension of the disease.

Although not a new experience, we are glad to be able to say that amid some tardy and inefficient Township Boards we find that most are coming to recognize their high duty, and only need direction and information as to authority and a medical member intelligent as to sanitation, in order to be of great service to a community.

A third disease, as to which we began the year with some anxiety, was small-pox. It had lingered in Trenton and Newark, and, although not reaching large epidemic proportions, had not been stamped out as rapidly as was desirable. It has, during the past year, occurred at a greater number of localities than we have ever known it to exist before during the same period. Yet it has

rarely reached many families. We think this is much to be attributed to prompt report, isolation and vaccination, although as to each of these there is still room for improvement.

The experience at Red Bank was a serious exception, and for a time forcibly illustrated what harm can arise from the dilatory methods of a Health Board. After the epidemic had obtained full headway and the most efficient member of the Board had been soundly abused, the community, amid the protestations of this Board and various citizens, grasped the necessities of the situation and showed their delayed ability. It is the testimony of both of the Inspectors, who had special oversight and gave aid and advice, that much loss which resulted to this beautiful and growing city might have been averted by prompt attention to early cases. From this point several neighboring places were invaded, but the Local Boards prevented spread.

In only one instance, that of Cartaret, was there concealment of the real facts and delay in action. The disease, however, in this case was mostly confined to a large boarding-house and did not spread through the community.

Important notes in relation to cholera, small-pox and diphtheria and the lessons from the year's experience will be found in another part of this Report, under "Comments Upon Some Principal Diseases." The facts as to cholera at Jersey City, small-pox at Red Bank and diphtheria at Hightstown, as there detailed, are worthy of the careful attention of all physicians and of Local Boards of Health.

LOCAL HEALTH BOARDS.

It can be said in general that the Local Health Boards of the State are increasing as to the efficiency of method in dealing with nuisances and in intelligent effort for the prevention of disease.

Those that make themselves familiar with our laws, pass ordinances, and use persuasion where force is not necessary, generally commend themselves to public opinion, and increase in their influence and efficiency. Our greatest lack is in competent Inspectors. A Board of Health is in itself a means of education, and so its members often become acquainted with needs through

their experience. Now and then a Board is too stringent in its first action and so brings itself into disrepute. While there is most reason to complain of sluggish Boards, it sometimes occurs that there is activity without insight.

During the past year one Board complained of a proposed cemetery when it was merely a question of landscape and of æsthetic choice. One very small village passed an ordinance that no horse stall should be allowed that had not a cemented floor; another, that every communicable disease should be reported, which would include whooping-cough and mumps. Another complained that an undertaker allowed his hearse to stand nearly in front of the house of a neighbor. An intelligent Board caused a house to be burned because of some cases of scarlet fever that had occurred in it.

Excesses will occur when great powers are given to those who are over-zealous and turn on the power at the wrong time, yet these cases are very rare and prove nothing against the general necessity of conferring upon Boards such rights of procedure as may be summarily used. It is far oftener the case that there is not sufficient promptness or severity. Let Boards fully acquaint themselves with the laws, with the mode of preventing nuisances as well as of abating them, and with what due discretion requires and due protection demands. Then let the law be enforced to the degree that the public safety demands.

DRAINAGE FOR HEALTH.

Public attention is so much attracted to questions of water-supply and sewerage that too often the equally important subject of drainage is overlooked.

Whole tracts of country which need draining, in the interests of health as well as of agriculture, are left to produce miasm or to give chilliness and variability to the air we breathe.

Cities are built upon ground that should be thoroughly under-drained to the depth of ten or fifteen feet below the surface. Reservoirs, or artificial lakes or ponds, are made and water so impounded as to raise the water-level in the ground for a long distance around them. The excavations for buildings, roads, railroads, etc., are constantly changing the natural contour of

the surface, so that places once dry and healthy become wet and malarious. The success of the drainage of the Pequest valley and the progress being made along the Passaic should encourage to the drainage of other large areas. It would be a noble work for the State, under the guide of this Board and that of the State Geological Survey, to arrange for the progressive drainage of various localities, much on the plan now being carried out as to stone roads. It would thus secure gains, both as to crops and to health, as remunerative and comfortable to the citizen as anything that can be done to facilitate travel.

Recently, Prof. R. C. Kedzie, of the State Agricultural College of Michigan, and well known as an authority in chemical and sanitary science and art, has furnished a paper relating to healthful ground. We quote as follows:

"In Michigan the drainage of swamps and marshes, removing all stagnant surface water, has been so promotive of the general health that no one now questions its benefit. In a State where one-ninth of the land was indicated upon the original surveys as swamp, the benefit of surface drainage was most obvious. Within my own recollection the malarial diseases of my State have been reduced one-half, and the most potent factor in this reduction was drainage of swamps. No law ever placed upon our statute book has been productive of more good and less evil than the law providing for compulsory drainage, where each land owner was made to bear his just part of the expense, and no churl could block the draining of a whole neighborhood because he chanced to control the outlet. This law has paid the State ten-fold the cost by reclaiming a large area of once worthless land, and it has paid a hundred-fold in protecting the public health.

"Surface drainage needs no advocate to-day, and I call your attention to a form of draining equally necessary, but the need for which is not so obvious. I refer to the under-draining of soils whose surface appear to be reasonably dry, but whose deeper recesses are full of stagnant water. This *ground water*, as it is called by the Germans, is never to be mistaken for soil moisture or water held in the soil by capillary action, but is the free water of the soil, which will flow under the action of gravity. This ground water diminishes in a marked degree the agricultural capabilities of the soil, reducing the temperature, preventing soil oxidation, arresting the elaboration of plant food and preventing the spreading of the roots in the soil, because the roots of most cultivated plants will die in stagnant water. I do not propose, however, to discuss the agricultural value of soil drainage.

"I call special attention to the influence of ground water because people are only beginning to realize how profound is the influence of ground water on the public health. This influence is exerted directly in three ways:

"(1) By making the soil and the air above it cold.

"(2) By making both soil and air damp.

"(3) By generating malaria.

"Indirectly, the ground water is the predisposing cause of a large number of diseases."

We may also refer to a paper on "Subsoil Drainage," by Ashbel Welch, C. E., in our Fourth (1880) Report, and to one by the Secretary on "Building Ground," Vol. 2, 1874-5, in the Papers and Transactions of the American Public Health Association.

The Circular of this Board No. 62 gives many illustrative facts. We urge attention not as a mere sentiment or opinion, but with the hope that some feasible plan will be adopted to secure better drainage of localities, and that power may be conferred upon Local Boards to prevent the use of wet lands for building purposes.

HEALTH BOARD HOSPITALS.

We have, before this, urged the importance of hospitals for contagious diseases at the command of Health Boards. The need has come, of late, to be much more felt because preparation for cholera has impressed many of our Health Boards with the greatness of the need, while cases of other diseases more frequently occurring are often found difficult of isolation and care because there is no fit place for their reception.

Every city and large township community should first of all, even if not ready to build, acquire a suitable half acre, or more, of land, properly located and expressly dedicated to this purpose, so that there may be no dispute about locality when the time comes for providing a building. Even before this such a place is often available for tents or for the temporary storage of Health Board apparatus, disinfectants, etc.

It has been clearly demonstrated that such hospitals can be maintained without risk to the locality, if only conducted with what are now well-known precautions. With the single excep-

tion of small-pox the contagions of most diseases are not diffusive except within very narrow limits. While it has been shown in the investigations of the Local Government Board of Great Britain that the contagion of small-pox is sometimes disseminated from hospitals (See Dr. Power's report as to Fulham Hospital, 1884. See also Paper on Small-pox Problems as to Westhulme Hospital, Oldham, by James Niven in "Public Health," August, 1893,) yet it is to be remembered that one case of this disease furnishes more skin debris than a hundred cases of any other disease, and that where numbers of cases are collected there is an amount which requires especial precautions. It is not difficult to secure these if the special risk is recognized.

It may be claimed that a Board of Health hospital is the great protection of a city from contagious disease if only properly administered and if conveyance thereto is conducted with proper sanitary precaution. It protects those near at hand better than they would be protected from cases in a tenement house, and is the assurance that the city has a refuge station for the care of contagious disease.

Where townships cannot provide individual localities it is well for them to combine or to arrange with a neighboring city for a reception of their cases. Building of County Hospitals is to be encouraged.

So important is this subject, that we have issued a special circular as to it this year, with some plans and suggestions as to construction and administration.

Red Bank, Morristown and Asbury Park have recently been added to the list of those localities provided with such hospitals.

We were so impressed in our inquiries as to hospitals and the need of nursing force in case of cholera or other epidemic, that during the summer we called the attention of all hospital authorities to provisions for nurses in the following note :

GENTLEMEN—Inquiry into the details of preparation and administration for dealing with cholera has revealed the fact that the difficulty of securing prompt and proper nurse care is recognized by most health officers. It is also felt by the staff and managers of hospitals, since, whatever may be their rules as to the reception of contagious diseases, epidemic periods have always shown that they are greatly concerned therewith, and that in cases of sudden invasion or great prevalence of such diseases, our hospitals come to be identified therewith. The subject is all the more important because the difficulties that occur as to

cholera are also quite prominently felt as to small-pox, diphtheria, typhus and enteric fever, scarlatina and allied diseases.

We are aware that some of our hospitals are doing good service by training schools for nurses, and that the standard of these is being raised. This Board has come to feel that in all localities where there are hospitals there should be some understanding as to nurse supply between boards of health and hospitals. Could it not be arranged that each hospital should, under the direction of the staff, keep a record first of trained nurses, with references, locality, recent address, etc.; also, a list of those who though not graduated have had experience, or who are ready to act as volunteer nurses in case of need? If any hospitals, together with health boards, are ready to adopt such a system, we should be glad to furnish a book of record, with forms of entry.

I have the honor, on behalf of this Board, to present this subject for your kindly consideration.

We had response from only a few of them and still urge the matter upon the attention of hospitals and Local Health Boards.

NOTIFICATION OF DISEASE.

It is vain to have hospitals or methods of isolation and disinfection unless there is a systematic plan as to the notification of contagious diseases.

Our law, in a most wise and liberal way, provides therefor, and it should be rigidly enforced as to the chief contagious diseases.

There is room for much difference of opinion as to the use of placards where patients cannot be removed to a hospital. It is claimed by some that the effect of a general system of placarding is to lead to concealment, and consequently to a spread of disease. Professor Lyman, of Chicago, who has long been an opponent of the system, puts his side of the argument strongly, thus :

"Much of the objection to notification in our large cities is due to the dislike of placards upon the premises. I have never yet seen a case of scarlet fever or diphtheria in Chicago where the isolation of the patient was made any more effectual by a placard. I have known of many cases where unnecessary hardship and pecuniary loss have been sustained because the sanitary authorities would do nothing nor furnish any assistance beyond the placing of a placard. I have known of many unnotified cases that would have been cheerfully notified but for the dread of the placard. I have known of the actual flight of patients and the

widespread dissemination of contagion, in the endeavor to escape the placard. Among intelligent members of the community who submit to sanitary regulations, effectual isolation and disinfection are easily secured without resort to placards; while among the lower classes such advertisement adds nothing to the isolation of the patient.

"In my opinion it would be much wiser to use the placard as a means of enforcing necessary measures for isolation and disinfection, rather than for the advertisement of disease. Let the sanitary officials use it only when really needed. Give the infected family to understand that if proper measures for isolation and disinfection are employed, the placard will be withheld, but that otherwise it will be displayed. Thus employed it can be made a useful weapon, instead of being, as now, productive of more harm than good."—*Medical Record, New York, June 17th, 1893.*

We do not, however, see how such notification is generally avoidable in such diseases as small-pox, typhus fever, cholera and yellow fever, while it may be often available in diphtheria, scarlet fever, enteric fever, etc. We confess to an inclination to avoid it when possible, and therefore think it should be a subject for the calm discrimination and judgment of Health Boards according to locality, circumstances and exposures. Yet, when once a Health Board has decided upon it, it should receive the full support of all its members and submission on the part of all concerned. A good Board will always have occasion, sometimes, to be arbitrary or to act without full explanation of the necessities of the case to the general public, but the safety of communities is in prompt and thorough obedience. Any real infringements of rights is likely to be early commented upon by the State Board and to be reached by the courts.

DISINFECTANTS.

While light and air and general cleanliness are chiefly to be relied upon as a means of preventing disease, there are times when the use of disinfectants is of great importance. They have both aseptic and antiseptic value, preventing sepsis or putrefaction and neutralizing its effects when they have occurred. The most valuable disinfectants are those which destroy germs or spores, and thus not only prevent or arrest decay, but also

destroy the specific causes of disease. The great difficulty is that some are used that are ineffective either in quality or quantity, or that they are so used as to be charms or mind-soothers rather than real agents. These "dabs" at sanitation are of no use. There must be thorough and skilled use. Our circular (64) fully treats of the various kind. There are, however, some more recent facts that need to be in mind.

Corrosive Sublimate used alone does not act on excreta containing sulphur compound or albuminous bodies. The ammonia present in stale urine may also interfere with the action of the corrosive sublimate. It cannot be relied upon for lumps of excreta and similar matters. It cannot be used with Chloride of Lime as this would give a precipitate of the Oxide of Mercury. It must not be used on metallic surfaces as copper, brass, lead and silver. If put in too strong solution, it may dry on floors and walls, and, as a powder, become disseminated through the air of the room as arsenic from wall paper sometimes is.

Chloride of Lime, when good, contains over 40 per cent. of uncombined lime, and its commercial value, as a disinfectant, is to be rated by the Chlorine it contains. This varies 20 to 25 per cent., and often diminishes in keeping. Its strength should be certified and often as bought in packages it is unreliable. Chloride of Lime is very valuable as a disinfectant when of proper strength, and in disinfecting excreta is better than Corrosive Sublimate. "Its strong alkaline nature aids in the action and the lime itself is useful to a degree. In disinfecting with chloride gas either sulphuric or hydrochloric acid may be used, the former being cheaper. They yield an equal amount of Chlorine." It is best prepared by putting a pound of good Chloride of Lime in a wide basin, stirring it with a pint of water and then pouring a pint of the acid into the mixture, the person being careful not to inhale the vapor. In all other respects the directions are the same as those as to Sulphur fumigation. Both Sulphur and Chlorine need the presence of moisture in the room for their full effect. As to Quick Lime or ordinary fresh lime, there is no longer any doubt as to its very great value as a disinfectant. It may be used with advantage in the discharges of the sick room as well as for general cleansing.

The value of hot water, either boiling or nearly so, as a disin-

fectant, is never to be lost sight of. It is quickly available and of great service. While from time to time other disinfectants may be employed, any Health Inspector who fully understands the uses of Sulphur, Chlorine, Quick Lime and hot water, need not be at a loss how to accomplish thorough fumigation. The sulphate of iron, copperas, is still much used and has great value as a deodorant.

GARBAGE DISPOSAL.

The question of the disposal of garbage continues to be one of the radical questions in the sanitary government of cities.

The first great principle is not to mix in one mass various materials of household and street refuse. Ashes, for instance, should always be disposed of separately. It should be an offense against law to add any animal or vegetable matter to ash-heaps, nor should liquid slops of any kind be added thereto. Ash carts should be provided by cities as a separate service, or such partitions made as will keep these totally distinct from garbage. The service as to both should be very exact and uniform, so that vessels containing either can be put out at regular times and be sure of speedy removal.

Besides the various methods of land disposal of garbage, much aid is now afforded by the various forms of crematory furnaces. These differ somewhat in construction and availability, but far more in details as to fixtures and management. It is certain that the garbage of cities can be disposed of in this way if the plant is well constructed and the administration is thorough. Nuisance, when it occurs, results either from mismanagement in the collecting and delivery of the garbage or from the absence of proper construction for the consumption of noxious and offensive stenches in the smoke. The evils are only to be remedied by a thoroughly-organized and well-executed system. In our Twelfth Report, we gave the chief details as to many of these furnaces. There have been some new ones since or improvement upon the old. We have investigated as to many of these and found that complaint either as to nuisance or excessive expense are generally the result of mismanagement. As to one quite successful in Findlay, Ohio, the former Health Officer writes me as follows :

"The crematory at our place continues to be a success. During the past year, January, 1893, I have several times visited it and found it working quite satisfactorily. I was recently informed by a member of the Board that the crematory had accomplished this year more than ever before. It has been very successfully managed by an intelligent man. He is paid \$100 per month and employs his own assistant. It is operated day and night. There is, practically, no smoke or offensive gases. The only thing offensive is when decomposed matter, either animal or vegetable, is being unloaded or waiting its turn to be consumed.

"There was consumed in 1891 :

Loads of garbage.....	3,422
Barrels of night soil.....	3,719
Dead horses.....	130
Dead cows.....	24
Dead dogs.....	119
Dead hogs.....	44

"The amount for 1892 was somewhat larger.

"It was under the care of I. A. Knapp, Sup't."

To show how extensively the destruction of garbage by fire has come into use we quote as follows from a paper by W. F. Morse, of New York City :

"Total destruction by fire of city waste has been proved by six years' experience to be of great service to this country. So far as reports can be obtained, none of the garbage furnaces in use two years ago have been abandoned, but, on the contrary, the number has nearly doubled. New forms of destructors have been brought forward for experiment; novel ways of employing fuels are on trial; the utilization of the heat produced for obtaining power is found to be practicable; more convenient means for handling the material are used; the cost of operation is considerably reduced, and a general survey of the whole field shows a decided advantage both in number of furnaces constructed and their ability to perform the work required.

"In Great Britain a still more rapid advance has been observed. From an exhaustive report to the City Council of Edinburgh made by a special committee, a paragraph may be quoted :

"There are now more than 310 cell destructors in use throughout the principal English towns, consuming 2,000 tons of refuse per day, at a cost varying from two and a half pence per ton at Bolton, to three and a half pence at Southampton; nine pence at Ealing and Leicester, to one shilling at Derby, and one shilling three pence at Winchester."

"It has been stated by competent authority that the present year there would be built in England 100 more cell destructors, dealing with 250,000 tons of refuse per year. Thus, in Great Britain, the process of destruction or disposal of town waste by fire has become a necessary part of the municipal sanitary work."

At the Columbian Exposition the disposal of the garbage and waste by the Engle Furnace attracted much attention.

The distinguishing feature of the Engle system is the use of the second fire, destroying the products of combustion from the material burned and utilizing the heat thus obtained within the furnace. In the destructors employed in England this is accomplished by a secondary fire called a 'fume cremator,' placed near the base of the chimney, the heat from which cannot be utilized. Before the introduction of this device their chimneys emitted smoke and offensive odors. The fuel used at the Exposition furnace is crude petroleum atomized.

Other forms of apparatus are well noted by Dr. T. R. Chambers in a brief article in this report.

In our own State, one in use at Paterson seems to be the most satisfactory. A new one has recently been erected at Scranton, Pa., on a new system. Many of our cities are needing some form of crematory. Choice should not be left to a visiting committee. Either a contract should be made with the parties furnishing the plant with privilege of purchase or an expert committee be appointed to make choice of method, together with a finance committee to agree as to expenditures.

Be assured the one great need of our cities is more thorough plans for the disposal of garbage without creating a nuisance. It is a shame that some of our cities are continually dumping their foul refuse in low places here and there within their limits. When driven from one after another of these, it causes similar nuisances in adjacent townships. The whole system must be broken up.

FERTILIZERS AND THEIR TRANSPORTATION.

Many complaints reach us as to the nuisance caused by the various forms of fertilizers and the modes of their conveyance. Sometimes bone-phosphates, guano, or other animal or material

substances are kept too long, or too closely in freight or store-houses, so as occasionally to undergo some form of change. The remedy is easily reached by strict rules on the part of companies and of store-houses as to times of keeping and delivery.

Far more serious is the conveyance of city compost for farm and garden uses. With our proximity to large cities and with the demands of market gardening this is a matter that must have regulation. In the interests of both city and country the traffic cannot be stopped, but there is every reason why the evils attending it should be reduced to a minimum. These relate chiefly to the material of which the compost is made up and its state of decomposition, to the selection of suitable places for loading and unloading, to the shortening of time and the periods of time in which the manure is on the road, and to the prevention of slovenly modes of cartage and deposit. In cities, or in places of deposit for conveyance, the Health Boards should satisfy themselves of the character and state of the mixture which is being transported. Too often it represents various forms of offal and garbage concealed in the droppings of horses and stable litter. Under the plea that farmers and gardeners must have fertilizers, it is wrong to defend the conveyance of masses of effete matter quite free from those natural odors which belong to different manures.

Some three years since an appeal to the company which has done most of the transfer, resulted in some improvements and in a prohibition of the traffic for three of the summer months. Our strongest complaints now are, that often the cars are left to stand and are unloaded amid close populations and that the material has to be carted through streets and often is carted in such wagons as allow the free distribution of odors and sometimes of material.

It is fully within the province of Health Boards to interrupt this.

A valuable report on this subject, which applies as fully to our own State, has recently been made by Dr. Parsons to the Local Government Board of England (see Twenty-first Report, 1891-92). "The conclusion is, first, that in so far as bodily discomfort and functional disturbance, at times involving general impairment of health, are concerned, exposure more or less

recurring to the offensive effluvia concerned, does affect health; and, second, that whilst certain affections, such as 'sore throat,' which it has not always been possible to differentiate from diphtheria, can with some degree of certainty, be held to have relationship with exposure to the manure-effluvia in question, it has not been possible so to eliminate other sources of infection and of disease as to identify the effluvia with the production of any specific affection."

The first flagrant case that occurs should be the occasion for summary fine, or appeal to the Court of Chancery, as we believe the facts in evidence will draw the line between necessary conveyance and that which exposes the public to materials and odors injurious to health as well as disturbing to the comfort of the reasonable citizen. Some facts recently elicited by the New York Board of Health show that there is increase of sickness, or more disturbance of health conditions in the vicinity of manure pits than in usual places. We earnestly draw the attention of railroad and transportation companies to these matters, and the attention not less of those cities which, under the compost plea, are in the habit of landing boat-loads of filth in adjacent townships.

PETROLEUM, FOOD AND DRUG LAW, ETC.

The law as to the use of kerosene or petroleum products is under the watch of this Board, but requires much less attention than formerly. After much opposition we were able to command the co-operation of the Standard Oil Company and other reputable refiners. An exposure of the evil results from low grades of oil, the enforcement of the law, improvements in refining and the cheapening of cost, have all tended to the use of oils of safe grade. Nearly all accidents now reported are from the accidental breakage of lamps or the use of kerosene for lighting fires. We still keep careful watch as to reports of explosions. Any such should be carefully inquired into by Local Boards in their respective localities, and where any co-operation is needed the State Board is glad to furnish it. One case of apparent explosion occurred the past year in oil sold as 150°, as to which the report of the chemist is suggestive. It is as follows:

"JOHN C. GREEN SCHOOL OF SCIENCE,
"COLLEGE OF NEW JERSEY.
"November 3d, 1893. }

"E. M. Hunt, M.D., Secretary State Board of Health, N. J.:

"DEAR SIR—The sample of kerosene received from you October 28th, and marked 'Kerosene Sample, Perry street, Trenton, N. J., gotten October 27th, explosive, reported October 24th,' has been tested by me, with the following results:

Flashing point, 118° Fahr.

Fire test, 131° Fahr.

"The oil is a safe oil for illuminating purposes, and quite up to the grades of oil, so far as I know, that are ordinarily used in lamps. I should, if such an oil were actually in use, ascribe any explosion to some accidental derangement of the lamp. I had to wait for some water to settle out of the oil which then was water white and clear."

In connection with our inquiries the past year into reported explosions, we have found that sometimes gasolene stoves and kerosene lamps are used by the same family. We have reason to believe that an occasional explosion occurs from mistake in using the wrong can. In one case, at least, we can account for the explosion in no other way, and we are informed by the agents of a large retail company that such accidents happen within their knowledge. This is all the easier because many of the five-gallon house cans now furnished have painted on them "either for gasolene or oil." We think that wherever gasolene and kerosene are sold to the same family that the law should require cans painted entirely differently or of different shape.

The Laws as to Contagious Diseases of Animals are carefully enforced. The work and the expense have been modified by the disappearance of contagious pleuro-pneumonia. Bovine tuberculosis attracts much attention because of its relations both to man and beast. It has been the subject of careful report by this Board. Discussions in medical societies seem to show that this has been somewhat overlooked, probably because the law requires that our reports as to it and other animal diseases be sent to the State Board of Agriculture, and published in its transactions. These can be had on application.

Glanders, as it occurs among horses, often requires the enforcement of the law. Swine plague, which so much affects the pork supply, still remains without effective treatment, although less frequent in the State than formerly.

We notice in our reports to the Board of Agriculture the cultures used in swine plague, also the tuberculin for cattle tuberculosis and mallein for glanders as now being experimented with. (Circular 50 of this Board contains information as to the laws as to various animal diseases.)

A law as to the registry of cattle in cities, Chap. 207, Laws of 1893; a law limiting as to outfall of sewers, Chap. 277, Laws of 1890; a law as to filing of cemetery maps, Chap. 129, Laws of 1885, are among those to which this Board has direct or appellat relation.

Circular 60 refers to most of the laws up to 1892, and those since then, or reference thereto, will be found in the more recent annual Reports.

ADULTERATION OF FOODS AND DRUGS.

The law as to the adulteration of foods and drugs has altered much in breadth and import since its passage by the Legislature in 1881. This law was general and would have embraced within its scope all the subjects of special food legislation since.

As to one of these there seemed to be need of special law, and so in 1882, at the instance of the dairy interest, the first milk law was passed. The only relation of this Board thereto was in the appointment of the Dairy Commissioner and the chemists whom he might employ.

In 1886 the oleomargarine law was passed, which absorbed the milk law, and with its appropriation of \$10,000 gave to the Dairy Commissioner, appointed under this act, entire control as to whom he should employ and as to expenditures.

In 1887 an act was passed authorizing the Dairy Commissioner to aid in the act as to adulteration of foods and drugs and allowing him to expend moneys from the appropriation under the oleomargarine act.

These various laws so far changed the relation of this Board to the whole subject that it has not felt called upon to investigate commercial frauds as such, but has directly confined itself to those changes in foods and drinks which more directly affect the public health.

In our earlier duties under the general law there were fuller

investigations, which still stand as evidence, and most of which, in the judgment of this Board, did not need to be repeated in the interests of public health. In fact, changes in products, in coloring matter and in adulterations have greatly narrowed the extent of injurious falsifications of foods and drinks.

This year we have only investigated, to a limited extent, water-supplies and a few soda-water fountains. The former will be found in our article on Public Water-Supplies and the latter is hereto appended.

We shall continue under our small appropriation to make such investigations as the public health and the public interests may seem to require.

SODA-WATER AND SODA-WATER APPARATUS.

Soda water was originally a very weak solution of soda in water highly charged with carbonic acid. Soda-water sold, however, as a beverage is ordinarily nothing but common water highly charged with carbonic acid. It is true of this as of other beverages, that very much depends upon the purity of the water, and this in part upon the machinery used and the holders containing the beverage. It seems often to be forgotten that poor water if found in drinks, as in beer, soda-water or other water charged with gases, is not made pure by the admixture. Where it is manufactured or kept under pressure in tanks or delivered through faucets or fountains it is often subject, in addition, to metallic contamination.

Several years since we had a few inquiries made as to it which showed this to be the case. An examination made some time since by the Brooklyn Board of Health of the soda fountains in that city showed many of these contaminations. This was found especially true as to the first glasses of the day and in the fountains of second-rate stores.

Recently the London *Lancet* had a special analytical commission to experiment on mineral water machinery and metallic contamination. It furnished important illustration of the readiness with which "ordinary water containing an excess of carbonic acid gas is capable of taking into solution distinct quantities of lead, copper and zinc."

We have recently thought it wise to have a very few chemical examinations made of soda-water and syrups in Newark and Jersey City, as also an examination of the machinery used. Six samples were taken, those of the soda-water as coming from the fountain, and the samples of syrup as vended therewith. The samples of syrup were of raspberry, strawberry and lemon, as best illustrating possible contamination. The examinations, both ocular and chemical, were by August Drescher, Ph.G., of the New Jersey College of Pharmacy, Newark, N. J., and were as to the following points:

- (a) The pipe-connections, their nature, whether of tin or lead, etc.
- (b) What kind of fountains, and from whom bought.
- (c) Syrup-containers, being of zinc, lead, tin, glass or porcelain.
- (d) The water-supply for making the soda-water.
- (e) Name of manufacturer of apparatus, and date of manufacture of apparatus; manufacturer's name of soda-water; manufacturer's name of syrups.

The following table presents the results:

<i>Name of Manufacturer of Fount and Pipes, Syrup-Containers, and When Made.</i>	<i>Name of Manufacturer of Soda Water from Whom Bought.</i>	<i>Condition of Apparatus and Pipes.</i>	<i>Condition of Syrup Tanks.</i>	<i>Water-Supply of Soda Water Manufacturer.</i>	<i>Name of Manufacturer of Syrups from Whom Bought.</i>	<i>Condition of Soda Water.</i>	<i>Condition of Syrups.</i>
No. 1. John Mathews, Newark. Made long ago.	Thompson, Newark.	Lead pipe and copper fount, tin-lined.	Glass.	Well water.	Shenkens, New York.	No poisonous metals found.	None found.
No. 2. B. Haussling, Newark, N. J. Old apparatus.	Hausling, Newark.	Lead pipe, copper fount, lined with tin.	Glass.	Well water.	J. Lefcowitz, Cherry syrup, colored with caramel, no flavor noticeable.	Found traces of lead, or less than 1-16 grain per gallon.	Adulterated; made of caramel and other factitious material.
No. 3. John Mathews, New York. Recently manuf'd.	Mathews, New York.	Block-tin pipe and lined fount.	Glass.	Well water.	Self-made by seller; very good quality.	Pure.	Pure, good.
No. 4. John Mathews, New York. Recently manuf'd.	Self-made by seller.	Block-tin pipe and cast-iron fount.	Glass.	City water.	P. Garrigan; self-made; very good.	Pure.	Pure, good.
No. 5. A. D. Puffer, Boston. Old apparatus.	Haussling, Newark.	Lead pipes and tin-lined copper fount.	Glass.	Well water.	Hyman Wissenbaum; poor.	Copper found in appreciable quantity— $\frac{3}{4}$ grain per gallon.	No fruit flavor; adulterated with caramel.
No. 6. R. M. Green, Philadelphia. Old apparatus.	Haussling, Newark.	Copper fount, tin-lined and tin pipes.	No tanks; syrups kept in bottles.	Well water.	J. Lefcowitz, Raspberry, adulterated.	Pure.	Adulterated with caramel and other foreign material.

Most of these samples were taken from parts of Newark where "low-grade" goods might have been expected, because of the unusually cheap price (two cents per glass). The "good samples," here analytically brought up, were from "good sources"—where five cents per glass is not deemed to be "too much"!

These results seem to indicate that sources of contamination exist. It is serious that in several cases city well-water was used. It is quite inexcusable, with the great improvements in holders and apparatus, that old, cheap or worn-out forms are so common. We shall make it a subject for further inquiry, and commend it also to the attention of all of our City Boards.

In reference to apparatus used we quote as follows from the report referred to:

"Copper, for various reasons, is, in fact, largely employed in the construction of aerated water machinery. According to our experiments, however, it would be better to employ tin, and then contamination of aerated water with injurious metals would be entirely avoided. But tin is not so workable as many other metals; it is too soft for some uses and too brittle for others; while it is very expensive. In spite of these drawbacks, however, we have recently inspected some soda-water machines in which it is impossible for the water to come in contact with any other metal than the purest tin, and tin is for all practical purposes as good as the noble metals gold, platinum and silver. Even the joints in these machines are thickly lined with tin, and all leading pipes are made of block tin. The condensers of these machines, in which the carbonated water is contained under pressure before being drawn off into bottle, are made of copper, thickly lined inside by a special and ingenious process with the purest grain tin. Larger condensers are made of best gun metal, in which case they are silvered. The water is conveyed into and from this condenser also through tin piping, the joints of which are of the same metal. We secured samples of the metal so used, and also a specimen of syphon heads, which was sent to *The Lancet* laboratory and examined. About the purity of the metal used for the lining process there can be no doubt whatever, for the mean result of several analyses gave the quantity of chemically pure tin as 99.90 per cent. Water saturated with CO₂ was then placed in a copper cup similarly lined with tin and specially made for the purpose of these experiments, and left for several days. The metal showed no signs of deterioration, while the minutest test failed to indicate even the smallest quantity of metal in the liquid. The syphon head was found to consist also of tin, with a small proportion of antimony, the antimony being used in order

to make the heads durable; but it is important to add that neither lead nor copper was found in any single instance. It may be remarked that copper or other metal tinned in the ordinary manner is not satisfactory, and once the copper is exposed the solvent action proceeds with comparative rapidity.

"Soda-water machinery has been brought during recent years to a marvelous pitch of perfection, and it is doubtful whether any other industry has made such rapid strides in so short a time."

SANITARY EXHIBIT AT THE WORLD'S COLUMBIAN EXPOSITION.

For the department of Hygiene and Sanitation authorized by the World's Columbian Exposition the various State Boards of Health were asked to furnish such specimens, diagrams, reports, models, charts and other illustrative material, such as should give an idea of the work being done and the methods adopted.

Inasmuch as the design of this was not for these Boards to exhibit house fixtures, apparatus, etc., the range was not large, but yet served to give valuable information as to the methods pursued by various boards.

This Board sent to the exhibit various blanks and reports showing the methods used in vital statistics, contour maps having relation to drainage and water supply, maps exhibiting lines of sewers of different construction in a few of our cities, spot maps for registering diseases and deaths as they occur, records of Asbury Park showing how Local Boards should have on hand for public use information as to the healthfulness of houses, and two hundred, or more, of food adulterations. These, not in an extended, but illustrative way, showed our conception of the work indicated to be done by State and Local Boards.

The exhibits of the whole department of Hygiene and Sanitation were well worthy of careful study, and received due attention from this Board.

That of Massachusetts was especially notable, since by its long experience and its appropriation for various sanitary work (about \$50,000), it has been able to do more than other Boards.

We notice among other things the model of the Lawrence Experiment Station of the State Board of Health, being the first of its kind established in America; the plans of the sand filters, designed by Engineer Mills for purifying the water supply of

Lawrence; photographs of sewage fields in operation, with plans of the principal filter beds thus far constructed. Also photographs of the Sewage Precipitation Works of Worcester, showing sewage disposal by chemical precipitation. These and many others inspire one with zeal in view of the great attainments already made, and yet cause some regret that most of the States are not alive to their great needs of larger provisions for health administration. Yet we can point to some advances in this State that are well worthy of attention and to structural arrangements in accord with advanced views.

OUR LIBRARY—CATALOGUE OF BOOKS.

The Library of the State Board of Health now contains over one thousand volumes. In every department works by the best authorities are to be found. While no effort has been made to secure each book published, careful selection has been made, and the student of sanitary science and art will here not find himself without efficient aid. Besides volumes of societies and associations and many valuable exchanges, special treatises or papers are in hand on engineering, chemistry, architecture, water-supply, sewerage, inspection and various more general subjects. Because of our relation thereto under the laws, there are also many valuable books on social science, on charities and corrections and on the diseases of animals. The Bureau of Vital Statistics has most of the valuable reports and documents relating to statistical work. We have been able in all these departments to select and secure the most important books needed for present or future reference, with some as rare as they are valuable. The library is open to the use of all students of any of those subjects and of members of Health Boards. Where books are needed to be borrowed for study, for two weeks or more, special arrangements will be made for sending them. We have recently issued a new catalogue of the library, which can be had on application by postal.

The Interest of the State to Conserve Its Streams.*

CARROL PH. BASSETT, C.E., PH.D.

It is not the intention of this paper to present much that is novel. Its aim is rather to direct attention to facts comparatively well understood but insufficiently appreciated, and to draw some conclusions therefrom. We have all felt the charm of sylvan scenes—

“Where the woodland streamlets flow
Gushing down a rocky bed,
Where the tasseled alders grow
Lightly meeting overhead.”

But it is not now proposed to praise the merits of pure streams of water—their beauty, their charm, their utility, or even their healthfulness. These features must for the time stand as accepted truths, as premises from which to look toward measures for their protection and conservation. With the Delaware forming the State's entire western boundary; with the Passaic and its fine tributaries flowing through the rich northern highlands; with the Hackensack, the Raritan, the Mullica, the Maurice, and the Great Egg Harbor rivers and Rancocas creek, widely separated throughout the State, there is no appreciable part of the entire population which is not interested directly in the care and protection of at least one neighboring stream.

A tabular statement compiled from the Geological Reports is here inserted showing the area, density of population and percentage of forest of the principal water-sheds within the State.

*Address of C. P. Bassett, C.E., as President New Jersey Sanitary Association, December, 1893.

Stream.	Sq. Miles.	Pop. per sq. Mile.	Percentage of Forest.
Passaic.....	949.1	338	.44
*Hackensack.....	201.6	216	.36
Delaware.....	2,344.8	129	.30
Raritan.....	1,105.3	105	.16
Maurice.....	386.4	72	.70
Rancocas.....	341.4	58	.61
Mullica.....	569.6	22	.90
Great Egg Harbor.....	337.7	21	.88

* Exclusive of Jersey City and Hoboken.

Interesting questions growing out of the percentage of forest area on a water-shed, although of direct importance in connection with the conservation of streams, must be here passed over with mere mention and reference to the valuable paper presented earlier in the session by Prof. Smock. It is rather the intention of this paper to consider methods for protecting and conserving the original purity of the streams—it being assumed that such an aim is desirable.

The pollution of streams is more or less directly proportional to the population on the drainage areas. It is natural, therefore, that the main instances of stream pollution that have attracted most attention have occurred upon the Passaic water-shed. Population brings pollution, and yet population must be fostered and pollution prevented. These facts have been partially realized by the public, and scanty legislation has been attempted to regulate them.

The following amended act passed during the the present year practically supersedes all legislation in the State which aims to prevent stream pollution :

“1. BE IT ENACTED by the Senate and General Assembly of the State of New Jersey, That if any person or persons shall throw, cause or permit to be thrown into any reservoir, or into the waters of any creek, pond or brook of this state, which runs through or along the border of any city, town or borough of this state, or the waters of which are used to supply any aqueduct or reservoir for distribution for public use, any carcass of any dead animal, or any offal or offensive matter whatsoever calculated to render said waters impure, or to create noxious or offensive smells, or shall connect any water-closet with any sewer or other means whereby the contents thereof may be conveyed to and into such creek,

pond or brook, or shall so deposit or cause or permit to be deposited any such carcass, offal or other offensive matter that the washing or waste therefrom shall or may be conveyed to and into any such creek, pond, brook or reservoir, such person or persons shall be deemed guilty of a misdemeanor and, on conviction thereof, shall be punished by a fine not exceeding one thousand dollars, or by imprisonment not exceeding two years, or both.”

The law varies but slightly from its predecessors of 1876, 1878 and 1880, so that but little progress has been made since 1876 in the laws seeking to prevent the pollution of the streams of the State. After watching the results obtained under these laws, I am convinced of their entire inefficiency for the purpose proposed. It is my opinion that the principle of providing some supervisory authority to secure the enforcement of laws devised to prevent stream pollution, which is entirely lacking in our legislation, is practically essential, as has been shown by experience elsewhere and manifested in the results secured. Wherever active efforts have been made to preserve the purity of streams in the midst of dense populations this requirement has been considered uniformly essential. The River Pollution Commission and the various Conservancy Boards in Great Britain, similar Boards in France and Germany, the Massachusetts and New York State Boards of Health, to which are delegated powers similar to those exercised by the foreign Boards mentioned, have accomplished the results that can best be cited as marking progress in conserving streams. The essential feature in all these cases has been a Board with power to investigate the condition of streams and the character of liquids discharged into them, and vested with sufficient authority to summarily prevent injurious pollution. In cases, this has required supervision of works erected to purify factory waste or town sewage by the Board, and has necessitated the power to approve or reject plans proposed for the purpose. This Board then becomes the arbiter of standards of purity required in liquids entering various streams and different parts of the same stream ; the conditions existing in each case determining the purity requisite in affluent liquids. Manifestly impure waters safely discharged into one stream should not be allowed to enter another. The uses of two streams may be different, or their ability to destroy filth—their digestive power—

may not be the same. Hence the objection to an arbitrary standard of purity involving no investigation or knowledge of the special conditions of each case.

Defendants of the law in this State as now framed may argue that if the statute forbids all stream pollution under sufficient penalties, it will be possible for any person or persons feeling themselves aggrieved by existing pollution to secure relief through the courts. Experience does not support this view. It is true that isolated cases exist where specific pollution has been prevented, but it is equally true that numerous cases of pollution exist along every stream of the State and pass unchallenged. Stream pollution is cumulative. The purity of a stream is generally endangered, as the moral tone of the community is assailed, by the accumulation of uninterrupted deteriorating influences. A stream has reached the danger limit at a given point, not perhaps so much on account of the pollution received from the last mill or hamlet passed as from the numerous other pollutions added in its course, any one of which would have made but a slight impression on its purity, but which, added at intervals, in the aggregate finally prevail over it. It is difficult to reach this scattered evil, and there is therefore great difficulty, as the recent cases in the courts of this State have abundantly shown, in practically preventing general pollution under the existing law.

We have witnessed within a few years a colossal movement in abandoning one of the State's principal streams for the purposes of water-supply, and giving it up to sewage pollution. Although the population of Jersey City, Harrison, Arlington and Kearney continue to drink the waters of the lower Passaic, they are hopelessly polluted, and other supplies seem to be an imperative necessity in the early future. Newark and some of its suburbs have secured an excellent water supply from the northern uplands at heavy expense, and it seems probable that other towns in the northern section of the State needing purer water must make terms with the combinations of capital that have laid a heavy hand upon the available surface-supply remaining. As has been mentioned, the water-shed of the Passaic is the most densely populated in the State, as it is practically the only one where means for preserving the purity of the stream have been seriously

considered. That the effort should have been abandoned offers little encouragement for a belief that other streams will long escape, unless measures other than those now existing be enforced. Elsewhere throughout the State measures for the protection of the existing water-supplies have an increasing interest. Sewerage systems are being built in many of the smaller towns, and there is a disposition to shirk the expense of sewage purification. The pollution of streams has everywhere occurred, and is increasing.

The cases where impure liquids may be safely discharged into streams have been used to justify in the popular mind wholly indefensible pollution. It was a wise as well as a witty saying of the English scientist that "What we want in water for potable purposes is innocence, not repentance." It is probable that water having received animal pollution is not in its early subsequent history in surface streams ever a wholly safe potable supply. The purifying power of streams has probably been largely overestimated; and yet our courts have taken an altogether different view of the matter. As illustrative of the most vigorous recent attempt to restrain the pollution of streams, we may cite the case in which the Newark Aqueduct Board sought to restrain the city of Passaic from discharging its sewage into the Passaic river four and one-half miles above its water-supply intake. It was confronted with a decision from the bench to the effect that there had been no evidence presented to the court that the discharge of sewage (which was admitted) would produce deaths in Newark, and therefore the court could not restrain the discharge. A quotation from the Chancellor's decision, sustained by the Court of Errors and Appeals, may be here made: "In the light of these circumstances it may be asked, why have not the dangerous qualities of the disease germs become manifested in Newark? Its experience seems to be a complete negation of the danger theory advanced in support of this application, or is sufficient at least to render doubtful whether the danger apprehended is more than chimerical." At the time of this decision the death rate in Newark and an analysis of the deaths showed an alarmingly large percentage of cases due to what is known as "preventable disease." With such a decision unchallenged, there can be but little incentive for individuals or municipalities

to bring action to prevent, under existing laws, the most grievous pollution of streams. It seems to us that the time is ripe for improvement in methods and results of stream conservation in the State.

If the evidence of the fatality of using water for potable purposes which is polluted with sewage is not complete, it seems high time, in the light of the full demonstration of the disease-germ theory of disease, that it were made so, and it would seem as though the State had sufficient at stake to secure such evidence, if need be, at the public expense. But what are some of the facts regarding this matter of proof that are available? The city of Chicago has experienced material reduction in its mortality from typhoid fever since its intake cribs were removed further from the shore. The facts concerning the epidemic of typhoid fever at Plymouth, Pa., are familiar to the public. Typhoid fever for years has been known to be excessive in Lowell and Lawrence, Mass.—supplied with water from the contaminated Merrimac river—as compared with other towns and cities of that State, and during the past year the State Board of Health has traced with remarkable certainty serious epidemics of the disease directly to the public water-supplies of both cities. A careless typhoid patient having polluted the Lowell supply, the epidemic there broke out and re-appeared at proper interval on the river below at Lawrence, due to the pollution from the Lowell sewers.

To show part, at least, of the effect of polluted water-supplies in the large cities of this State, I have secured the population of five of the larger cities from 1880 to 1890, and the record of deaths from enteric diseases as recorded by the report of the Bureau of Vital Statistics, and prepared the following table. Enteric diseases are ordinarily the most competent to show the effect of specific pollution in potable water.

	Trenton.	Camden.	Paterson.	Jersey City.	Newark.
Population 1880.....	29,910	41,659	51,031	120,722	136,508
Population 1890.....	58,488	58,274	78,358	163,987	181,518
Average pop. for decade.....	44,199	49,966	64,699	142,354	159,013
Total deaths from enteric diseases for 11 years.....	163	541	302	1,121	1,061
Average number deaths, &c., for each year.....	14.8	49.1	27.4	102	96.3
Death rate per 1,000 from enteric diseases.....	.33	.91	.42	.72	.60

From this table it will be seen that Trenton, taking its water-supply from the Delaware above the city—almost entirely unpolluted by sewage—has the lowest death rate; it is closely followed by Paterson, which takes its water from the Passaic above the falls, and before serious pollution occurs; while Newark and Jersey City, both supplied from the lower Passaic, largely polluted by sewage, and Camden, supplied from the lower Delaware at a point affected by the sewage of Camden, Philadelphia and the entire population as far up the river as Trenton, all have abnormally high death rates. Had Newark's rate for the decade been no greater than Trenton's, a saving from enteric fever alone of 429 lives would have been effected among its people; and if Jersey City had the same rate, 553 persons would have been saved. Could figures be more convincing? It should be understood that these are not statistics collected in support of any preconceived theory, but are the official returns of the State Health Department, and, therefore, should be given the weight of unprejudiced authority.

But in the consideration of this subject there are other questions even than the pollution of water-supplies involved.

Suppose we abandon the use of a stream for potable purposes, are we to put no limit upon the contamination? Are we to permit the slow building up of a colossal nuisance similar to that existing on the Thames below London, where conditions exist of revolting enormity?

It is argued that these questions are for the consideration of impartial scientists and sanitarians rather than for the determination of lawyers and courts, confronted with expert evidence much of which may be bogus or prejudiced, and will, in any case, probably be conflicting.

It is further argued that where these evils exist they can better be removed by a thoroughly competent and unprejudiced board possessing scientific knowledge than by the uncertain, complicated and procrastinating channels of the courts.

Water companies should be supervised to see that the character of water supplied by them to their consumers is at least free from serious suspicion; sewage disposal works—their design, maintenance and results—should be examined to secure the requisite purity of effluent waters and freedom from nuisance;

towns should be prevented from permitting conditions resulting in the pollution by their sewage of their own water-supply. Several such cases have existed in the State and some uninterested external authority seems a necessity to prevent them. Such duties would be performed by the proposed board.

I am not sure but that the most satisfactory method of caring for the existing evil is to place the care of streams specifically in the hands of the State Board of Health or some department thereof, as is done in New York and Massachusetts. Such an arrangement would have numerous advantages, but it appears to me that under whatever auspices the control is secured the combined services of a sanitary engineer, skilled in the various hydraulic questions involved and familiar with processes available for sewage and filth purification, and the results attainable from each; a biologist competent to conduct the most recently perfected processes of investigation regarding disease transmission, and the recognition and isolation of various micro-organisms; and a chemist equipped with the latest knowledge and appliances for water analysis, should be secured to effect the results which science announces as essential to the well-being of the commonwealth.

In conclusion we may ask, How are the desired results to be secured? That is the practical question. The personal equation of each stream, its purifying power, and the degree of purity required in affluent waters, is a matter for scientific determination, and such supervision as has been suggested requires expenditures. How are we to expect from a Legislature, as ordinarily constituted, intelligent supervision for such work?

The education of the most intelligent portion of the public, coupled with such influences as this association may bring to bear upon our more thoughtful legislators, can, I believe, secure a radical improvement along the lines mentioned. Much has been done already in Massachusetts and even in New York. I believe at least as much may be accomplished in New Jersey.

Sewerage and Sewage Disposal at Freehold, N. J.

BY GEO. E. WARING, JR., M. INST. C.E.

SEWERAGE.

Freehold, the county seat of Monmouth county, is a village-like town of 3,500 inhabitants. Its sewerage was planned and executed in 1892, and the irrigation works for sewage disposal were constructed in 1893.

The system is what is known as the strictly separate system, from which all storm water is excluded and which is flushed by automatic flush-tanks (Waring's system).

The sewers are laid at a general depth of 7 feet. The system covers nearly the whole town, all that could be drained toward the north and east, except two or three new streets, on which there are as yet few buildings. These will be connected when necessary. Other small sections are to be cared for hereafter.

The work, as completed, comprises:

19,583 feet of 6-inch sewers.
8,602 " 8-inch "
2,228 " 10-inch "
1,269 " 12-inch "
927 " 15-inch "

Total, 32,609 feet, being 6.18 miles.

103 hand-holes.

77 inspection pipes.

31 man-holes.

27 flush-tanks.

The contract prices for the work complete were as follows:

6-inch sewers.....	per foot, 41 cents; branches, \$1.04
8 " "	" " 50 " " 1.36
10 " "	" " 64 " " 1.80
12 " "	" " 69 " " 1.96
15 " "	" " 84 " " 2.60
3 " tile drains	per foot, 3 cents.
Flush-tanks.....	\$66.00
Inspection pipes.....	9.00
Man-holes.....	38.00

The minimum grades established for the different sizes are as follows:

6-inch sewers.....	.40 per 100
8 " " .....	.24 " "
10 " " .....	.24 " "
12 " " .....	.24 " "
15 " " .....	.20 " "

Man-holes were placed at all junctions and, on the larger sizes, at all changes of grade. The inspection pipes are "T" branches of the size of the sewer, extended to within 10 inches of the surface, where they are covered with a cast-iron head, reaching to within 4 inches of the surface. They are placed on 6-inch and 8 inch sewers every 200 to 300 feet, according to local conditions. The hand-holes are simple T branches, with caps, set in the same manner as the inspections, but not carried higher. They are placed between the inspection pipes. A "Y" branch is placed at a point opposite every house and every vacant lot. The exact location of the branches and of the hand-holes and inspection pipes is carefully recorded, so that they may at any time be found by surface measurement.

Agricultural drain tiles, 3 inches in diameter, are laid in the ditch at the side of the sewer wherever it was thought that ground-water accumulated in wet weather. These have very materially improved the condition of the streets, as was shown in the spring of 1893.

At the head of each branch sewer there was placed a Rhoads-Williams automatic flush-tank, with a discharging capacity of 150 gallons, the discharge occupying about fifteen seconds.

The filling of the trenches was settled into place by flooding with water. They were very soft for a day or two after the flooding, but the filling then became compacted once for all.

There was no further settlement during the ensuing winter and spring.

The bids for this work were opened on the 18th of September and ground was broken on the 27th. The last pipe was laid on the 12th of December. The work was then tested by passing through the lines balls of a diameter somewhat less than that of the pipe. It was accepted on the 28th of December. Within less than three months something over six miles of sewer, with all the appurtenances of the system, were constructed in the best manner, at a total cost for material and labor of about sixty-four cents per foot, or \$3,366 per mile.

SEWAGE DISPOSAL.

Freehold lies on the summit of the low elevation that divides the drainage between the ocean and the Delaware river. The water-courses of the region are unimportant, and in the dry season they have little or no flow. They are entirely unavailable for the discharge of sewage. It was evident at the outset that some such means of purification must be adopted as could be used throughout the whole year. The commissioners had recognized this condition, had investigated various methods of treatment and had determined that some form of application to land would be best suited to the local conditions.

When engaged to act as engineers, we could only confirm their judgment. After examining the various tracts available, we recommended the purchase of about fifteen acres of the Hudson Benet property—selecting this, in spite of its somewhat unfavorable character, because it was the only tract near by that could be reached by gravity flow. Much of this land is peaty, with a surface of from six to twelve inches of bog-iron ore. The remainder is greensand marl and a clayey gravel soil, which is quite permeable. The section having the greatest depth of peat was in a depression and would need filling.

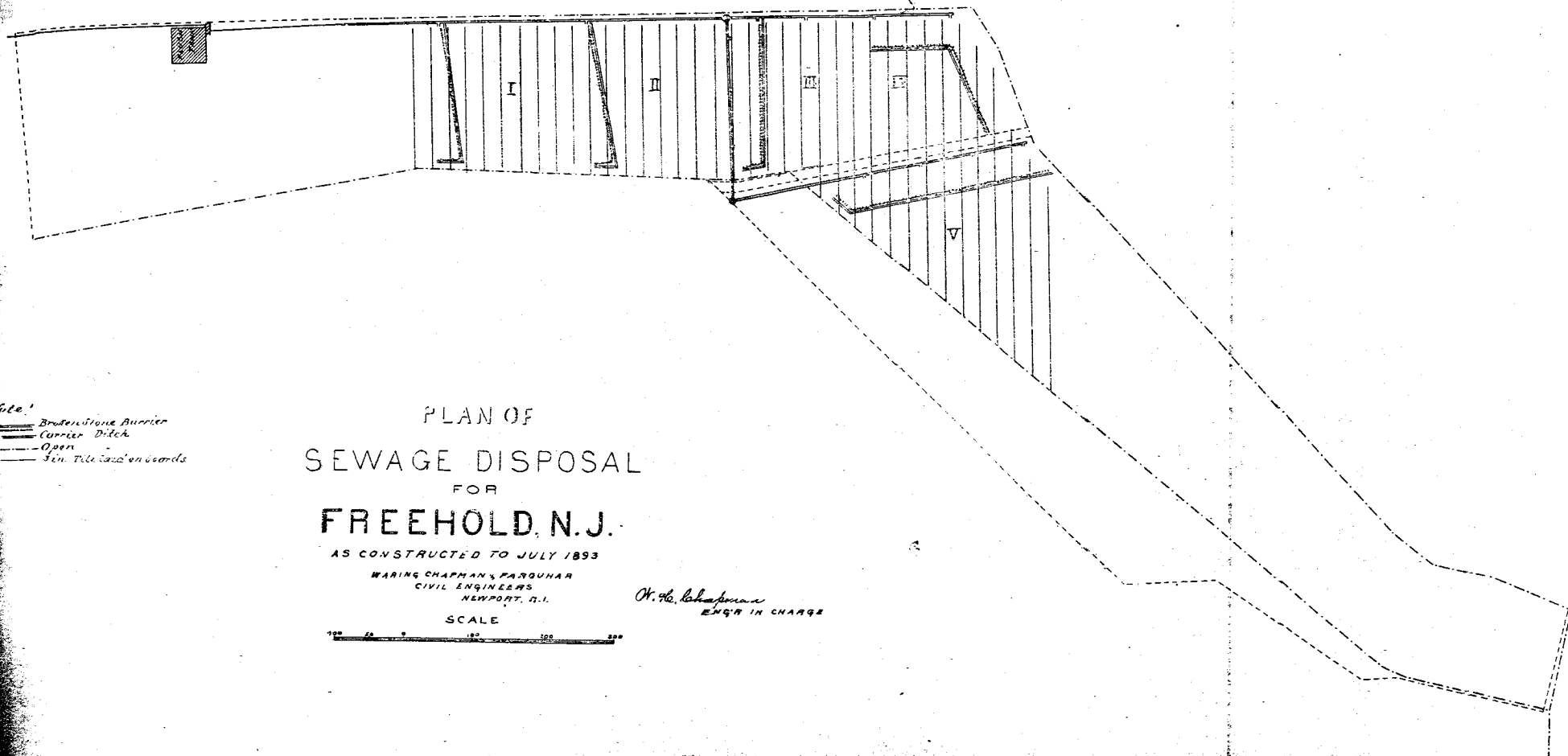
The soil is far from being an ideal one for sewage disposal, but its nearness to the town, the ability to reach it by gravity and the fact that it would require the purchase of only a few hundred feet of right of way made it seem the most available. Its advantages outweighed its disadvantages.





An attempt had been made to drain this tract by open ditches, cut at both sides of the upper field, with some cross-ditches. These had lowered the drainage level about $2\frac{1}{2}$ feet at the upper end and about $1\frac{1}{2}$ feet at the lower; a few tile drains had been laid at a depth of about $1\frac{1}{2}$ feet. These had become more or less obstructed, and they were in any case too shallow to have much effect.

Permission was obtained to deepen the brook through the adjoining property, so as to secure a free outlet for the tile drains of the lower part of the tract. Work was begun late in March, 1893, the brook being lowered to about $4\frac{1}{2}$ feet below the surface in order to get a free outlet for the tile drains 4 feet deep. No difficulty was encountered, save in two instances, where quicksand was found. Here the banks sloughed in and the bed had to be thrown out repeatedly. They now stand fairly well, but will need watching for some time. This ditch having been brought to grade, the upper tile lines were opened. At this time, April 11th, the field was so wet that it was impossible to drive onto it, and one could hardly cross it on foot without miring. The great effect of underdrainage will be appreciated when it is said that on the 20th of April between two and three inches of rain fell, and that on the next morning a team could be driven over all the underdrained portions of the land.

The tiles—3-inch—were laid on hemlock boards, 8 inches wide, a piece of board 3 feet long being laid under their butt joints to prevent settlement at either end. The joints of the tiles were wrapped with muslin, to exclude dirt which might follow the flow of water before the filling of the trench became fully compacted. This was very effective, for, when the trench was flooded with dirty water, the tile lines ran half full and perfectly clear. After the tiles were laid they were carefully covered with the best material from the bottom of the brook. This was continued to within less than a foot of the surface. The remainder of the filling was whatever came to hand.

As soon as the tile drain ditches were filled and flooded, the field was graded to a uniform surface from a borrow pit near the sewage tank. Owing to the unequal shrinkage of the peat after draining, some parts of the field had to be refilled several times. It is probable that slight depressions will still show themselves, and will require a little regrading.



- Note:*
-  Broken Stone Barrier
 -  Currier Ditch
 -  Open
 -  3 in. Tile laid on upwards

PLAN OF
SEWAGE DISPOSAL
FOR
FREEHOLD, N.J.

AS CONSTRUCTED TO JULY 1893

WARING CHAPMAN & PARSONS
CIVIL ENGINEERS
NEWPORT, R.I.

W. H. Chapman
ENGR IN CHARGE



The general arrangement of the system is shown in Figure 1, which includes all the land purchased. The portion at present in use is that occupied by the parallel underdrains.

The outlet sewer from the town runs along the side of the sewage tank, entering it at the point of outlet, so that any deposits formed by the checking of the flow will lie in the full sweep of the current when the tank is discharged. The outlet from the tank runs along the upper side of the field, as indicated, and is discharged at will at the points shown. The irrigation field is divided into five sections, numbered I, II, III, IV and V respectively.

The main sewer from the town is 15 inches in diameter. It discharges over a horizontal screen, made in duplicate for removal for cleaning. This screen is handled by a differential pulley on a traveler. From the screen chamber the sewage passes into a large open tank, 50 feet square and $4\frac{1}{2}$ feet deep, which is also provided with a vertical screen to arrest any coarse matter that might escape the horizontal screen and might obstruct the siphon by which the tank is discharged. This is a 6-inch automatic Rhoads-Williams siphon, and is now adjusted to give the tank a discharging capacity of about 22,000 gallons. It can be lengthened as occasion requires, increasing this capacity to about 50,000 gallons. As now arranged the tank is discharged in about 1 hour and 20 minutes.

Much less than 22,000 gallons of sewage per day is now produced, and, in order that it may not remain in the tank long enough to putrefy, a 12-inch water-gate, provided as a cleaning outlet, may be opened every day, until the regular daily inflow reaches the height needed to bring the siphon into action. When the flow is enough to discharge the tank once a day the siphon will take care of it.

The tank also has a high level outlet, with an 8-inch gate, through which to deliver sewage over a tract lying at a higher elevation than the rest of the field, and above the siphon outlet.

The carriers, through which the sewage flows from the tank to the different sections of the field, are 15-inch half-pipes, laid as open gutters on embankments, the bottom of the gutter being laid several inches higher than the adjoining surface of the field, so that it may drain out completely when not in use. The em-

bankments are carried 3 inches higher than the edges of the gutters, and are made wide enough for a foot-path on either side. They are drawn to true slopes, and should be solid. The gutter pipes are laid without cement, so that they will not be broken by frost. The slight leakage at their joints is of no consequence.

At intervals along the carriers branch openings have been provided, as shown in Figure 2. These are made of concrete. Light cast-iron gates are furnished which fit into grooves in the concrete. By a proper arrangement of these gates the stream may be let out at any point or at several points, or it may be caused to pass on to a more distant tract. At the end of each branch piece there is an area of broken stone to check the flow and prevent washing. Distributing wells are located at points where branch gutters leave the main lines, and these are provided with gates for diverting the stream.

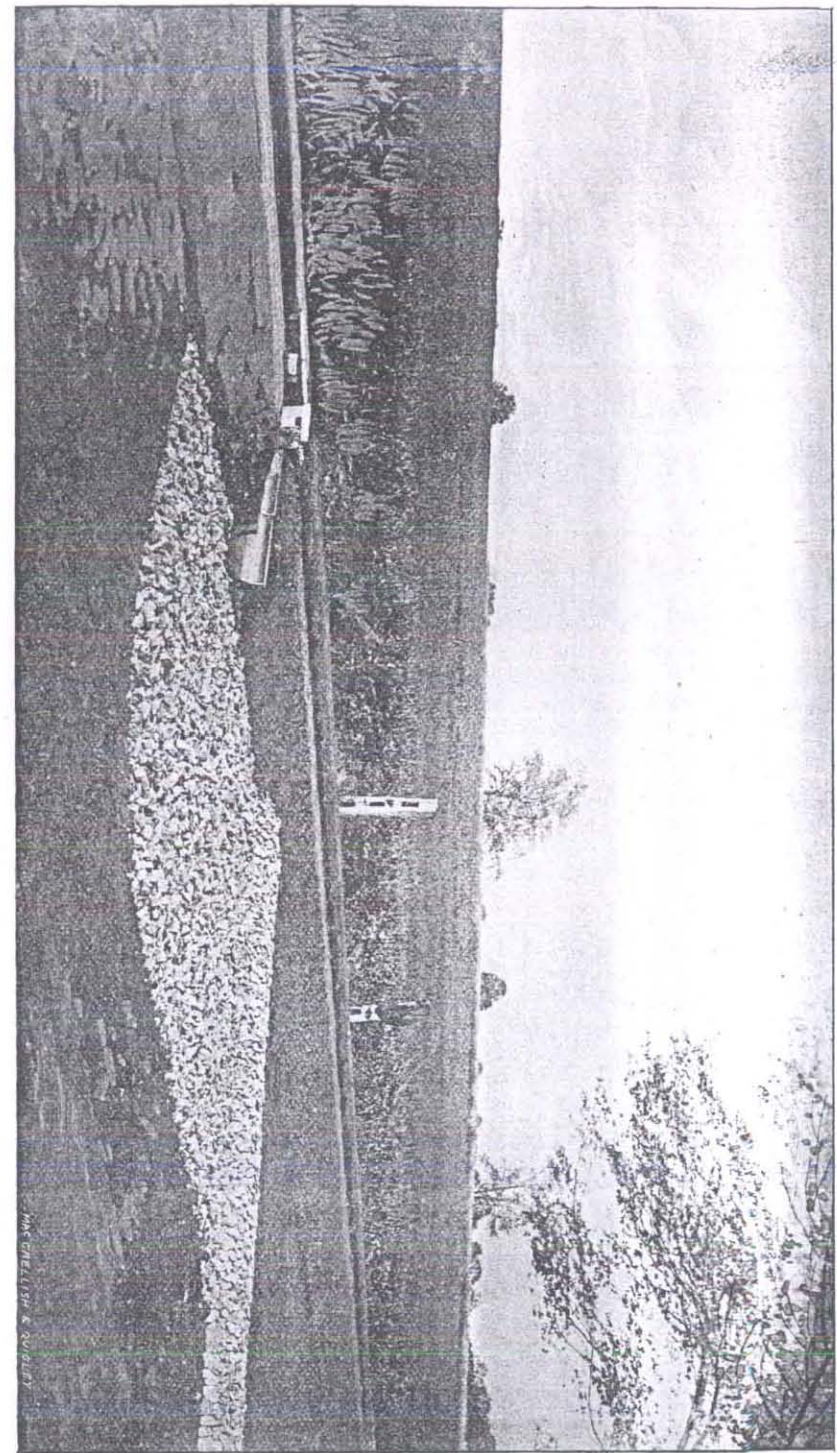
For securing an even distribution of sewage over the land, the usual "catch-drains" are supplanted by barriers of porous material, laid on the smooth surface of the ground, sometimes on the contour and sometimes at a fixed inclination, according to the manner in which the sewage approaches them, whether at one end, or equally along their length.

These barriers are made of broken stone (macadam). They afford a sufficient obstacle to the flow to collect it and to transmit it with considerable uniformity. They may be placed at greater or less intervals, according to the slope of the land and of the volume to be treated. They have the great advantage over solid embankments or gutters that they cause no ponding of the sewage. Soon after the discharge ceases all has passed through the barrier, and the whole surface is exposed to the air. The slightest attention to the upper side of the barrier suffices to keep it in good order. In this work, the barriers are $2\frac{1}{2}$ feet wide and 8 inches high to the top line. The cross section is about $1\frac{1}{2}$ square feet.

Figure 3, looking from the corner of Section IV toward the tank, shows the construction of the barrier of this section, and the location of those of Sections I, II and III.

Figure 4 shows the tank, its vertical screen and the arrangement for handling the horizontal screen, with the disposal ground beyond.

FIGURE 2.—Branch Opening with Gates for Directing the Flow, and with a Broken Stone Apron to Check Velocity.



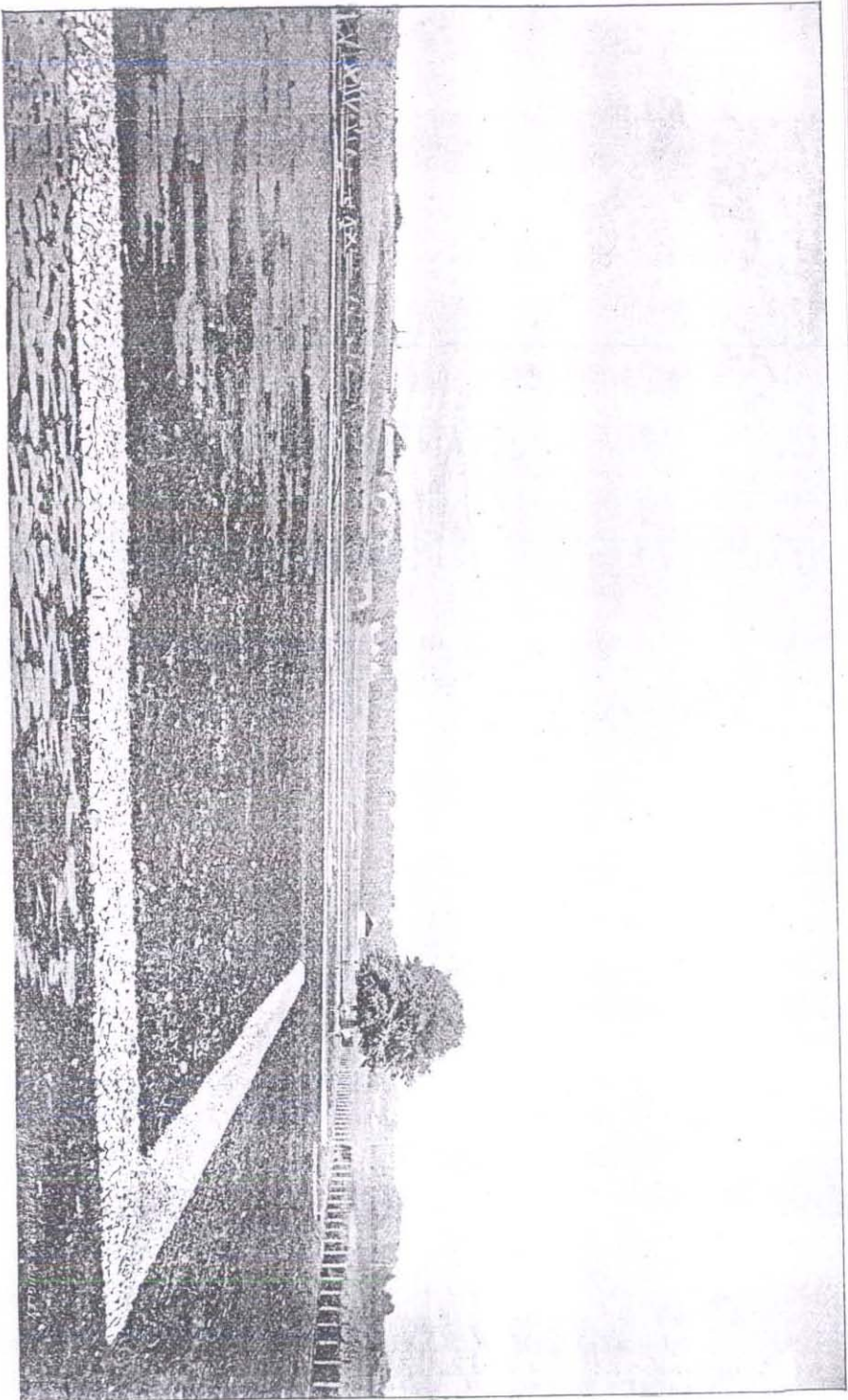


FIGURE 3.—The Barrier of Section IV, and a Ground View of the Field, Looking Toward the Tank.

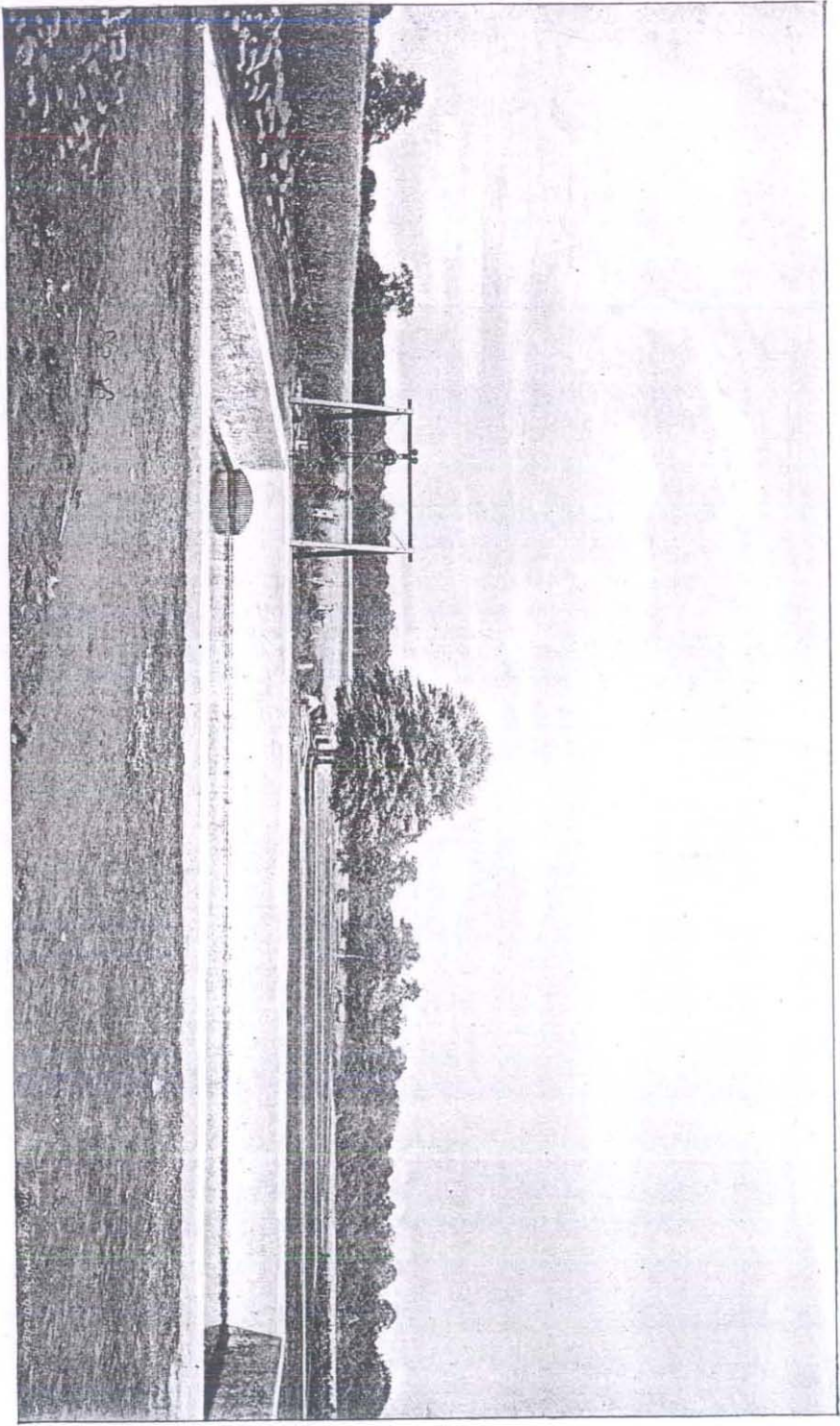


FIGURE 4.—The Sewage Tank, with Disposal Ground beyond.

The necessary minor equalization of the flow is effected by cutting very shallow V-shaped channels in the surface, after the manner of ordinary irrigation work. This field is, however, so nearly level, about 1 to 175, that little more will be needed than to maintain a smooth grade until the ground becomes fully settled.

The arrangement of the field, so far as now completed, is shown in Figure 1. On tracts I and II the barriers are laid to a grade, the sewage being delivered at their upper ends; as it flows down back of the barrier it leaches through, and flows evenly over the land below, being absorbed before it reaches the next barrier or embankment. On tract III the barrier is level, and the sewage reaches it from three gates of the cross gutter; openings are also provided for this tract from the main line. Tract IV is supplied from the main line only, and its distributing barrier is arranged according to the irregular slope of the land. Tract V is supplied through four openings, and the barrier is somewhat obstructed at the left end, where the field has little width, an increasing amount of sewage being allowed to pass where the reach is longer.

It is intended that each of these five tracts shall receive the sewage of one day, each being, that is to say, one day in use and four days at rest. This is a longer rest than is necessary; two days out of three will answer perfectly, and every other day will give good results for a considerable time. Therefore the provision of five tracts will make it easy to withdraw land from use whenever the condition of its crop requires it. There is a considerable area which has not yet been prepared for use, and which will suffice for a large future increase of population.

The lay of the land and its condition as to quality, contour and natural drainage conspired to make its development difficult and costly, much beyond what is usual; at the same time a most troublesome problem has been solved in a satisfactory and economical way, and a demonstration has been afforded of the value of methods of treatment, which may be more cheaply and more easily applied in a great majority of cases.

The sewerage system was built by contract, by Herbert Tate, of New York, for \$20,831.64; the sewage tank by contract, by Andrew MacDowell, of Freehold, for \$1,246; the preparation of

the field, connection with the flush-tank, fencing, etc., were done by days work, under the direction of N. J. Conover, of Freehold, at a total cost of \$6,206.50; the cost of engineering and superintendence was \$1,944.14, making the total cost of construction \$30,228.28. The cost of all of the land and of the right of way was \$4,120. Of this not more than \$2,000 is chargeable to the area actually prepared for use.

The entire work was carried out according to plans made by, and under the direction of, W. H. Chapman, of Waring, Chapman & Farquhar, Newport, R. I.

Surface Examination of Water-Supplies.

BY DRS. CHARLES LEHLBACH, A. CLARK HUNT AND A. WOODWARD,
WITH PREFATORY NOTE BY THE SECRETARY.

Much attention has been given the past year to the condition of our public water-supplies. Besides the possibilities of specific contamination, there is more and more evidence that water abounding in decomposing matter helps to prepare the system for invalidity, and often is the direct cause of acute disease.

Some of our sources of supply have been found so defective as to be abandoned, while others have been supplemented by driven wells or other temporary devices. The failure of New Jersey to adopt a comprehensive system of State water-supply, for which it is so admirably fitted, leaves it as a duty for each municipality to look carefully to its own interests. In so doing it is always better that the municipality control the supply, but in any and every case there must be responsibility and assurance as to the water-shed, the river, lake or other primary gathering source, the intake, reservoirs, pipes and house distribution. These must come directly within the frequent inspection of Health Boards, and not be left to stockholders, company officers or city officials.

We have repeated evidences that it is only the vigilance of independent Health Boards and of State authority, together with broad laws, that can secure protection.

Inquiry into surface pollutions of a few of our sources as detailed in this report prove the necessity of annual or semi-annual inspections, followed by vigorous action. We do not need either the chemist or the biologist to inform us that loads of filth, carcasses of dead animals and streams of discharging sewers should not pass into rivers within a few miles of the intakes of water-supplies.

With modern improvements for filtration and storage, it is inexcusable that muddy water, plant life and animal life should

find their way through public water-supply into houses. The time has come for the thorough enforcement of those State laws which protect public water-supplies, and for demanding of all public and private corporations security for their purity.

In villages, wells, too, should be subject to careful inspection, and we should not wait for typhoid fever, dysentery or other intestinal fluxes to inform us that there is death in the well.

In our last report we gave some data (page 83) valuable for reference as to the significance of chemical facts. We here add the following four analyses of public water-supplies, which we procured in September last, as illustrating variations.

We also add the following explanation of technical terms usually given out from the Stevens Institute chemical laboratory when chemical examinations are made:

DEPARTMENT OF ANALYTICAL CHEMISTRY }
 JOHN C. GREEN SCHOOL OF SCIENCE }
 COLLEGE OF NEW JERSEY,
 October 4th, 1893. }

DEAR SIR:

The samples of water received for examination from a large Trenton well September 22d, yielded the following results:

Per 100,000 Parts.

	Free ammonia.	Albuminoid ammonia.	Oxygen consumed.	Nitrogen in nitrates and nitrites.	Chlorine.	Hardness.	Total solids.
Well used by a large number.....	0.008	0.0098	0.10	0.057	.98	.....	24.5

Remarks.—Considerable yellowish *sediment*, of vegetable nature; unpleasant odor, especially on boiling; *nitrites* considerable.

This is distinctly a suspicious water—high *free ammonia*, much *organic matter* and *nitrites*—all point to drainage (sewage) contamination of some kind.

Very respectfully,

H. B. CORNWALL.

TRENTON WATER-SUPPLY.

OCTOBER 9th, 1893.

The samples of water received by me for examination October 9th, 1893, yielded the following results (sample drawn October 6th, according to label):

Per 100,000 Parts.

	Free ammonia.	Albuminoid ammonia.	Oxygen consumed.	Nitrogen in nitrates and nitrites.	Chlorine.	Hardness.	Total solids.
Trenton city water from faucet.....	0.0045	0.0068	0.2	0	.25	.....	5.8

Remarks.—The water was colorless, odorless and showed very little sediment. The analysis showed it to be in a very satisfactory condition.

H. B. CORNWALL.

DEPARTMENT OF ANALYTICAL CHEMISTRY, }
 JOHN C. GREEN SCHOOL OF SCIENCE, }
 COLLEGE OF NEW JERSEY,
 October 4th, 1893. }

E. M. HUNT, M. D.,

Secretary New Jersey State Board of Health:

DEAR SIR—The sample of water received by me for examination, September 21st, yielded the following results:

Per 100,000 Parts.

SAMPLE.	Free ammonia.	Albuminoid ammonia.	Oxygen consumed.	Nitrogen in nitrates and nitrites.	Chlorine.	Hardness.	Total solids.
Jersey City reservoir.....	0.003	0.017	0.43	0.023	.57	.....	9.0

Remarks.—Color, yellowish; *sediment* (vegetable matter, Algae), considerable; odor, slight and suggesting damp straw; no *nitrites*. The water is rather highly charged with organic matter; some chemists would call it "impure," on account of the large proportion of "oxygen consumed" The chlorine stands at a rather high figure for river water (I have found *chlorine* in Croton water .44, and in Schuylkill water .57), and there is a small amount of *nitrates*, which should not be present in pure river water. I regard the sample as unsatisfactory and not free from suspicion of sewage contamination.

Very respectfully,

H. B. CORNWALL.

The following is the analysis of a sample of water of unusual foulness, made because of serious and fatal cases of typhoid fever in a family at Tuckerton, N. J.

Per 100,000 Parts.

SAMPLE.	Free ammonia.	Albuminoid ammonia.	Oxygen consumed.	Nitrogen in nitrates and nitrites.	Chlorine.	Hardness.	Total solids.
Mr. M., Tuckerton.....	0 143	0 036	.....	10 33	135	.....	104.6

Remarks.—The water was free from *nitrites*. It yielded considerable sediment, mostly earthy, but in part vegetable growth, with a few microscopic organisms, such as *infusoria*, but not having any especial bearing on the analysis. On boiling, the water yielded a peculiar *mouldy odor*. This water is one of the worst I have tested in many years. It contains a very great excess of *free ammonia*, *albuminoid ammonia*, *chlorine* and *nitrates*. I am certain that investigation will show it to be subject to sewage or household drainage contamination. It might very easily be the means of conveying infection, and in any case is entirely unfit for use. Boiling will help matters, but I should hesitate to use it in any case after such analysis.

Very respectfully, H. B. CORNWALL.

HOBOKEN, N. J., September 29th, 1883.

CERTIFICATE OF WATER ANALYSIS.*

From whom received, No. 1864.

September 7th.

Source of sample, faucet, Hoboken, N. J.

Color, °0.5; taste, peaty; smell, none.

Data Obtained by Analysis:

	Parts in 100,000	Grains per Gallon.
I. Free Ammonia.....	0.0045	.....
II. Albuminoid Ammonia	0.0145	.....
III. Oxygen Required to Oxidize Organic Matter.....	0.428	.....
IV. Nitrites.....	.....	.....
V. Nitrates.....	.....	.....
VI. Chlorine.....	0.525	.....
VII. Total Hardness.....	.....	.....
VIII. Permanent Hardness.....	.....	.....
IX. Temporary Hardness.....	5.5	.....
X. Total Solids.....	9.60	.....
XI. Mineral Matter.....	6.60	.....
XII. Organic and Volatile Matter.....	3.00	.....
XIII. Other Data, when required for judgment.		

Bacteria, 140 colonies per cubic centimeter.

Signed, ALBERT R. LEEDS,

Professor of Chemistry, Stevens Institute of Technology.

* NOTE.—The U. S. Gallon is taken at 58,334.95 grains.

HOBOKEN, N. J., September 29th, 1893.

CERTIFICATE OF WATER ANALYSIS.*

From whom received, No. 1868.

September 21st,

Source of sample, faucet of Jersey City Hospital.

Color, 0.°5; taste, peaty; smell, musty.

Data Obtained by Analysis:

	Parts in 100,000.	Grains per Gallon.
I. Free Ammonia.....	0.005	0 0029
II. Albuminoid Ammonia.....	0.0215	0.012
III. Oxygen Required to Oxidize Organic Matter.....	0.464	0.27
IV. Nitrites.....	trace	trace
V. Nitrates.....	0.273	.....
VI. Chlorine.....	0.575	0 34
VII. Total Hardness.....	.....	.....
VIII. Permanent Hardness.....	.....	.....
IX. Temporary Hardness.....	4.25	2.48
X. Total Solids.....	10.40	6.06
XI. Mineral Matter.....	6.90	4.03
XII. Organic and Volatile Matter.....	3.50	2.03
XIII. Other Data, when required for judgment.		

Contains 1720 bacteria in the cubic centimeter.

Signed, ALBERT R. LEEDS, PH. D.,

Professor of Chemistry, Stevens Institute of Theology.

* NOTE.—The U. S. Gallon is taken at 58,334.95 grains.

EXPLANATION OF TECHNICAL TERMS.

COLOR.—1° of color is the same tint as *yellow*, as is struck by 0.01 part of ammonia in 100,000 parts of water when treated with the Nessler test.

FREE AMMONIA.—This is derived from decaying organic matter containing nitrogen, from sewage, or from surface rain-water.

ALBUMINOID AMMONIA.—This is the measure of that portion of the organic matter which contains nitrogen and which, while not as yet decomposed, is capable of undergoing putrefactive decomposition. In the course of this decomposition it yields ammonia.

OXYGEN REQUIRED TO OXIDIZE ORGANIC MATTER.—The amount of organic matter which is capable of undergoing decomposition is measured by the amount of oxygen required to effect its oxidation at 212°.

NITRITES AND NITRATES.—The former measure the nitrogenous organic matter, which has undergone, by natural process, *partial* oxidation; the latter, that which has undergone *complete* oxidation. In themselves they are harmless, but their determination is of service by way of indicating the amount of previous contamination. The nitrites are estimated as nitrous anhydride (N_2O_3); the nitrates as nitric anhydride (N_2O_5).

CHLORINE—An excess of chlorine over the amounts regularly found in the good water of any particular locality indicates possible contamination by sewage.

HARDNESS.—Hard water will yield a lather with soap only when all the lime and magnesia salts present have been thrown down by the soap in the form of an insoluble compound. Hardness may be either *Temporary* or *Permanent*—the former is removed by boiling, the latter is not. No diminution of hardness occurs on boiling, when the amount of lime and magnesia present as *carbonates* is less than 1.75 grains per gallon, or when the lime and magnesia exist in the form of sulphates and chlorides. Hardness is measured in degrees, a degree standing for the hardness which would be given to water by one grain of carbonate of lime dissolved in one gallon. *Soft* water is water under 5° in hardness. The greatest hardness allowable in good water is 15°. October 15th, 1891, the Croton water was 3°.17, the Delaware water was 0°.86, the Passaic was 3°.50, the Hackensack 3°.94.

SOLIDS.—The total solids should not exceed 10 grains per gallon, on account of the hardness which usually results from excess of mineral matter. In river-water the organic and volatile matter should always be small in amount as compared with the mineral matter. In the Passaic water, as delivered in Newark and Jersey City, the ratio is about 1 to 3, which is already too high as compared with the same water in its unpolluted condition. In wells the ratio should be much smaller, and should not exceed 1 to 10. The total solids are determined after drying at 110° Centigrade, the organic and volatile matter after heating to low redness.

OTHER DATA, when required for judgment.—The twelve preceding data are particularly specified as being those which are essential to the formation of a sound judgment upon the potability of a water and its fitness for technical use. As a general rule their determination will be sufficient. But when such is not the case, the analyst will not restrict himself to their determination, but will add all other data essential to the settlement of every reasonable doubt. This, in many cases, requires a microscopic and biological analysis to determine the nature and amount of the living vegetable and animal forms that are present. The decision as to the character of the water involves a very grave responsibility, inasmuch as a hastily formed and inaccurate judgment may lead to widespread sickness among those drinking the water, or the introduction of a water into manufactories where it may impair the steam boilers, or deteriorate the quality of the goods in whose manufacture it is used.

While appreciating the value of chemical examinations and, in some cases, of microscopical and biological inquiry, much can practically be done by surface, sanitary patrol of water-courses and by examination of intake, reservoirs and modes of distribution. Some conditions of water-supply will be found to depend chiefly on imperfection of pipes, neglect of reservoirs, or where the pollution is chiefly vegetable, in the lack of proper facilities for sedimentation and filtration. Even where no serious risk might occur to health, most of our rivers during freshets or in

times of severe draught have much foreign matter, and water taken from them for family use should be settled, strained or filtered at the place of intake by methods now well understood and successful. The failure to do this is generally because it will make a slight difference in the percentage of dividends.

The patrol of rivers reveals many sources of contamination which ought not to exist. Some of these are readily abated when once the attention of the person permitting the pollution is drawn thereto. In other cases the law can easily be enforced. We urge upon all Boards of Health careful attention to this subject and are ready to aid by State inspection.

During the past year we have made a few of these examinations for the purpose of testing their feasibility and of satisfying ourselves as to actual conditions.

As specimens of this kind of work we give in part the examination of the Newark water supply as reported by Charles Lehlbach, M.D., the Medical Officer of Health, of Newark; that of Rahway river by Inspector A. C. Hunt, M.D., and that of the Delaware river from Trenton to Lambertville by A. Woodward, M.D. These and other such reports are then presented to Boards of Health whose cities derive supply from such sources.

It is often best that some member of the Board accompany the State Inspector, and in many cases the Board itself may be able to take charge thereof.

The Newark Water-Supply.

BY CHARLES LEHLBACH, M. D., MEDICAL OFFICER OF HEALTH,
NEWARK, N. J.

At the regular May meeting of the Board of Health, of Newark, the Health Officer, in conjunction with an inspector of the State Board of Health, was instructed to visit the Pequannock watershed and ascertain the amount and kind of contamination of the reservoirs and streams and tributaries, and to devise means for the abatement of contaminating sources. On the 10th of May, 1893, Dr. A. Clark Hunt, Inspector of the State Board of Health, and your Health Officer, proceeded to New Foundland and on the following morning commenced a systematic inspection of the water-shed. The commencement was made at Macopin intake, and working up stream, each tributary and sub-tributary including the smallest rivulet was followed, so that at the completion of the inspection no possible contaminating source could have escaped detection. Four days were required to make the inspection.

Summed up, the sources of contamination are as follows:

FIRST—PRIVIES.	
Privies found built over stream.....	3
Sewer Drains connected with water-closets, and emptying directly into water.....	2
<i>Privies (open surface.)</i>	
1st. 15 feet or less from stream.....	7
2d. About 30 feet from stream.....	6
3d. About 50 feet from stream.....	2
4th. About 75 feet from stream.....	1
5th. About 100 feet from stream.....	5
Privies (open surface) 150 feet from stream	6
Privies (open surface) 200 feet from stream	7
Privies (open surface) 250 feet to 300 feet from stream.....	3

Privy vaults found.—These mainly very shallow and not water tight. May also at any time be sources of direct contamination.

About 50 feet from stream.....	3
About 75 feet from stream.....	3
About 100 feet from stream.....	2
About 200 feet from stream.....	3
About 250 to 300 feet from stream.....	2
	<hr/>
	13
Number of vaults found within 150 feet, but exact distance not determined.....	10
Cesspool, with water-closet connections, 150 feet from stream..	1

The above gives a total of 66 privies found—direct and indirect sources of contamination. Of these, those 100 feet or less from the border of stream may be deemed as directly contaminating and number 26 (including those built on stream and those draining into water by means of sewer—five in all).

SECOND—BARNs.

Within 5 feet.....	1
Within 15 feet.....	2
Within 25 feet.....	2
Between 25 and 50 feet.....	2
Between 50 and 100 feet.....	2
Over 100 feet.....	6
	<hr/>
	16

Those given are such from which contamination takes place.

THIRD—PIG STYES.

Within 10 feet.....	4
Within 25 feet.....	6
About 50 feet.....	1
About 100 feet and over.....	4
	<hr/>
	15

From the above it will be seen that in all were found about 97 actual and possible sources of animal contamination. Among the worst sources of contamination were found the following: *Booth's Cullery Works privy*, below Stockholm. This was built directly over the stream, and used by 35 employés. It is said that since the inspection was made Mr. Booth has introduced an

earth-closet system, and abandoned the privy in question. The privy of Mr. Wise, New Foundland Post Office, is an open one, and within 10 feet of the Pequannock river. Rain flushes the contents into the river. This is a place to which people come from miles around, and in summer visitors from cities are received. Mr. Wise has signified his willingness to remove this objectionable source of danger, and provide a properly-constructed vault or cess-pool sufficiently removed from the stream to insure non-contamination.

Another privy, contents of which find their way directly into the Pequannock river, is one about a mile below Stockholm, and in a barn belonging to the East Jersey Water Co.

On the properties of Theodore Brown and M. P. Norman were found, respectively, a tile and iron drain, connected with water-closets in house.

Among the barns found there were a few in very close proximity to the water edge, and the drainage from these was directly into the stream.

From the foregoing, and by a perusal of the appended notes, it will be seen that the main reason why animal contamination is slight is because habitation in the area drained by the Pequannock river and its tributaries is so very small. In fact there is perhaps no other region in New Jersey covering the same number of inhabitable square miles in which so few people live. But the majority found, with few exceptions, drain directly or indirectly into streams from which Newark draws its water-supply.

It is self-evident that although the existing contamination is very small, measures should be at once adopted which will insure *absolute purity* of the water, and will *exclude any possibility of infection* from epidemic diseases. Under the present conditions should typhoid fever or cholera occur in the Pequannock region, the germs of these diseases might readily find their way into the water, and would in consequence prove a source of great danger to this community. Of as great importance as is the removal of existing nuisances, is the prevention of those which might occur, and *undoubtedly will* in the future. This region is open to increased settlement, and hand in hand with it will come increased pollution unless steps are taken to prevent it.

Already Cedar pond, which is one of the sources from which Clinton reservoir draws its water, has been bought by a Passaic company. They own about 2,500 acres, and intend to establish summer residences around this small but beautiful lake in the mountains. This may happen in other sections of the drainage area—*e. g.*, Hanks pond and Echo lake—or around the reservoir.

While it would be the wisest, and perhaps cheapest, course in the end for this community to acquire sufficient land adjoining all the reservoirs, streams and tributaries, to insure forever non-contamination by excluding habitation, the questions at present are, *how can the present nuisances be abated, and by what means can contamination in the future be prevented?* The answer to the first is:

The enforcement of the present laws, especially the law of 1893, Chapter 157, which makes it a misdemeanor to contaminate in any manner the water of any creek, stream, etc., used for drinking purposes. It may be added that it is clearly the duty of the Board of Street and Water Commissioners to take active steps in the prosecution of those who are at present in any way allowing filth of any kind, directly or indirectly, to flow into the streams or their tributaries in the Pequannock water-shed.

The future contamination of the water as long as the population remains limited, after all present nuisances have been abated, can be insured by the passage of laws which will give some body, preferably the State Board of Health, power to draw a sanitary code for any water-shed in this State, and appoint an inspector to see that the provisions of such code are carried out. One of the first and most important steps would be to regulate the construction of privies and cess-pools and provide for the proper building of manure pits. It should be mandatory that no privy or manure-pit be maintained within a distance of at least 200 feet of freshet mark, and constructed absolutely water-tight and in such a way that the contents can easily be removed and disinfected. Cess-pools should be built at least the same distance from the water, and in no case should water-closet connection be allowed with them. The use of the earth-closet system should be allowed, providing the disposition of the contents is satisfactory to some competent authority.

While some time may elapse before the necessary laws can be enacted to carry out the latter suggestions, much good work can

be done by vigorously prosecuting those who wantonly defile our water-supply, by the enforcement of our present laws. During the coming summer it would seem a good plan to have an inspector for that district appointed, to whom power to make examinations can be given by the State Board of Health, and who could report, from time to time, to the local authorities the conditions existing, and draw attention to any new source of danger which might occur.

At several points in the water-shed region the main pipe of the Standard Oil Co. was found exposed and unprotected. It was found crossing the Echo Lake brook about three or four hundred feet from Clinton reservoir, and several large stones resting upon it. As far as can be ascertained no large leaks have occurred in the last few years, but should this pipe break at this point, or at several others noticed, the escaping oil would find its way directly into the water, and might, if sufficient amount escaped, render it unpotable for a time. Wherever the pipe is found unprotected near streams, the Standard Oil Co. should be notified to take all possible precautions to prevent leaks from occurring by removing all rocks resting on the pipe or in danger of falling on it, and by building iron guards around it, and should institute more frequent inspections of the line than are at present being made.

It will be seen that in this report no note was made of vegetable contamination which may take place—the time of year being unfavorable for such an inspection.

Note—A full description of each contamination with notes, comments and photographs was also submitted, but the above is the condensed report.

Examination of Rahway River.

BY A. CLARK HUNT, M.D.

The examination was started at the pumping station, situated outside of the thickly-settled portion of the city. The pumping capacity is three million gallons in twenty-four hours. Screens are used to retain floating materials and a sand-filter to clarify the water. At the time of inspection the filter was not in use and the water was being pumped directly into the mains.

Following up the stream about one-half a mile, we came to Bloodgood's mills, and found that the closet for the use of the operatives had been removed from the bank of the millpond to a point on the bluff, where there is little danger of contamination. The aniline dyes used in the establishment are emptied into an evaporating reservoir.

Above this mill is the pond, but no houses are near the river banks until we come to Vreeland's mill, which is one and one-half miles below Cranford. There is an ice-house on the pond at this point and Mr. Bunnell's house is on the road beyond the mill. Above this point, on the south side, the stream has a high bank, and on the north side there is woodland and swamp. The stream flows over a clean gravel-bed with swift current, and up as far as the Lehigh Valley R. R. bridge is shaded, and there are no dwellings near it.

After passing the Lehigh Valley R. R. bridge, the stream is still clear, and on either side there is woodland. Coming to a place on Walnut avenue, a brooklet enters from the west and receives the drainage from a house and a tenant-house. Above this point three houses, facing on Walnut avenue, have house-drains connected with the stream; closets are fairly well removed.

The next point reached was the upper mill (Bunnell's). Above the mill, on the east side, are two houses—one a new one, and

from the latter a new ditch has just been dug, presumably for use as a house-drain.

Above this, on the west side, is a house with a four-inch house-drain emptying into the river. From here to the Central R. R. bridge no contamination was noticed. Just beyond the bridge, on the east side, there is a twelve-inch pipe which has a constant flow of sewage and showing evidence of water-closet connection.

Above this, on the south and west sides of North avenue bridge, enters the eight-inch street-gutter, and on the west and north sides of the bridge a twelve-inch sewer from the Miller building, and also within a foot of this the outlet of the Irving sewer, which drains private houses.

From this point until we reach the limits of Cranford there were thirty-three connections of house-drains and sewers, the largest being a twelve-inch pipe. These various drains in Cranford are estimated as representing the waste from at least one hundred houses.

Above Cranford the stream becomes narrow and at points is not over 20 feet in width, and for a long distance no houses are near it. About one and one-half miles up the stream from Cranford there is a house on the left bank, with a water-closet only 25 feet from the river. We then come to the Union road bridge, then to the road below Meekers' mill and pond, then to the Morris avenue bridge, and 100 yards beyond this the stream divides into a northeast and a northwest branch.

THE NORTHEAST BRANCH.

Following up this branch we cross the Springfield road. Beyond this the stream turns toward the east, and about 100 yards from the road bridge is a house, with hog-pen on the bank of the stream, but water-closet well removed. Above this a small branch enters from the east.

The stream from this point runs parallel with Springfield avenue. It then crosses the road and is located back of the Riley Maplewood hotel; then through open meadow and parallel with the road leading from Springfield to South Orange. One hundred yards along this road there is a water-closet placed over a small rivulet which enters the stream. We then passed the

Maplewood mills, where there is a hog-pen and closet near the raceway. The stream is, above this, located between the road and the railroad, and the dark color of the water is very noticeable. We then follow to the railroad bridge, where the water is very black. The stream is now on the west side of the D., L. & W. Railroad and was being cleaned out. Just before we come to South Orange avenue there is a closet near the stream, and a foul-smelling ditch enters from the east side at a lumber yard, and the closet is only ten feet from the stream.

The next house to the avenue on the east side has a water-closet located on the bank.

After crossing the avenue 100 yards further up, there is a water-closet within 100 feet of the stream, and a brook enters it from the east, which we followed up under the railroad; and between the railroad and Scotland street there are five water-closets and three barns and a pig-pen on the banks, and the brook is stoned up. From this point to Strathan street no contamination was noticed. On the east side of this street, commencing at a milkman's house, there are four water-closets within fifty feet of the brook, and a little further up a house-drain, coming under South Orange avenue, empties into it. The brook then becomes very small and disappears in open meadowe.

Returning to the river, opposite the athletic grounds, a slight brook enters. Beyond this, on the east bank (back of Mountain station), are two closets in the rear of greenhouses. From this point to Montrose avenue no contamination noted.

We then reach the new pumping station of the Orange sewers, and here for a long distance the stream is boarded up on both sides. Nothing further was noticed up to a bridge on Valley road, where the brook is divided—one branch coming from the east, in which the water was black, and one from the north, which was clear.

Following the north branch to Chestnut avenue we found six closets within fifty feet of it. Beyond the avenue there is a closet on the left bank.

Further up, on Mitchell street, on the east bank, are four houses within 125 feet of the stream with closets located on a side hill, so that during heavy rains the contents would naturally

enter the brook. The brook at this point is dry, and above this comes from open fields and from the mountain.

The east branch, running through Orange, is described as follows:

The brook bed from about 150 feet north of Tremont avenue to where it crosses Christopher street is abandoned, the water entering into the storm sewer at the last-named street. From Christopher to McChesney streets there are four privy vaults within ten feet of the brook. One house on McChesney street is built right over the brook, and all waste-water enters directly into it. From McChesney street to Nassau the brook is walled up on the east side. McChesney & Fisher's hat factory is on McChesney street, and the brook and all waste-water from sizing and dye shops, hundreds of gallons per day, flows into the brook. The lots on South Jefferson street between these streets abut on the easterly wall of the brook, and in this block nine drains from kitchen sinks lead into the brook, and eleven privy vaults are within six feet of it. At Nassau street two houses are built over the brook, and several drains from the neighboring cellars enter the brook here. The drainage from a butcher shop also finds its way into the water course here. The block between Nassau and Forrest streets is occupied by Austin & Drew's and Fr. Berg & Co.'s hat factories, while here all waste-water runs into the brook. A privy vault at Berg & Co.'s is also within three feet of the brook-wall. From Forrest to Freeman streets there are two tenement houses built over the brook. The rest of the block is occupied by Connett & Read's and Cummings & Matthews' hat shops. The privy vaults are away from the brook, but the waste-water enters the brook from both factories. Two drains enter the brook near Freeman street, to one of which the urinal of a saloon is attached. On the north side of Freeman street are six tenement-houses, and the cesspools and privy vaults are connected with the brook by a culvert. Then on to Mitchell street there are two privies at the No Name Hat Factory within eight feet of the brook, also the privies of three dwelling-houses. The west side of the brook here is in West Orange, and several cesspools leak into the brook from that side. Above Mitchell street to the point on Joyce street where both beds of the brook enter West Orange are the hat factories of McGall Bros. and William

Clover. In both the privy vaults are well away from the brook, but large quantities of waste water are discharged into the brook. Otherwise the brook is free from contamination.

The dye stuff used by hatters is logwood, fustic, madder, copperas and sulphuric acid.

Beyond the Orange City line, in West Orange township, the stream was examined but no contamination noted as it ends at a new street and a small branch enters from the mountain.

Returning to the point of division of the river below Millburn, the *Springfield Branch* was followed to the Springfield road where it divides; one branch coming from Millburn the other from Springfield and Short Hills.

The Springfield branch was not contaminated until after going through old mill-pond bottoms you reach the disposal works of Short Hills, where the effluent enters the brook. This effluent appeared fairly clear.

The branch coming from Millburn has entering it a stream which originally drained some of the ponds and has on it a paper-mill. At this point the water is somewhat discolored and there is a deposit on the bottom of the stream.

A closet near the mill is not over 10 feet from the brook.

Following up the main stream toward Millburn we came to a paper-mill and the same conditions were noticed as at the other one. Above this, opposite the Episcopal Church, on the main street there are four closets directly on the bank and one back of a store so located as to drain into the river.

Nothing further was noticed to Springfield avenue, leading from Millburn to Summit.

Between the avenue and the D., L. & W. R. R. there are on the west bank a closet and drain back of Mr. Mundy's store, both of which empty into the old tail-race, and there are also three closets within 75 feet of the main brook.

This brings us to the railroad, where the examination was discontinued.

As a result of the examination the facts as to contamination were laid before the Cranford Board of Health and they at once by vote of the people, ordered plans drawn for sewage disposal, and at Orange, as soon as possible, the portion of the stream so seriously contaminated will be filled up and the hat

factory workings, etc., will be carried to the Passaic river by the city sewer. When this is done the supply will represent a good sample of surface supplies. The result of such examinations of our streams used for public water-supplies cannot fail to awaken anxiety, and strenuous efforts should be put forth by cities and local authorities through whose territory the streams flow, to secure the enforcement of rigid laws controlling such contaminations.

NOTE.—We are indebted to Mr. William Schleur, the Assistant Health Officer of Orange, for valuable assistance rendered in securing data in reference to that portion of the stream which flows through Orange.

Inspection of the Delaware River from Trenton to Lambertville, N. J.

BY ABNER WOODWARD, M.D.

Beginning on the Pennsylvania shore opposite the city of Trenton water-works, I found as follows: The general pitch of the land is from the river bank, which is from ten to twenty feet high, to a depression inland about three hundred yards from the river. The Pennsylvania canal, which runs nearly parallel with the river, receives the inflow except what percolates through the soil. This is of a sandy alluvial deposit mixed with small boulder stone and a few rocks; near New Hope the pitch is toward the river with high hills to the river edge. The general course of the river is northwest. It has a swift current and a depth of from three to ten feet, running over a bed of gravel, boulders and rocks. There is a rift or ledge of rocks from Canoe island to the Pennsylvania shore, one at Scudder's falls and another at Lambertville. Over all of them the water pours with much force and agitation. The distance to this point is about sixteen miles. There are three islands (see further on). The first stream entering the river is at Old Ferry, about one-quarter mile above the new bridge. It is quite a large stream in winter, but in summer it is small, sluggish and muddy; it cannot mix with the water taken for the city supply on account of the rapid current which carries it below the intake. Mill creek, at Yardley, is a stream ten or twelve miles long, draining farm lands and meadow. It is a filthy stream, with a number of water-closets, hog-pens and chicken-coops on its banks within a few feet of its outlet in the river. The flow would mostly be caught by the current on the Pennsylvania side. Puff creek, one mile beyond Yardley, is a small, clear stream running over a gravel bottom.

Goose creek, three miles from Yardley, is about twenty feet wide, ten miles in length, with a gravel bed and water clear.

Hough's creek, five miles from Yardley, is sixty-five feet wide at its mouth, it receives a large amount of surface drainage from cultivated farm land; there is a flour and feed mill at its mouth. It empties into the Pennsylvania canal.

There is an overflow of the canal near Hough's creek into the river. At Taylorsville there is one water-closet on the river bank and fifteen water-closets and stable-yards within fifty feet of the river. This is about nine miles from Trenton.

Lawlos creek is a small stream receiving the draining of farm land and swamp; it has clear water and a gravel bottom.

One mile beyond Brownsburgh is an outlet for the Pennsylvania canal. Neeley's creek with an overflow empties into the river three miles beyond Brownsburgh.

New Hope has a water frontage of one mile on the river and over one-half mile on Ingraham creek. Both are lined with water-closets, hog-pens, stables and chicken-coops. There is a paper-mill here that uses old rope and jute bagging for making paper. After the rope, etc., are ground and the dust and fine particles are sifted out, it is boiled in a strong solution of quick-lime for half a day. The lime is washed out, then it is put in a saturated solution of chlorate of lime and again washed. The water goes into the river. They use about fifteen bushels of lime and ten of chlorate of lime each day.

NEW JERSEY SIDE.

The river bank on the New Jersey side has an incline inland to a low marshy meadow running parallel with the river as far as Washington Crossing; then the highland comes to the river edge. The height of the bank is from ten to two hundred feet. There is much vegetable and other deposits on the bank and margin of the river. For about one-quarter of a mile from the upper bridge at Trenton is a flat, marshy strip of land, covered with a growth of willows and birch, which has been the means of gathering the floating weeds, grass, brush, wood, mud, etc., to a depth of several feet. All along the edge of the river is a

growth of small willows and trees. The soil is mostly clay and sand, mixed with rock.

There is an outlet from the feeder into the water-power, and an over-flow from the water-power directly opposite the inflow from the feeder. We get water from both canal and water-power only a few hundred feet above the city intake, with a very rapid current which carries the water directly over and into the intake. Only a few yards beyond is a stream which has its head in Ewing township, running through farm land, woods and meadows. This stream receives the sewerage of a water-closet and the wash-water of the Girls' Reform School, about one mile from its mouth. This branch runs to the west of the Park and under the canal through a culvert. The other branch receives the drainage of Hillcrest and the east side of the Park and runs under the canal culvert. The two branches form a junction below the canal, on the Park lands, and then runs through meadow, receiving the drainage from houses, water-closets and stables. It is discharged through a culvert under the water-power into the river about two hundred and fifty yards above the city intake. There are several sewers emptying into the water-power at Cadwalader Place about one mile above overflow. At Brooksville, two and a half miles above Trenton, there are two water-closets on the river bank, a stable and a pig-pen on a raceway which flows into the river.

At the State Insane Asylum, all the wash-water from the laundry and in the winter the water-closets from the main building is sewered into the feeder, which has an overflow just above the intake. At other seasons of the year, the cesspools, water-closets, hog-pens and stables are sewered into a large, open, cemented basin, located about twenty feet from the canal.

There are several leaks through the cemented wall and the filthy fluid runs over the towpath into the canal. This open cesspool is only sixty or seventy feet from the Belvidere Railroad. The stench from this basin is noticeable from the cars as the train passes it. On the east of the Asylum grounds there is a small stream which receives the rain water from the new asylum building, also a small basin at the mouth of this used as a place for dumping. At Gold run, near the Reading Railroad bridge, there are two water-closets emptying into it. The mouth of this

stream is opposite an overflow from the water-power. One-quarter of a mile beyond is a stream running through lands belonging to Mr. Keeler. It is a sluggish stream with water-closet, hen-house and stable on its bank emptying into the water-power three hundred yards above the overflow in the river. At Wilburtha hotel is a water-closet twenty feet from the river. At Somerset Junction, two miles above Wilburtha, there is a cow-yard about three hundred feet from the river and a stream of black, cow-yard water running from it into the river. A short distance above the junction is the mouth of Jacob's creek. It is a clear stream running through a deep valley, with wooded banks and cultivated farm lands. It is nine miles long and is discharged through a culvert under the canal into the river. There is a flour mill near its mouth. At Washington there is one water-closet five feet from the water. Half a mile east of Titusville there is a stream running over rocks and gravel—the water clear. At its mouth is a large amount of lodged vegetable matter. There is a small stream running through the centre of Titusville, dividing the cemetery in two equal parts. It is a very dirty stream and empties into the river. At the west end of the town is Fiddlers' creek, about three miles long. On its bank is located a canning factory which, in summer and autumn, empties all its refuse into the creek. A flour and feed mill is also located on the stream. Also a shoddy rubber mill, which uses five and sometimes more carboys of oil of vitriol each day to clean old rubber boots, shoes, hose, etc. The water flowing from this mill kills the fish in the stream. All these mills are within one hundred yards of the river and the water enters into it. There are nine water-closets and four horse-stables on the river bank. At Moore's station is the mouth of Moore's creek. This stream is eight miles long and is a clear, clean stream running over rocks with a very rapid current. It enters the river through a culvert. Between Moore's and Lambertville there are several mountain brooks with clear, clean water emptying in the canal. At Lambertville there are thirty water-closets, one of them used by two hundred and twenty-five men, which empty into the river. On Swan creek, which runs through the town, there are twenty-five water-closets and a number of hog-pens which empty into the river. Also a rubber mill and gas works. Also four paper mills, the waste from which empties into the feeder at the outlet of the canal in the river.

There are many water-closets and stables which sewer into the feeder, and several mills and factories which ultimately sewer into the river.

With the exception of one man at Wilburtha, all seemed pleased that the State Board of Health was inquiring as to the surface and refuse drainage into the water-supply. Several assured me that they were willing to abate their part of the nuisance, though some corporations wished an official notice so that the objections could be laid before their Board of Directors.

Thoughts for Sanitary Workers.

BY EZRA M. HUNT, M. D.

I.—THE CAUSES AND QUALITIES OF DISEASE.

There are three factors that enter into the securing of a successful result in farming. They are right seed, right soil or surroundings and right ingathering. Disease, for its success, has very much a similar history. There must be some form of particle or contagium, a richness of soil and surroundings fitted for its germination or growth, and an individual capable of gathering up and utilizing the result. It is sometimes a difficult problem in nature to explain the different qualities of seed, or why this or that seed suddenly makes its appearance. It is also difficult to tell why this or that soil is always productive and another sterile. And it is even difficult to tell why this or that man is successful as an ingatherer, being able to appropriate and use what is acquired. How these difficulties multiply when we come to that which is abnormal and which we call disease! We try to analyze each of the three factors, and know that we must have them all. But how hard to define their power of presence (catalysis) or their proportionate influence and the details of their activities.

In one case the seed itself seems weak, in another rampant, in its germinating activity. In one case the soil and surroundings, made up of earth, air, locality and surroundings in general, is an intense fertilizer, and pushes the seed into malignant exuberance. In another case the individual is a wonderful utilizer and gathers in the entire evil crop. We have terms for all these, which help to describe but do not define. We call the seed or cause, efficient, powerful, malignant. We call the surroundings susceptible, or favorable, as when a seed falls into a muck-heap exactly fitted for its most prolific growth. We call the individual sus-

ceptible, or having a tendency, or diathesis, favorable to receptivity.

It is the duty of hygiene and preventive medicine, as far as possible, to define all these factors, and, by close observation and numbers of cases, to settle what constitutes the adaptation of seed and soil to surroundings and persons to disease in general, or to this or that disease in particular.

If studying the disease or germinal cause he asks, whence the seed, why its difference in vitality, is it a vital or a chemical result, does it change and become so modified by evolution as to be really a new thing? Does it hybridize or become a mongrel, and thus practically become a new disease? Does it have its hybrids or its sports, which become specialized? Do other combinations occur which are not vital, but which, either by chemical or mechanical results, cause a new disease or impart gravity to the old?

What makes the difference of soil or locality? Is it in the air, the earth or the water? Why does one filthy soil seem to cause no harm, while another is the hot-bed of disease? Why does one condition of atmosphere seem to cause some disease to spring out, as do mushrooms, in a night, while at other times apparently similar conditions produce no harm? Why does one person catch almost every disease, while another is resistful to the last degree?

These are but specimens of hundreds of questions that centre around every inquiry as to the causes of disease and the modes of their prevention. They are only to be answered by that knowledge which comes from closeness of study, from thoroughness of observation, from precise records of observed facts, by men who have become as skillful and competent as the instruments they use. It is slow work, it is plodding work. It is, in a sense, empirical and experimental, and takes a long time to result in experience. It is at best a science of probabilities. Nevertheless it is a science and art which technic methods in the laboratory, numerical methods in the statistical bureau, recorded methods in collective investigation and clinical methods at the bedside have shown to be competent and successful. Out of it comes an art as well as a science.

The past is full of encouragement for us to keep on investigating in all these directions.

Thus we add not only to the sum of human knowledge, but to that kind of knowledge which limits disease, which preserves life and which therefore belongs to the higher sphere of human benefaction.

II.—SOME POSSIBLE SOURCES OF EPIDEMICS.

Notwithstanding all that biology is doing to apparently indicate to us the causes of epidemics, it must yet be admitted that there is much that is obscure or inexplicable. Now that the tendency is, to doubt the interposition of providence, to dispute all superstitious views and to believe that the discovery of all causes is within human reach, we are exposed to many vagrant tendencies. Experiment assumes as proven what has appeared only for a few times; hypothesis quickly dresses itself up in the garb of theory and then vaunts itself as if clad in the full armor of fact.

Yet how inexplicable are many occurrences of disease. Hydrophobia begins to be in a dog that never has been bitten. Hospital gangrene breaks forth in a new hospital and spreads from a single case that could not by any fair facts be shown to have derived it from another person. Cholera, like the plague, lights upon Hamburg and destroys its thousands, while it enters Paris, or Havre, or Antwerp and has only moderate prevalence. One series of ports has no quarantine and escapes, another series, similarly exposed, has both quarantine and cholera.

The twelve cases of cholera in New York in 1892 could not, by any fair summary of facts, be connected with foreign importation or quarantine.

We are to remember, first of all, that all spreading diseases cannot be traced to one class of causes. Koch says that rabies can scarcely be considered a bacterial disease. Malaria is spoken of as probably a protozoa, and cancer, etc., are by some suspected to be in this category. Most of the common eruptive diseases of childhood, as scarlet fever and measles, have as yet refused to yield up the mystery of their contagion. So it is with small-pox, and vaccination is still more inexplicable.

If many diseases represent a microscopic botany, we are yet far adrift as to classifications. Families may be the same, but it

is hard to locate classes, orders, genera and species, or to distinguish between those that are and those that are not allied.

Have we not hybrids, and crosses, and mongrel fertilizations, and sports, as in the higher orders of fauna and flora? Can we tell why one of these is fertile and another not? or why one, like the gentian, becomes fixed, while the other easily reverts to its norm?

It is now very certain that we cannot announce fixed rules as to development, or as to the mingling of different forms. Some departures are very transient; others, under rare circumstances, revert, while others in their evolution attain a permanency like that of an original form. It is sometimes difficult to determine which have spores and which not. As by cultivation some harmless plants become poisonous, so surroundings not only seem to give malignancy to disease, but impart a new and destructive vitality, so that we are compelled to give a new name.

The study of plant life in many diseases is yet in its infancy. It is premature to be dogmatic as to invariability of causation.

We believe it to be untenable to centre all contagious diseases about one class of causes. There are gases as well as particles. The distinct aromas that we get from cookery are not all bacterial. Of particles, all are not living, and too many are laden with possibilities of disease. We are to remember, too, that with the doctrine that the disease is not in the micro-organism itself, but in its products, we may have floating matter which is not living and yet which is infective. So the gases of certain kinds of decomposition may be sources of contagion without our deciding whether or not they have been produced through the agency of low forms of life.

It is wonderful, too, how in the great open, streams of such floating material may move through the atmosphere to great distances, lighting down on one place and not on another. The wind has been blowing heavily this morning after a light snow storm, which has laden the foliage of a wide-spreading pine with snow, yet the upper limbs were cleared before the lower ones. We have watched the process. It seems strange how the wind for time after time would strike the limbs thirty feet high and escape those twenty feet high. Was it not wonderful when, years ago, a reddish haze settled over the sky long before sunset? We

believe it was quite fully agreed to be owing to volcanic eruptions that had taken place months before in the Indian archipelago. The atmosphere has its gulf-stream and currents far less easily located. Sometimes the dust of disease may be whirled upward, and stay there until neutralized or precipitated by unseen influences. Sometimes it moves in streaks through the lower air like the little hot-air, or cold-air wave, met on a country road. Sometimes it seems to coat itself with a protective, just as now smoke particles are said sometimes to be filmed over with oil and to be kept in suspension without being dissipated. Many years since we visited a factory which rendered the sludge from petroleum in order to get back from it the sulphuric acid which had been used in refining. Strata of air from that factory would meet people here and there in an adjacent city. It was much worse on some days and at some corners or blocks. It was a variable and indefinable nuisance occurring at times and then again ceasing, and lighting upon distant villages now and then. While the factory was being alternately operated and closed under charge of a commission appointed by the Chancellor, we once on a snowy, damp day, with favoring wind, on a section of road with woods on each side, met a strata of that air twelve miles from its place of origin. We were fully able in this case, and in others, to verify the fact that, protected by oily particles, or in some other way, it had resisted the law of the diffusion of gases, so as to preserve its identity far afield. Had this been the product of some small-pox or typhus fever hospital, would we not have had what might fairly have been called an epidemic constitution of the atmosphere? If so, I would not the less quarantine a passenger from that hospital, or cleanse him, or isolate him, or keep him under observation, as the case might be. But I would not claim that the epidemic could arise only from such a person or his effects. It is a question of probabilities or possibilities, of certainties or uncertainties, greatly modified by facts and conditions.

An analogous remark can be made as to the spontaneity of disease. It generally depends upon a previous case. But such are the possibilities of change, both physiologically and pathologically, of the influence of climate and environment, of origin of species, of fixity or relapse, that we cannot say of most diseases that they never arise *de novo*.

There can be what is equivalent to this without any spontaneous generation. This infinite variety of nature has its analogue in the infinite variety of disease, except that while nature has its origin in creation, disease can far more be claimed as an artificiality. We have an immensity of learning, probably, yet to acquire as to the relation of persons and things to new developments of life, and as to the relation of life itself to developments from it that establish a totally distinct unity and character.

Our only way as to epidemics is to live up to the light we have, to adopt measures which have seemed and still seem to be effective, to rely upon the great principles of cleanliness, natural law and the use of remedies which give apparant relief. In the meantime we propound working hypotheses oftener than we adopt, theories, and practice upon facts in evidence rather than upon a course of treatment which this or that doctrine would require. For instance, we do not drop the doctrine of heredity because apparently inconsistent with the doctrine of an inhaled or inoculated bacillus as an only cause. The physician and the sanitarian, while alive to all thought and intelligent guess-work, are more alive to that system of dealing with disease, or its prevention, which gives the best results and which shows administrative skill.

III.—THEORIES AS TO DISEASE AND ITS ORIGIN COMPARED.

There has always been so much room for speculation as to the causes of disease that it is not wonderful that medical hypotheses are the besetting sin of leaders in medical thought. It seemed almost necessary that a Boerhaave should have a medical explanation of his own to support his fame and his successes; that Cullen should have his pet theory as to fevers and inflammations; and that Rush should found his active treatment on some original therapeutics of his own. The present age easily accounts for all these speculations by the real ignorance which existed as to physiology, pathology and therapeutics, and congratulates itself that the doctrines of the present era are founded on solid facts, logical reasoning and intelligent practice. But it well behooves us to remember that both knowledge and activity incline to speculation. In fact, medicine, both as a science and an art, was

never so speculative as now. It was never so full of theories and of working hypotheses which are too soon accepted as real knowledge. If we have not astrology and mysticism and superstition to deal with, we have rationalism mixed with our observations and empiricism cloaked under imperfect experiment and experience. Our physics gets easily mingled with metaphysics, and ever and anon the doctrines of this or that specialist obtains sway. This led Dr. W. Collins, in a recent address before the Abernethian Society of London, to say "that medical philosophers are few and far between, and the tendency of the present is to narrow rather than widen the basis of scientific culture in the profession."

A passing example of this variety of speculative belief, or of asserted doctrine is furnished by the neuro-humoral theory of Heine and Brücke, the cellular theory of Virchow and the vascular theory of Cohnheim as to the cause of inflammation. The neuro-humoral theory claims that the circulatory disturbance depends on the contraction of the afferent arteries of a part reflexly called forth by the excitation of sensory nerves or on a reflex relaxation and dilatation of the arteries. The vascular theory of Cohnheim, which is the more recent, explains the whole process of inflammation on the assumption of an alteration, a molecular change of the vessel walls. He claims that neither the blood, the vaso-motor nerves or the surrounding tissues are primarily at fault. His views are ably set forth in his pathological lectures, published by the New Sydenham Society, 1889, and are such as have commanded large attention: "The cellular theory of Virchow, which has long enjoyed such wide acceptance, teaches that the 'genuine central point of the entire process must be sought in the tissue cells of the affected part. These are supposed to swell and enlarge on exposure to the inflammatory irritant and then to give birth to the new cells, the pus-corpuscles.'" Although this theory is not so fully accepted as formerly, yet it is easy to see how it mingles with and controls newer theories. Recently Virchow, in an elaborate paper, has re-asserted its chief contention and maintains its most essential features.

As we turn to the more recent discoveries in medical biology, we have the Germ theory so far dominating all others as quite to

obscure them, except that it still fully recognizes the cell and specializes the *inflammatory irritant* which the theory of Virchow pre-supposes. But, with this last theory before us, it is worthy of note what rejection it has from the few, what modification it has by reason of its limitations and what different forms of speculative statement or positive assertion prevail among those who accept it in general. As an example of the first, we refer to "A History of Epidemics in Britain," by C. Creighton, M.D., M.A., Cambridge University Press, 1891.

A reviewer, not in sympathy with his views, speaks of it thus: "It is not only a monument of industry and erudition, but is marked throughout by a scientific discrimination strongly contrasting with the credulity of some previous workers in the same field. * * * It is significant that from the first page to the last there is no mention of or allusion to bacteria. * * *"

It would be a labor lost for us to enter here on a defence of bacterial pathology, but *fas est ab hoste doceri*, and we frankly admit that the author has brought forward much evidence from which the reader may learn to modify, or rather to perfect, his theories. Without bating one iota from our belief in the essential connection between bacteria or their products and disease, we may—indeed we must—with him, recognize evolution as a factor in the etiology of even the most specialized of these diseases, since the alternative hypothesis of their origin in separate creative acts is at once improbable and utterly unscientific. Reading thus between the lines, and interpreting "the gradual transition of one form of disease into another, with the rise of new diseases *appropriate* to new material and social conditions" as processes of evolution whereby bacteria acquire new characters under altered surroundings, we shall find his views on the relations of typhus fever and plague, of dysentery and yellow fever, and, though more speculative, of ecthyma and small-pox, in the highest degree suggestive and fraught with instruction.

As to leprosy our author ridicules the notion of its having been imported from the East, and "finds its origin in the use of coarse and unwholesome food; especially of decomposing and ill-cured flesh or fish, together with 'misery' of every kind."

So, Dr. Creighton's theory of the origin of plague virus is, "that while filth and famine tend to generate spotted typhus fever,

the bubonic plague has constantly been associated with cadaveric pollution of the soil." He plainly shows that in "1667 it abruptly and unaccountably disappeared; certainly not in consequence of the Great Fire, since it has been far more severe in the out-parishes than in the city, and in some provincial towns than in the metropolis itself." He adduces also the sweating sickness, which first appeared in England in 1485 and vanished from the earth in 1551, as alike in its etiology and pathology inexplicable by any of the recent doctrines of causation.

As a specimen of modification of views we refer to another recent book, "History and Pathology of Vaccination," by Edgar M. Crookshank, M. B., Vol. I. and Vol. II; London, H. K. Lewis, 1889. Here we have a book by a learned authority which through all its pages gives evidence of most thorough and accurate research. Yet this distinguished professor of bacteriology throws no light upon the etiology of small-pox, and, although pursuing his subject according to the rules of scientific method, without regard to actual experience, arrives at the conclusion that there is no scientific support for vaccination which will ere long fall into neglect and into ultimate rejection. It may well be said as a fact resting on better proofs that "such statements are entirely opposed to universal experience; to experiences both of prevention of small-pox and of mitigation of its attacks; to experiences which belong to every quarter of the globe and which are far more to be trusted than the theories of comparative pathology, however suggestive, and however interesting these may be."

But we turn now to note what varied forms of speculative statements or assertion prevail among those of us who *accept* in general what is termed the germ theory of disease. This is so ably presented in the Croonian Lectures on the Progress of Discovery Relating to the Origin and Nature of Infectious Diseases, delivered at the Royal College of Physicians, London, by J. Burdon-Sanderson, M.D.Ed., F.R.S., etc., that we need only to give very briefly a few illustrative examples. From the view that contagium is particulate rather than chemical and from the old theory of zymosis we have advanced to the view that all inflammation is infective and that microphytes are the efficient cause. Then we find that "ordinary saprophytes are not them-

selves to^xpic, but act by the to^xpical products to which they give rise in the soil in which they grow; if that soil is wanting the products cannot be developed." So what is biological in its beginning is chemical in its results, in other words "the proximate cause of inflammation is always chemical."

Then we have the important and more recent view that "living tissues and fluids of the human and animal body possess, in a greater or less degree, the power of arresting the development of certain disease-producing microphytes, and that certain chemical products of microphytic vegetation impair this protective power, and at the same time inhibit local inflammatory reaction." In the contention between the offices of the blood serum and the phagocyte, we are easily reminded of the humoralists and the solidists. Many new views too are asserting themselves as to the virulence of microphytes as affected by environment, so that such remarks as that filth, etc., never originates small-pox or scarlet fever, do not announce as a law that there is no such thing as a new disease dependent for its existence on surroundings.

Again, many are entertaining the view that different microphytes may produce the same disease, or that the same microphyte is subject to modification, in virulence and in its products, and that disease may be influenced by the quality as well as by the quantity of the invading irritant. Attenuation or mitigation with all its wonders has various shades of belief, and ranges strangely from insusceptibility or immunity to the production of modified forms of disease.

No longer is the microphyte looked upon as always our enemy, but there are wide fields of excursion in showing the necessity of such forms of life and multiplied cautions as to germicides lest in pulling up the tares we destroy the wheat, lest in our zeal to kill a specific microbe we also kill others in which was the life hope of the individual man. Then again, while spontaneous generation is no longer taught, we are not frightened as to the suspicion of scepticism by vindicating evolution as applied to the origins of disease and asserting that what are practically new diseases appear, or re-appear, to a degree independent of the characteristics of an original microphyte. The writer now finds views presented by him years since, and then regarded by most

as exceedingly imaginative, accepted as at least in the line of working hypotheses.

We may yet come to know that the flora and fauna perceptible to our senses have their analogies in this infinitesimal world; that there are sports, and hybrids, and mongrels, some very transient, some fertile for a time, and others becoming so specialized as to originate and maintain new diseases, or perhaps, after a long period, give way and cease to exist.

Thus we note a few specimens of the many hypotheses that here and there are springing up, many of which can not be set aside without further inquiry. They must serve as a caution to those who would speak of the germ theory as if it represented a confirmed doctrine, or who would put less value than formerly upon that experience which must ever constitute the real and successful practice of either medicine or hygiene.

Once again must we urge that we must not speak of doctrines as settled which are only strongly entertained. We must use what facts we have as the nucleus for very many related facts, for arrangement and analysis, and insist upon the rigid rules of evidence. Thus only will plausible hypotheses vanish and we secure the survival of the fittest, which means the survival of the truth.

Summary of Reports From Local Boards,

AND LISTS OF MEMBERS AND HEALTH INSPECTORS, WITH
ABSTRACTS FROM MOST OF THE REPORTS, AS SUM-
MARIZED AND ARRANGED BY
A. CLARK HUNT, M.D.

We furnish the usual summary of reports from Local Boards as sent to us about November 1st of each year. The following is the schedule:

SUBJECTS FOR REPORTS.

- | | |
|---|---|
| A. Location, population and climate. | N. Almshouses, hospitals and other charities. |
| B. Geology, topography and contour. | O. Police and prisons. |
| C. Water-supply. | P. Fire-guards or escapes. |
| D. Drainage and sewerage. | Q. Cemeteries and burial. |
| E. Streets and public grounds. | R. Public health laws and regulations. |
| F. Houses and their tenancy. | S. Registration and vital statistics. |
| G. Modes of lighting. | T. Quarantine or care over contagious diseases and vaccination. |
| H. Refuse and excreta (how managed) | U. Sanitary expenses. |
| I. Markets. | V. Heat and ventilation for dwellings. |
| J. Diseases of animals. | W. Prevalent diseases of the year. |
| K. Slaughter-houses and abattoirs. | |
| L. Manufactories and trades. | |
| M. Schools and school and other public buildings. | |

Other subjects may be named under X, Y, Z. The subjects may thus be referred to by the letters.

If the sheet provided is not sufficient, add others, marked with the letters which designate the topics treated.

Some of these subjects are so fully treated in former reports as not to need repetition. As to others there have been some changes or lack as to details. This Report is not mere formality. It should actually state facts and conditions. It should especially report what has been done the last year as to the prevention and abatement of nuisances, as to house-to-house inspection, water-supply, cesspool

management, garbage collection, plumbing oversight, examination of stations, schools, public buildings, separation of sick in Health Board hospitals, reports of disease and various other items.

The faithful inspector or member of a Health Board, if he will read this or the record of former years, will not fail to see the kind of work that good Health Boards attempt and secure and the failure of some others.

The Township Boards may not be so conspicuous as City Boards, but in dealing with special outbreaks of disease, with the houses and yards of village streets and with various other items, often have much to do or much to neglect. Instances are often before us of valuable service by these Boards.

While selecting with care from the large material furnished us, lack of space or the substance of former reports leads us often to publish only brief abstracts and place the rest on file for reference.

We urge upon all Local Boards promptness and care in these yearly returns.

We send with the October blanks a circular of directions, and from the returns received often can judge still more than before what is being done. We generally send the blank to the city health officer or assessor, because these are most in correspondence with the State Board. We are glad also to send a blank to the secretary or other member, where this is requested. We at least wish it to reach the one who will report to us the fullest statement and the real truth. We have passed the period of mere talk about the importance of hygiene and good advice.

It is now the period for definite and advanced methods of local sanitary administration. We earnestly urge upon our Boards an early spring meeting, a year of exact plans and executions and an annual report of just what has been done, of failures and of the most pressing needs. While the great work is thus local we are ever ready, by correspondence, by technical advice and by the visit of inspectors, to assist in this important work of preventing preventable disease and of moderating or checking its effects when it occurs.

REPORTS OF LOCAL BOARDS OF HEALTH BY TOWNSHIPS AND COUNTIES.

AS SUMMARIZED AND ARRANGED BY A. CLARK HUNT, M.D.

ATLANTIC COUNTY.

ABSECON TOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Clayton L. Higbee, George B. Lutts, Japhat Adams, James B. Townsend, Tower Townsend, Elmer C. Bates; Sanitary Inspector, Dr. E. H. Madden; D. H. Bates, Health Inspector. Post-office address of all, Absecon.

Population of the town about 600. Water-supply is provided by wells of good quality. All cellars dry. No sewers. Houses have no basements. No tenement-houses; no slaughter-houses; no factories. The Board has passed ordinances.

FRANLLIN GARTON,
Assessor.

ATLANTIC CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Josiah H. Borton, President; Julius Coty, Harry S. Scull, William G. Hoopes, Jr., William B. Loudenslager, Jacob H. Leedom, Treasurer; M. D. Youngman, M.D., Secretary; Alfred T. Glenn, Health Inspector; P. J. Hughes, Assistant Inspector; A. T. Glenn, Jr., Clerk. Post-office address of all, Atlantic City.

Water-supply, as heretofore reported upon, has been of ample quantity, and is unsurpassed in quality. The connections with our improved sewerage system have gone steadily forward, at the rate of 15 to 20 per month throughout the year.

Our streets have been the principal theme of public discussion the past year, the advisability of paving them, the material to be selected, etc., being discussed, *pro* and *con*, in a very interested manner by both residents and visitors. As a start, one avenue (Vermont) is now being macadamized. All streets are freshly graveled, spring and fall, and carefully swept and scraped throughout

the year. And many of our people are opposed to paving of any kind.

Houses have no basements or cellars below the surface of the ground. It is the rule here, now to build houses with brick foundation, walls of 6 to 10 feet high, so that a basement above the ground is secured. A great improvement has been manifest in the class and character, to say nothing of the expensiveness, of the buildings that have been erected within the past few years; many beautiful private residences, with all the latest sanitary appliances, have been among the number. The Board keeps at its office a record, open to the public, of the sanitary condition of all hotels and private houses.

There have been very few contagious diseases. Cases which occur are all carefully quarantined or held under surveillance, with prompt and effective disinfection of the premises.

The Board has gone on struggling with low lots, and alleys below grade, and has accomplished much. Titles in dispute, and non-residence of owners, in several instances, have added difficulty of procedure and vexation of spirit.

The Board again appointed, during the summer season, a special inspector of the ocean front, which gave general satisfaction.

During the year the Board has been greatly interested in the "garbage question," our present system having proved inadequate for the enormous growth of the population. The city council has, by ordinance, passed the matter over to the control of the Board, together with the appropriation, \$18,000, and the Board has visited several cities, among them New York, Philadelphia, Providence, R. I., and Washington, D. C., and investigated several improved systems of garbage destruction, utilization, cremation, etc.; among others, the Simonin, the National Sanitary Company, the Freusil Pan, the Eugle, and Dowling furnaces. As yet nothing has been decided upon.

Meetings of the Board are held weekly during the months of May, June, July, August and September, and every two weeks during the remaining months. The meetings are always well attended, and many special meetings were held during the past year. The Board is an active power in the city, receiving the hearty support of the people. The office of the Board is open daily from 8 A. M. to 6 P. M., and is in charge of a clerk to attend to all affairs of the Board.

M. D. YOUNGMAN, M. D.,
Secretary.

BUENA VISTA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dominick Corsegia, Buena Vista; George B. Cake, Buena Vista; Douglas Reed, Buena Vista; William Chew, Buena vista; C. W. Jones, Assessor, Richmond.

There is nothing to add to former report. The health of the township is generally good, no prevalent disease. Township Committee organized as a Board of Health.

C. W. JONES.

EGG HARBOR CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George F. Breder, William Mueller, Lawrence Berchtold, Henry G. Regensburg, Valentine P. Hofmann Secretary. Post-office address of all, Egg Harbor City.

For the more efficient drainage of the city, the Common Council passed, on July 1st, 1893, an ordinance to locate and construct a main sewer. Initiatory steps have been taken to condemn the necessary lands.

From October, 1892, to June, 1893, sixteen cases of diphtheria were reported, of which four died, and of eighteen cases of scarlatina, one died. The Board took the necessary precautions to isolate the cases.

Pursuant to the State Laws, the Board enacted an ordinance on June 26th last, requiring the registry of all cattle kept within the city limits, which has generally been complied with.

The public have met readily any demands which we have made upon them for the observance of any rules and the abatement of nuisances.

Regular meetings were held punctually, besides a number of special meetings.

V. P. HOFMANN,
Secretary.

EGG HARBOR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. C. Fifield, Bakersville; J. G. Corson, Bargaintown; Samuel N. Smith, English Creek.

W. H. LEEDS,
Assessor.

GALLOWAY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Hanselmann, President, Cologne; Isaac Strickland, Oceanville; Joseph M. Collins, Port Republic; M. S. Lyon, medical member, Absecon; A. H. Higbee, Secretary, Leeds Point.

Water-supply from wells and cisterns. No public supply. No sewers. No known diseases. No slaughter-houses. Phosphate factory; no nuisance. Mumps have prevailed. The Board met for organization in March, and elected a medical member. Met in June to take action regarding a mad dog which had bitten several other dogs; said mad dog was killed and ordered buried by Board; also requested Township Clerk to issue proclamation concerning mad dogs, which was promptly done. All bitten dogs were killed and the disease stamped out.

A. H. HIGBEE,
Secretary.

HAMILTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James M. Blaisdell, John V. Beckett, David Eberhardt, Mulford Hoover, Lewis Cranmer, H. C. James, M.D., Health Inspector. Post-office address of all, Mays Landing.

There has been a considerable increase in the population of Hamilton township since our last report. Two new manufactories have started—a shoe factory and a brick plant; large tracts of land have

been cleaned, streets laid out and new houses built. The Board of Health has been called upon several times during the last year to abate existing nuisances.

During the month of December scarlet fever broke out in public school, some twenty cases occurring. Most of the cases were of a mild form; two of the cases were of an unusually severe form, and both cases died.

The Board of Health acted promptly, closing the school and thoroughly fumigating and cleansing the building. June, July and August, a large number of cases of acute dysentery occurred in the adults and a large number gastro-intestinal troubles in children.

During the months of September and October whooping-cough was prevalent among children.

H. C. JAMES, M. D.,
Health Inspector.

HAMMONTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. S. Newcomb, President; A. J. Smith, Secretary; Edward North, M.D., Physician. Post-office address of all, Hammonton.

There is nothing new to report this year. The sanitary condition of the town is as good as possible. There has been no epidemic here in the last year, and we have not had as much sickness as for several years past. The town is thoroughly inspected several times during the year, and any nuisance or anything detrimental to health is immediately removed. There has been but one complaint to the Board this year. That was attended to and found to be without cause. Our people are nearly all intelligent and do everything in their power to carry out the advice of the Inspector.

EDWARD NORTH, M.D.,
Health Inspector.

LINWOOD BOROUGH.

Report not received in time for printing.

MULLICA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Reuben Brooker, Elwood; Charles Saalman, Egg Harbor City; George W. Huntsman, Nesco; Dr. H. W. Smith, Inspector and Physician, Elwood; John T. Irving, Secretary, Elwood.

Our Local Board of Health was organized May 27th, 1893, and is now in fairly good working order.

This (Mullica) township is located in Atlantic county, 20 miles northwest of Atlantic City, between the Great and Little Egg Harbor rivers, which gives us a natural drainage into these streams. The soil is porous and readily absorbs the rains, so that little stagnant water can be found here. The water-supply is entirely from wells and we have none but surface drainage. The largest village in the township is Elwood, with a population of 500. Pleasant Mills, Nesco, Weekstown, and the "Agricultural District" (population almost exclusively Germans) are the other settlements within the township borders. There are no slaughter-houses or regular markets. Fruit farming is the principal industry, although at Pleasant Mills there is a large paper manufactory, which employs 25 or 30 persons. The school-houses are frame buildings, well lighted and heated and kept in good sanitary condition. The dwellings are heated by wood and coal stoves. The Board of Health have a full and complete code of laws which will probably cover every emergency. We have no regular hospital or place to isolate contagious or infectious diseases, but in case of serious epidemic could probably secure such. Since the organization of the Board there have been seven cases of diphtheria, four of which (all children) proved fatal. The disease was confined to two families, who were closely related. The dwellings have been thoroughly fumigated and disinfected and no new cases have appeared since August. The first case was doubtless contracted in a town outside the township. The township has always been most remarkably free from epidemics and is considered one of the healthiest locations.

JOHN T. IRVING,
Secretary.

PLEASANTVILLE BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Isaac Andrews, Pleasantville; R. M. Sooy, Pleasantville; L. H. Barrett, Chairman, Pleasantville; Richard Risley, Pleasantville; R. I. Risley, Smith's Landing; Isaac Collins, Smith's Landing; Samuel Bartlett, Secretary, Pleasantville; R. M. Sooy, M.D., Health Inspector.

There has been in the past year very little or no variance in the subjects that have before been written about and published in the yearly report.

There has not been this year a single report of any contagious, infectious or miasmatic disease. While being free for years past from any epidemic or endemic of these diseases we have usually a few sporadic cases.

There was one complaint made to the Board of a nuisance being maintained in Egg Harbor township close to the borough line, caused by garbage compost. The case was reported to the Township Board of Health and was speedily and effectually abated without trouble. Some of the garbage made by Atlantic City is still used by some of the farmers. Their manner of using it now seems to give little or no trouble. It is brought daily in scows from the city and placed in trenches, then covered with salt hay, lime, marsh mud, then earth, and thus kept till cool weather, when it is taken out and used as a fertilizer. This manner of using it not only prevents noxious odors but the flies, besides keeping it nearly as free from decomposition as when placed there.

Our animals have also been free from disease this year.

The Board of Health holds regular meetings and all the members seem to be alive to their duty and their responsibility for the sanitary care of the place and people.

DR. R. M. SOOY,
Health Inspector.

BOROUGH OF SOMERS POINT.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. F. Kappella, Mark S. Somers, Job W. Steelman, Frederick Stuth, Wm. H. Keates, H. H. Vansant. Post-office address of all, Somers Point.

Somers Point, situated on the west side of Great Egg Harbor inlet, bay and river. Population, 400. Contains 1,600 acres. Water from springs, soft and clear. Drainage, surface. No malaria and no swamps near by. Houses with cellars used for storage, and they are in a fair sanitary condition. No tenement houses. Cesspools, half cement and half surface. No slaughter-houses. One school-house, with good sanitary condition. Canvass fire-escapes to hotels. Two cemeteries. No quarantine at present. Stoves and heaters for heating purposes. The Board has not passed any ordinances this year. Sanitary condition satisfactory, and in case of an epidemic the Board stands ready to protect the borough.

N. D. VAUGHAN,
Clerk.

WEYMOUTH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. I. Parker, Sr., Tuckahoe; Anderson Campbell, Tuckahoe; Anderson Bourgeois, Estellville; W. H. Campbell, Assessor, Scullville.

BERGEN COUNTY.

BERGEN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Frederick Kohbertz, Chairman, Woodbridge; Adolph Kruger, Assessor, Secretary, Carlstadt; F. J. Feitner, Moonachir (P. O., Carlstadt); John McMahan, Wallington (P. O., Carlton Hill). A. Richter, M. D., Health Inspector, Carlstadt.

Bergen township was created by an act of the Legislature of 1893, and is a part of Lodi township, and contains about 3,100 acres. Population, about 3,000.

Water-supply is given to some parts of the township by the Hackensack Water Company, but the largest part has to rely on wells and cisterns. About 100 houses are supplied by the above-mentioned company. Water is good, and no complaints are made about quality or supply. There are a few wells, and the largest part of our people have cisterns.

We have no sewers, but cellars are generally dry. We have swamps near us, but are troubled very little with malaria.

Our houses are almost universally without basements. The cellars are used for storage of vegetables. No more than twenty tenement-houses with more than two families. We have no house inspection.

Of diseases, we have had but very little. A few sporadic cases of diphtheria have lately been reported to me.

We have no slaughter-houses, nor any new factories, and no nuisance from any such.

Our Board of Health has passed a code of ordinances.

Returns are received regularly, except from the part of our township called Wallington, which lays adjoining Passaic City, and the doctors and undertakers, etc., all residing in said city return their certificates to the Registrar of Vital Statistics there, and although I have several times requested said gentleman to send me the returns belonging to our township, he fails to do so.

Our Board, through its members and the Inspector, have been very attentive to all complaints received, and have had no trouble, as a notice to the owner of any house has been sufficient to have any nuisance existing therein abated.

We have monthly meetings of our Board, where we receive complaints, and attend to all routine matters.

Respectfully submitted,

ADOLPH KRUGER,
Assessor.

BOILING SPRINGS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William McKenzie, Rutherford; Jas. Van Roden, Rutherford; Jas. P. Edwards, Rutherford; William W. Vandyke; M. Tygert, M.D., Health Inspector.

The sanitary condition of the township has been excellent during the past year, with the exception of a slight epidemic of scarlet fever, which by strict quarantine we succeeded in keeping under control. There is nothing new to add to last year's report. The expenses for sanitary matters have been comparatively little.

M. TYGERT, M.D.,
Health Inspector.

ENGLEWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Oliver Drake Smith, President; M. E. Springer, Secretary; James Harris, Henry J. Brinkerhoff, Hardy M. Banks, M.D.; Hugh Smith, Health Inspector. Post-office address of all, Englewood, N. J.

Having carefully examined my report dated October 5th, 1892, in which the subjects named above were answered as fully as possible, I do not see that I can add anything thereto. There have been no changes or happenings that need to be mentioned in this report.

The general health has been good; the local board is trying to do its duty in looking after the public health, and the machinery works so smoothly that everybody is satisfied.

M. E. SPRINGER,
Assessor and Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter S. Winter, Wyckoff; Albert Lozier, Campgaw; George C. Demarest, Oakland; John W. Ackerman, Oakland, Assessor; E. W. Hamilton, M.D., Oakland, Health Inspector.

There is nothing new to report more than to say that the health of the township has been remarkably good for the past year. The Board has not been called out during the year. No factories or slaughter-houses that are a nuisance.

JOHN W. ACKERMAN,
Assessor.

HARRINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. Lindemann, President, Closter; C. N. Duni, Secretary, Closter; Joseph F. Mount, Closter; R. B. Hearn, Tappan; L. B. Parsell, M.D., Closter.

One public school building; brick; two stories; three teachers. No large cemeteries in the township. Ordinances passed to second reading,

and will finally adopt on October, 13th, the Model Code furnished by your Department for Township Boards. Malaria in mild form and minor ailments have prevailed. It has been an unusually healthy year. Nothing has been done aside from the adoption of the Model Code, except routine business.

C. N. DURIE,
Secretary.

HACKENSACK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. S. C. Wells, President; B. B. Barkman, Treasurer; D. G. Jeffers, Secretary; C. F. Adams, M.D., F. H. White, M.D., L. Perrot, C. Conklin. Post-office addresses of all, Hackensack.

The healthfulness of Hackensack continues, and with the exception of a few sporadic cases of scarlet fever and diphtheria, we have been free from contagious diseases. The Board adopted measures to properly care for any probable cases of contagious diseases, and during the summer months the sanitary inspector was active in removing any probable causes of infection. The Board have held their regular meetings and have promptly dispatched all business requiring their attention. The plumbing inspector has continued his diligent supervision of the plumbing ordinance.

D. G. JEFFERS,
Secretary.

HOHOKUS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles P. Young, Mahwah; William Wilson, Allendale; David F. Smith, Ramseys; William Thurston, Ramseys; Wm. H. Murray, assessor, Ramseys; D. S. Wanamaker, Ramseys.

We have nothing to report.

C. P. DEYOE, M.D.

LODI TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Clausen, Little Ferry; Henry Lemmerman, Hasbrouck Heights; John Haggerty, Lodi; John Van Bussum, Hasbrouck Heights; Dr. Davenport, Garfield.

The village of Hasbrouck Heights is supplied by the Hackensack Water Company; quality of the water, fairly good. The river receives no sewerage above the point of supply. Other parts of the township depend on wells and cisterns.

There is no general drainage. Cellars are usually dry. Ditches have been opened in the meadow adjoining the New Jersey and New York Railroad.

Basements are the exception. Cellars used for storage. Houses generally occupied by one family. There is no yearly house-to-house inspection.

There is no general sewerage. Many of the houses have cesspools built with open bottoms, the contents used to fertilize the soil.

There has been no disease prevalent among animals. The Assessor in his annual visits does not inquire into the loss of animals nor into contagious diseases.

There are no slaughter-houses or abattoirs.

There are no new manufactories. One complaint has been made against a factory in the village of Lodi.

The Board of Health has made every effort to do its duty faithfully. Returns, although sometimes slow, have been carefully forwarded.

The Board has kept a general supervision over the health of the township, trying to remove all known cause of disease and to prevent contagion when single cases of that character have occurred.

JOHN VAN BUSSUM,
Secretary.

MIDLAND TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John G. Zabriskie, Chairman, Rochelle Park; Nicholas R. Voorhis, Cherry Hill; Casper T. Zabriskie, Ridgewood; Nicholas G. Hopper, Secretary, Ridge wood; Herbert S. Jones, M.D., Oradell, Health Inspector.

The Board having organized early in the spring appointed a day for the hearing of complaints. A few complaints, of a trivial nature, were made and those were looked after immediately.

The Inspector has been called upon once during the year, in regard to a minor nuisance, which was adjusted at once.

The general health has been remarkably good. In other respects our report is similar to that of previous years.

NICHOLAS G. HOPPER,
Assessor and Secretary.

NEW BARBADOES TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Andrew Diedrick, Richard P. Paulison, Edward Schmults, Fernando Vreeland, Assessor; E. Howard McFadden, Health Inspector. Post-office address of all, Hackensack.

Our Township Board of Health was re-organized April 11th, 1893, and up to this present time we have had no complaints of any kind. The health of the township has been very good; we have not had any epidemics and very few cases of contagious diseases. The two schools in our township are in very good sanitary condition, the attendance is good and the majority of the children have been successfully vaccinated.

FERNANDO VREELAND,
Assessor.
E. HOWARD MCFADDEN,
Medical Inspector.

ORVIL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Charles W. Badeau, Allendale; O. W. Jennings, Saddle River; E. D. Leary, Hohokus; Henry L. Hopper, Waldwick; Dr. Badeau, Health Inspector.

I do not know of anything to report. The health of the people in the township has been very good the last year. No contagious disease among cattle. No complaint to Board of Health.

ABRAM N. ACKERMAN,
Assessor.

PALISADES TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. H. Brinkerhoff, Bergenfields; D. D. Blauvelt, Assessor, Secretary, Schraalenburgh; Theo. L. MacIntyre, Tenafly; J. B. Christie, Riveredge; J. B. W. Lansing, M. D., President and Inspector, Tenafly.

No regular Sanitary Inspector, other than the Health Inspector, has been chosen in this township, which has only the one Board of Health.

The source of water-supply is the Hackensack river, and its tributaries. The plant is located at New Milford, and the mains reach us from Englewood, where a new pumping station has been erected during the past year. Mains were laid in our principal streets about three years ago. The plant is controlled by the Hackensack Water Co., a private corporation.

The water is usually regarded as satisfactory, and is uniform in its character. The pipes are blown off at quite regular intervals.

The Tenakill, a good-sized stream, which passes through Tenafly, empties into the Hackensack river above the source of supply. It is a matter of serious regret that this stream, the Tenakill, is in a deplorable condition. Owing to a private dam across the stream at Demarest, which has existed for years, the water has become almost stagnant, and most of the time is foul-smelling, dark-colored and unfit for sanitary purposes. The natural fall or current of the stream which in former years was sufficient to keep it clear of deposit and decaying vegetable matter has, since the erection of said dam, been more and more interfered with year by year, until at present there is scarcely a perceptible flow to the water, which has been dammed back, forming acres of swamp land right in our town, where formerly the ground was capable of cultivation.

The bed of the stream contains large quantities of decayed vegetable matter from one to three feet deep, the accumulation of years. A greenish film is present much of the time on the water's surface, and at times a most disagreeable odor is present. The small tributaries are filling up, and require yearly expenditure of money for cleaning, which at best is only temporary, as the black, oozy, slimy sediment quickly backs up and obliterates all the work accomplished.

It is the sense of this Board that immediate measures should be introduced by the proper authorities, whether the water company, the State Board of Health, the Township Committee, or our Local Board of Health, to compel the lowering of said dam and the removal of all other obstructions to this stream, which forms so large an element of our water-supply, and an appropriation made to keep it in a good sanitary condition. A few instances have been reported where sewerage flows directly into this stream. The public health is jeopardized by the presence of such conditions as this stream presents.

Our citizens are becoming dissatisfied in yearly subscribing money to clear out a branch of this stream when, by permitting the dam to exist, our labor and money go for naught.

The majority of families depend on wells for drinking purposes. Cisterns are seldom used. The Board has no list of houses that do not use the Hackensack water.

There is no system of sewerage, except cesspools. Cellars, for the most part, are dry, except in the valley, where, after heavy rains, owing to the insufficient outlet along the Tenakill, they become temporarily flooded. The water level is sufficient if the fall of the stream were left natural and unobstructed. A certain number of swamps do exist, but could be drained by the Tenakill and its branches.

A large percentage of cesspools are not cemented, but walled up dry. They are emptied by private parties, and the contents used for fertilizing purposes.

We have been, happily, free from epidemics, and the general health of our community has been good. A few isolated cases of scarlet fever and diphtheria have occurred, but confined to the house of origin. In each case a semi-quarantine has been effectual.

We have no slaughter-houses or new manufactories.

Our Board of Health on August 5th, 1893, adopted the regular code recommended by the State Board of Health.

Our Board has been unusually active during the past summer. All reported nuisances have been carefully investigated and abated.

As long as it was deemed advisable, we held monthly meetings, but at our last meeting we adjourned subject to the call of the president.

J. B. W. LANSING, M. D.,
President and Inspector.

BOROUGH OF RIDGEFIELD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

General Alexander Shaler, President; Samuel E. Stohr, Secretary; H. A. Wilson, Joseph Jaraczewski, A. Ertle.

The Borough of Ridgefield is located in the southern portion of Ridgefield township, Bergen county; area, 4 square miles; population about 500—about 4 per acre; climate similar to that of New York city. About one-half of the borough is salt marsh, balance upland. Sandstone, brown and gray predominate; some gravel and trap-rock. Eastern boundary is the Palisade Ridge; western, Hackensack valley; southern, Fairview, Ridgefield township; northern, Palisade Park. Residences are mainly located on the Ridge, which is a spur of the Palisade Ridge.

Water-supply introduced in 1882 by the Hackensack Water Company. Houses located on main and lateral lines use that water. About ten per cent. of the population depend upon wells, and a list of such is on file with the Board. The water is clear and seemingly pure—never discolored. No system of drainage other than that afforded by sewer. Cellars, generally. A private sewer is in the main avenue—8-inch glazed sewer-pipe, length about 2,000 feet; average fall 3 feet per 100 feet. Discharges into a creek which empties into the Hackensack river.

Streets macadamized, gravel and stone. No public grounds. Houses all private, except one which is arranged for three families. All have cellars, but no basements. House-to-house inspections have not yet been adopted. Springfield gas machines and kerosene oil lamps furnish light. About 17 houses are connected with the sewer. The others, 60, use cesspools, which are generally stoned and cemented sides and open bottoms. Emptied by owners and contents buried.

We have no market. No diseases of animals during the past year. No slaughter-houses or abattoirs. A fertilizer factory is within our limits, but not now in operation. One public school-building—no other public building. No alms-house, hospital nor other public charity. One constable. One prison in the borough. No fire guards or escapes. One cemetery, not incorporated. The Board has adopted a sanitary code. A record of vital statistics is kept. Reports and returns are promptly and regularly made to the Board. No provision

for quarantine nor the care of contagious diseases. The unvaccinated pupils (about 30) of the public school were recently vaccinated on the suggestion of the Board. No prevalent disease during past year.

The Board has during the past year caused a general cleansing of cesspools where found necessary, the removal of house drains from the public highway, also the removal of a house drain discharging into a fresh-water stream which empties into a pond, the source of ice supply to the community.

S. E. STOHR,
Secretary.

RIDGEFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Albert Rerekes, Ridgefield Park; Joseph Schlosser, Fort Lee; Peter Spindler, Nordhoff; Joseph Huger, Health Inspector, Fort Lee; Thomas F. Mallon, Assessor, Fort Lee.

The conditions as to health have been during this year substantially the same as last. There have been some complaints made to the Board of Health, but upon notice to owners they have been abated.

There have been no local epidemics of any kind. But few contagious diseases, such as scarlet fever and diphtheria, in which cases the places were quarantined as soon as discovered.

THOMAS F. MALLON,
Secretary.

RIDGEWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. Nickerson, President, Ridgewood; Thomas Terheun, Secretary, Hohokus; Abm. G. Hopper, Treasurer, Ridgewood; H.W. Hales, Health Inspector, Ridgewood; Dr. J. T. DeMund, Medical Inspector of Board of Health, Ridgewood.

The health of the township has been about the same as previous years. Few complaints have been made, all of which have been promptly looked after.

THOMAS TERHEUN,
Secretary.

BOROUGH OF RUTHERFORD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. E. Armstrong, M.D., President; Charles Burrows, Secretary; J. C. Sares, Treasurer; H. H. Hollister, M.D.; W. E. Sturm; C. Collins, Inspector. Post-office address of all, Rutherford.

One thousand acres. Population, about three and one-half to the acre. City water supplied by the Hackensack Water Company, wells and cisterns. Main sewer outlet laid; some connections made, otherwise cesspools.

Three school-houses, five churches, two engine-houses, one club-house, one armory, all of which are in good sanitary condition.

Where feasible, connection with sewer system has been insisted upon.

SADDLE RIVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard T. Snyder, Paterson; Henry A. Hopper, Fair Lawn; Peter Alyea, Dundee Lake; Isaac A. Hopper, Fair Lawn; Dr. Moak Garfield, Health Inspector.

There is nothing to report from Saddle River township this year. The Board has met twice. Health of township excellent.

ISAAC A. HOPPER,
Secretary.

UNION TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Brandenburg, President, Kingsland; W. W. Taylor, Kingsland; Charles Harrington, Lyndhurst; Alex J. Davison, Secretary, Kingsland; William E. Trautwein, Health Inspector, Lyndhurst.

The water-supply is from wells and is very good. There is no system of drainage. The Hackensack salt meadows are near. Malaria has been very bad here this season. The houses here are

mostly two-story with cellars. There is a yearly house-to-house inspection. There have been no prevalent diseases this year. There are no slaughter-houses. We have three schools in good condition. There is one cemetery; it is kept in first-class condition. The public health is good. When any nuisance is complained of the Health Board orders it removed inside of twenty-four hours, or they have it done. The Health Board has had a meeting once a month this last year. There have been very few complaints this year and they were abated as soon as notified.

ALEX J. DAVISON,
Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Ackerman, Woodcliff; Albert van Emburg, Westwood; Daniel O'Mara, President, Westwood; Dr. S. J. Zabriskie, Westwood; John G. H. Knoner, Assessor and Secretary, Westwood.

The general health of this township for the past year has been unusually good, and there have been only unimportant occasions for the Local Board to take action. In fact conditions, so far, are so very favorable that a good many people question the necessity of having an organized Board of Health at all, probably on the same principle that people having escaped fires question the wisdom of insuring their property. The Board held a meeting on April 18th, 1893, for the purpose of hearing complaints. Only one complaint was made about a stagnant pool of water at Etna. The owner has promptly remedied it. Another stagnant pool, near School No. 68, has been drained. The closets at School No. 20 have been removed to a proper distance, and the old ones cleaned and filled up. There is no further complaint about the closets at the railroad stations.

The returns of vital statistics are, in most cases, prompt and satisfactory. One undertaker and one or two ministers are inclined to be a little slack.

JOHN G. H. KNONER,
Secretary.

BURLINGTON COUNTY.

BASS RIVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. Garrabrant, M.D.; Levi French, R. A. Mathis, M. W. Adams, Assessor.
Post-office address of all, New Gretna.

No changes from last year, for which you have on file a complete report. The Board has done nothing above what they did last year. The people are healthy and there has been no prevalent disease.

M. W. ADAMS,
Assessor.

BEVERLY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles E. Russ, Beverly; Robert Stuart, Beverly; John G. Hippenstiel, Delanco; Jos. B. Carter, Delanco.

The Local Board of Health was organized in March of this year, but as the general health has been good, and no complaints having been made of any one violating the health ordinances, it has not been deemed necessary to hold any meetings since the organization.

JOS. B. CARTER,
Assessor.

BEVERLY CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Doctor J. J. Currie, Chairman; Dr. B. F. Sooy, Secretary; C. F. Richardson, Geo. A. Smith, Wm. K. Vansciver, Chas. H. Peast. C. F. Richardson, Health Inspector. Post-office address of all, Beverly, N. J.

The Board has held twenty-one meetings during the year, at fourteen of which a quorum was present, and regular business transacted. There seems to have been little complaint regarding the water-supply from the Delaware, and no cases of sickness directly tracable to it as a cause. Last fall and winter a few cases of diphtheria and scarlet fever were reported, and the same were duly quarantined, and no cases appeared to have resulted from such quarantined cases.

The Board has called the attention of parents to the advisability of attending to the vaccination of their children, as a large number attending school are said not to have been vaccinated. This was done as a precaution, although no cases have been reported in our vicinity.

The attention of City Council was called early in the spring to the necessity of some definite plan for removal and disposal of garbage. Proposals were invited, but the expense involved seemed to bar any definite action. It is hoped that the question will be solved before any disease is spread from such a source. At present it is either buried, burned in the kitchen stove or removed by some who call regularly at a stated price per week.

Complaints to the Board have been investigated, and, where found justified, have been promptly remedied. The question of sewage disposal is becoming more and more serious each year, as the number of dwellings increases, for where a public water-supply goes to a house, the drainage must be disposed of. The expense of a regular sewer system probably deters the authorities from seriously considering the subject, but some time soon it must be taken up and perfected. Beverly has an advantageous grade and locality for a sewer farm, as in some other places in the State, and it may be found cheaper ultimately than the present mode of local disposal on the premises of each house.

Several cases of typhoid fever in a group of houses has caused special cleansing, and fortunately there were no deaths therefrom. In one house, not very near the locality referred to, there have been four cases of fever of typhoid type, it is alleged, within three years. After the first case the house was thoroughly overhauled, and the plumbing improved. The fourth case is now under the physician's care. The premises will be thoroughly inspected, and the source of disease discovered, if possible.

In another house three cases occurred within the year, including one death, and every precaution was taken, apparently, to make the place in good sanitary order.

But few objections have been made against complying with the requests of the Board, and they have mainly resulted from the idea that the responsibility lay elsewhere.

The Board has endeavored to avoid all harshness in their acts, and the public generally has indorsed all their proceedings.

C. F. RICHARDSON,
Inspector.

BORDENTOWN CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. H. Shippo, M.D.; Jos. L. Vansant, D. R. Brown, Fred. G. Wiese, L. D. Lebo, M.D.; I. D. Young, M.D.; H. N. Jobes, Inspector, Post-office address of all, Bordentown.

The water-supply is taken from Crosswicks Creek, near its entrance into the Delaware river, and conveyed to a reservoir, after being filtered; nearly all the houses use it, have very few wells, mostly on the back streets. There are several factories drained above where the water is pumped from, and one especially, Niedt's soap factory, is very offensive; there is always a white scum on the water for several miles from where they sewer. Our water is mostly free from discoloring matter.

The city is drained in part by a system of sewers, mostly only in the principal streets. Quite a good many cellars have water in them, especially in the spring of the year. We have a few swamps. Don't think malaria is very frequent.

Our sewers were introduced about five years ago. Our houses all have cellars. Very few tenement houses. I believe there is a yearly inspection of houses.

Majority of cesspools are cemented, and the contents are emptied by a local scavenger. The contents are generally taken to neighboring farms.

I don't think the assessor inquires into the losses of animals and contagious diseases. There is no record kept of persons keeping animals, with the exception of dogs.

Slaughter-houses are not to my knowledge inspected.

Springfield worsted mills is about the only new manufactory.

Report of contagious diseases for the year ending October 31st, 1893, as follows: Typhoid fever, 13; scarlet fever, 35; diphtheria, 20.

Sewers have been flushed twice weekly during the summer and fall months.

Health of the public better than during the year previous.

Largely through the efforts of the Board of Health the streets and gutters of the city are in better condition than in many years.

I have informed you about all that I know of the condition of the city.

CHARLES R. GARWOOD,
City Recorder.

CITY OF BURLINGTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Frank S. Carter, President; Dr. J. B. Cassidy, Treasurer; Dr. J. S. Adams, Secretary; A. H. McNeal, Esq.; Capt. Alfred Platt; Charles H. Stowell, Health Inspector. Post-office address of all, Burlington.

In my report of 1892 I stated that the Board was composed of almost entirely new men, and there never having been any minutes kept of the transactions of the Board prior to my coming into it, in September, 1892. Having no data to base our actions on, outside of the two or three printed copies of the code of the Board then in existence, it became our aim to inform ourselves as to the requirements appertaining to our several duties. The Board flatter themselves that they (with the approval and assistance of the citizens) have the city in as good sanitary condition as is possible under existing circumstances, notwithstanding many improvements may be made which will require time, money and hard work.

The city is without proper sewerage, all waste-water and excrements are run into cesspools or privy wells, which require considerable attention from our most efficient Sanitary Inspector and frequent cleaning by the owner, the work being done at the present time by night scavengers in the crude old-fashioned way of bailing out and carting away in box wagons. But at our next meeting, in December, an ordinance will be adopted to have all such work done after the most approved "odorless" manner.

Our shoe factories and other manufactories are all provided with the best sanitary arrangements. But our city officials, I must say, are very slow and neglectful as to all sanitary arrangements in and around all public buildings, more especially at the city hall and lock-up. The Board has been after them since September, 1892, with very little success, the cells being in such a vile and dilapidated condition that many a violator of the law has escaped just punishment on that account, the Mayor refusing to confine them for any length of time in such a place.

During the past year we have had but very few cases of contagious diseases reported, excepting during the month of October, when some thirty-five cases of scarlet fever were reported. Upon investigation we found it to be almost wholly confined to children attending St. Paul's

Roman Catholic school. Through the assistance of Rev. Father Griffin we were successful in preventing it, becoming epidemic.

There is one matter particularly interesting not only to the citizens of Burlington, but to every town or borough getting their water-supply from the Delaware river, and a matter seriously, or will in a very short time seriously, affect our water-supply from that source, and to which I wish to call your especial attention. That is, the running of all sewerage matter from the city of Trenton into the river. While we, at this point, use all means to prevent the pollution of the water, right at the fountain-head the city of Trenton is allowed to dump thousands of gallons of sewerage and filth every day into the very source from which thousands of people get their drinking-water supply.

The Board is composed of active business men, at all times ready and willing to give all the time and attention necessary for the health of the city. There has been held a meeting of the Board every month, with several extra meetings, for the past year. We have a regular printed code of excellent rules, which are rigidly enforced as far as practicable.

DR. J. S. ADAMS,
Secretary.

BURLINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Upton, Ezra B. Marter, Thomas McFarland, Ellsworth Mount.
Post-office address of all, Burlington.

CHESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel S. Dager, Chairman; John S. Rogers, Secretary; Joseph Stokes, M.D., Levi L. Lippincott, John B. Warrick, John R. Mason, Assessor and Inspector; Joseph Stokes, M.D., Health Inspector. Post-office address of all, Moorestown.

Our Board met and organized on April 12th, 1893, as before stated, and passed ordinances, and have met seven times at different intervals. There have been sixteen complaints made to the Inspector, all of which have been attended to promptly by the Inspector and the

Board. Our main trouble is from the citizens of the town draining out in the streets. A system of sewers is badly needed in town and the Board is doing what it can to press this matter. All the drainage is surface drainage and there are several places that need constant care or they soon become very offensive. We feel that much good work has been done and that the year has been a healthy one.

JOHN R. MASON,
Inspector.

CHESTERFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. W. Ridgway, Chesterfield; C. B. Holloway, Chesterfield; John F. Rogers, Crosswicks; George H. Warner, Chesterfield.

Water-supply entirely from wells. Drainage entirely by tile drains. Cellars mostly dry. No swamps. Few cases of malaria. Cellars, no basements. No houses with more than two families. No inspection except when called. All open cesspools. No prevalent disease. But two slaughter-houses, both clean. No new manufactories. No nuisance.

T. W. RIDGWAY,
Chairman.

CINNAMINSON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Hartley, Edward H. Ogden, Isaac Evaul, Timothy Mo-ton, Assessor; Alexander Murry, Jr. Secretary acts as Inspector.

The year has been one of unusual healthfulness. There have been no epidemics, no typhoid fever, and very little malaria. The water-supply continues satisfactory and bountiful. The sewer answers its purpose admirably. The Board adopted a code of ordinances after those recommended by the State Board. As yet we have not had occasion to inflict any penalties for violation. Some of our principal roads have been improved by macadamizing and others by Telfordizing, through the agency of the State Road law. Nothing more of importance to report.

ALEX. MURRY, JR.,
Secretary.

DELRAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Martin Schlendwien, Thomas Fairbrother, Charles G. Robeson, Thomas S. Lippincott, M.D., Robert W. Babington, Assessor. Post-office address of all, Riverside.

There have been no epidemics in our township during the past year. We have nothing special to report excepting a few cases of typhoid of a mild form. The Board has had but little work to do, except to abate a few minor nuisances, which was promptly done as soon as they were notified of the same. A new school-house is building, with four rooms, appointed with complete warming and ventilation.

ROBT. W. BABINGTON,
Assessor.

EASTAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard L. Hall, Chairman, Smithville; William G. Dobbins, Secretary, Smithville; George W. Vandveer, Physician, Mt. Holly; Charles G. Hatcher, Smithville; Joseph G. Parker, Mt. Holly; W. G. Dobbins and Richard L. Hall, Health Inspectors, Smithville.

Our Board has held all meetings required by law and one to look after a reported nuisance. Our township has been in a very healthy condition. There has been no sickness in the village at all. We have kept the drainage in good condition and have put disinfectant in all out-houses, and have had all alleys cleaned once a week during the summer.

WILLIAM G. DOBBINS,
Secretary.

EVESHAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John J. Mitchel, Chairman, Evesboro; Richard H. Leeds, Marlton; Boman S. Lippincott, Marlton; P. V. B. Stroud, M. D., Marlton; William L. Brown, Assessor, Marlton.

The report of the Board of Health in Evesham township is much the same as of former years; nothing of any importance new to report. Families are supplied with water by wells; the water is generally good. Considerable underdraining to fit land for agricultural purposes, and yet some cellars in some localities have water in them in the spring of the year or unusual wet times. No swamps of any extent. The health of inhabitants of the township is good. Have not heard of any contagious diseases amongst animals. There are two slaughter-houses in the village of Marlton, which have been inspected. There has been no complaint made to Board as to there being a nuisance.

WILLIAM L. BROWN,
Assessor.

FLORENCE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Kale, John Peacock, Earl Gray, David Baird, Jr., M.D. Post-office address of all, Florence.

Location on Delaware river. Water-supply good. The laws are obeyed fairly well. No contagious diseases and no place to care for them. There has been no vaccination done in several years. Stoves and hot-air heaters are used. Prevailing diseases are malaria, bronchitis, German measles, phthisis. We have improved the drainage and put the privy vault in a better condition, and on a whole the town is fairly healthy.

TOWNSHIP OF LUMBERTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Albert Middleton, Hainesport; Philip Haines, Lumberton; Edwin T. Crispin, Lumberton; William C. Parry, M.D., Hainesport; Edwin Rogers, Secretary, Masonville; Assessor Edwin Rogers, Health Inspector.

There has been no organization of the Board this year.

TOWNSHIP OF MANSFIELD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John R. Naylor, Albert N. Dobbins, George Block, D. G. Van Mater, M.D., Health Inspector. Post-office address of all, Columbus.

The water-supply here is by ordinary wells. There is no system of drainage. All the houses or a great majority have cellars; a great many are used for the storage of vegetables. There are no tenement houses of more than two families. There never has been a yearly house-to-house inspection. Refuse and excreta emptied in out-door water-closets, cleaned out occasionally and disinfected. Don't know of any disease that has prevailed this year among animals. The slaughter-houses are out of town, with one exception, which stands well back from the street and not very near any dwelling; it is kept clean, so that there is no complaint. Our Board has passed no ordinances. There has been no epidemic disease the past year that I recall, and we have not been called on officially.

D. G. VAN MATER.

MEDFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Bun Wilkins, Assessor; Elwood H. Kirkbride, Henry L. Garwood, J. Reeng, Physician to Board of Health. Post Office address of all, Medford.

Dry cellars except very wet season. No sewers, cesspools open bottoms. No epidemic; this year unusually healthy. Slaughter-houses looked after when necessary. No new factories. No ordinances passed. One nuisance inquired into and abated.

MOUNT LAUREL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Andrews, Fellowship; Charles Sordon, Mount Laurel; Samuel B. Lippincott, Stanwick; Joseph K. Matlack, Assessor, Hartford.

The Board has no report to make.

JOSEPH K. MATLACK,
Assessor.

NEW HANOVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Lorenzo D. Woodward, Cookstown; Martin V. Pullen, Cookstown; William G. Johnson, Pointville; Benjamin Remine, Wrightstown; Amour D. Shaw, M.D., Health Inspector, Jacobstown.

We have nothing special to report, aside from the existence of hog-cholera during the year.

BENJAMIN REMINE,
Secretary.

NORTHAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert L. Nivon, Charles C. Cowperthwaite, Thos. W. Nippins, Richard H. Parson, M.D., Health Inspector; Isaac B. Huff, Secretary. Post-office address of all, Mount Holly.

We will call your attention to three special features: 1st. To our water-supply, which has been fully described to you before. We have added a new reservoir, with a capacity four times as great as the former one, which will give us a supply of clean water for family use. 2d. We are building a new public school, that will be second to none in the State from a sanitary view. 3d. We have also adopted and put into effect a new code to our ordinances, which compels all property-owners living adjacent to sewers to connect to same immediately, which has been done, with one or two exceptions.

The Board has met every week for the past six months, and have abated a large number of nuisances. Our slaughter-houses are in good condition, there being no complaints from them. Taken altogether, the town is in better sanitary condition than ever before.

ISAAC B. HUFF,
Secretary.

PEMBERTON TOWNSHIP.

Report not received in time for printing.

SHAMONG TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Decou, Chairman, Tabernacle; George W. Haines, Treasurer, Tabernacle; Edward B. Stokes, Indian Mills. Winfield S. Haines, Assessor, Tabernacle.

We have no Inspector, nor a resident physician.

This township is situated on the Atsion river. Its population is about 1,000. Climate is good.

Good cellars, used for storing vegetables.

As good water as their is anywhere.

We have no ordinances passed by the Board.

The Board has ordered one dead horse buried. Aside from this no action has been necessary.

WINFIELD S. HAINES,
Assessor.

SOUTHAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Haines, John C. Brown, M. D., Samuel F. Kelly, Chas. G. Naylor, Assessor, Chas. H. Rogers. Post-office address of all, Vincentown, N. J.

The Board has organized and the township is in a healthy condition.

SPRINGFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Stockton, Jobstown; I. H. King, Jacksonville; E. Newbold, Jobstown; Dr. Van Marter, Columbus; Albert B. Evans, Assessor, Springfield; A. B. Evans, Health Inspector.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas K. Sooy, President, Green Bank; Albert S. Sooy, Green Bank; William Johnson, Lower Bank; A. E. Koster, Secretary, Green Bank; J. Ely Cary, M.D., Lower Bank; J. E. Cary, M.D., Health Inspector.

Only one meeting was held, to organize and elect officers. General good health prevails throughout the township.

A. E. KOSTER,
Secretary.

WESTAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. Frank Gaskill, Chairman, R. Shannan Haines, both Rancocas; Firman Dubell, Mt. Holly; Wm. L. Martin, M.D., Physician, Rancocas; J. Barclay Hilyard, Assessor, Rancocas.

Bounded on south by Rancocas river; west, northwest and partly on north by Mill creek, a tributary of the Rancocas. Population is not far from 750.

Water is supplied by wells almost entirely; with a few instances in Timbuctoo, a colored settlement, using springs.

Cellars in the township are dry. There are no swamps near enough to dwellings in the township to cause danger from malaria. We have no use for public sewers.

Houses, with possibly a very few exceptions—in the colored settlement mentioned—all have cellars. Some farmers keep roots and vegetables in barn or crib-house cellars, but more perhaps keep them in the cellar under dwelling. Know of no tenement with more than one family.

There has been no inspection this year.

Gutters are generally allowed to carry slops from sink a safe distance from dwelling, then to be absorbed by the earth. Privies are cleaned out and contents carted away to be mixed with other fertilizers.

No prevalent diseases have come to our knowledge this year. We have received no instruction as to the other two particulars and consequently made no such inquiry.

No slaughter house in the township.

No manufactories.

No ordinances passed so far as I know.

Dwellings are heated by stoves, either wood or coal. Ventilation by doors or windows.

WILLINGBORO TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob H. Leeds, Rancocas; Oliver Parry, Beverly; S. E. Stokes, Beverly; Assessor, J. M. Stokes.

WOODLAND TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Lee, Chatsworth; Charles Pitman, Brown's Mill; J. W. Thompson, South Park; Patrick Rowe, Assessor, Chatsworth.

There is nothing new to report.

PATRICK ROWE,
Assessor.

CAMDEN COUNTY.

CITY OF CAMDEN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George R. Fortiner, M.D., President, 517 Cooper street; George F. Hammond, 18 South Third street; Charles Watson, 432 Federal street; Frank H. Burdsall, 411 North Fifth street; Allen C. Wood, 440 Lite street; William S. Moslander, M.D., 837 Penn street; Benjamin S. Lewis, M.D., 701 Pine street; John D. Leckner, M.D., Health Inspector.

The water-supply is received from the Delaware river; plant owned by the city; fully five-sixth of the houses use city water; after heavy rains and high tides the water becomes discolored. The city has an aggregate length of 38 miles of sewers; as soon as a new sewer is completed all owners of properties abutting are compelled to connect to same within 60 days from and after completion of sewer. During the year ending October 1st, 1893, one thousand (1,000) houses have been thoroughly underdrained and separately connected to sewer; our records so showing. There has been no disease among animals during the past year. Slaughter-houses are inspected and are kept in good

condition. We have twenty public schools and several public buildings in city all in good sanitary condition. We have one hospital, two dispensaries and two homes for friendless children; all well managed institutions. During the year the Board has passed several amendments to ordinances regulating the sanitary and plumbing codes. All contagious diseases are under charge of the Medical Inspector and Sanitary Committee of the Board. Our city has had no serious outbreak of contagious disease during the year, except during the month of July last, when there were about twenty cases of malignant diphtheria in a radius of two blocks. The Board at once ordered all cases quarantined and placed special officers on guard both day and night, not permitting any one to enter or leave premises, which had the desired effect of stamping out the disease in short time; all clothing infected or coming in contact with the disease was at once taken away and destroyed and houses thoroughly fumigated. During the year there were six hundred and seventy-three (673) cases of contagious disease reported, two hundred and twenty-two (222) of typhoid fever, one hundred and thirty-six (136) of scarlet fever and three hundred and fifteen (315) of diphtheria; of the above number there were 19 deaths from typhoid fever, 10 from scarlet fever and 67 from diphtheria, making a total of 96 deaths in all from contagious disease.

The Board held regular meetings during the whole year and called specials whenever it was deemed necessary.

CENTRE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John D. Glover, Mount Ephraim; Abram E. Rowand, Chew's Landing; Geo. H. Thomas, Snow Hill; John H. Jackson, Secretary, Magnolia; Wm. B. Jennings, M.D., Health Inspector, Haddonfield.

The condition of the health of the township for the past year has been unusually good. There have been no cases of typhoid fever that we know of. Measles and whooping cough have been moderately prevalent. Bronchial and pulmonary affections occurred during the winter and spring. All animals have been remarkably free from

disease during the past year, so, as a whole, we can safely say that the sanitary condition throughout the township is excellent.

J. H. JACKSON,
Secretary.

DELAWARE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John A. Meredith, Haddonfield; Wm. T. Lippincott, Moorestown; Samuel T. Matlack, Haddonfield; Wm. Graff, Ellisburg; W. B. Jennings, M.D., Health Inspector, Haddonfield.

There have been no complaints made to the Board during the year. The report is the same as last year, with the exception of prevalent diseases. There has been very little sickness, with the exception of an epidemic of measles which occurred during the months of May and June; there were no deaths therefrom. There have been no contagious diseases among animals.

W. B. JENNINGS,
Secretary.

GLOUCESTER CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Warner, President; Duncan W. Blake, H. M. Harley, E. J. Stur, J. C. Stinson, P. Mestay, Daniel F. Lane, Secretary; John J. Haley, Health Inspector, Post-office address of all, Gloucester City.

We have nothing new to report from last year, except that the general health of city has been better this year than what it generally has been. We are now using spring-water altogether from some ten wells sunk from depth of 75 to 200 feet, and also from reservoir that is supplied from springs.

DANIEL F. LANE,
Secretary.

GLOUCESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Brewer, Chew's Landing; Joshua B. Sickler, Chew's Landing; Charles Jenkins, Kirkwood; Robert Jaggard, Clementon; Dr. Joseph E. Hurff, M. D., Blackwood; Wm. J. Brown, Assessor, Kirkwood.

Our township during the past year has been in a healthy state, and no call has been made on the Board of Health to abate any nuisance. Our water-supply is mainly from wells, as it is an agricultural section, with few towns, and they small ones. The water facilities of the County Insane Asylum and Almshouse have been increased by new works, at a cost of \$10,000. So they now have an abundance of pure water for daily use, and also an ample supply in case of fire, a most necessary precaution, and one that has been too long delayed. Drainage by natural fall and streams, as the country is rolling. Houses mostly inhabited by owners. Excreta in the new towns is collected in sunk cemented cesspools. Among the farmers it is mixed with earth, and carted out and spread on the land. Malaria not prevalent, and there has been no epidemic of any contagious disease. But one slaughter-house, and there has been no complaint as to that.

WM. J. BROWN,
Assessor.

HADDONFIELD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George D. Stuart, President; William H. Harrison, J. Morris Roberts, George T. Haines, John R. Stevenson, M.D., Secretary; William B. Jennings, M.D., Inspector. Post-office address of all, Haddonfield.

Haddonfield is located on the south side of the south branch of Cooper's creek, on an elevation of from 50 to 90 feet above the tide-water in the Delaware river, six miles distant. It has 700 acres within its borough limits, with a population of about 2,800. It is supplied with water, introduced in 1887, by a company, from a reservoir (old mill-pond) filled entirely from springs located in a circumscribed glen, on the north branch of Cooper's creek, a mile distant from the borough limit. The water is clear, soft, and free from any taste. No sewerage or surface drainage runs into it. The reservoir, holding two millions of gallons, is emptied and cleaned several times a year. The fire-plugs are opened twice a month to clean out the pipes and stand-pipe. The number of houses with public water is 366 out of a total of 557 dwellings; and all new houses have it introduced. The other houses obtain their water from wells.

The drainage of the town is superficial, into Cooper's creek, there being but two short sewers, or rather drains, each about 300 feet long, that carry off chiefly rain-fall and the kitchen-waste of half a dozen houses. No water-closet drains go into them. Kitchen drainage is mostly carried into receiving wells, but grease-traps, connected with subsoil drainage, is now being introduced, as most buildings are detached on lots varying from 50 to 100 feet front by 150 to 300 feet deep. Water-closets are not numerous, but their number is increasing, the flow from which is carried into separate receiving vaults constructed after the general directions of the State Board of Health. None of the houses have basements, are occupied by but a single family, and all have cellars, which are dry.

The cesspools, generally, are of regulation size and cemented, and their contents are cleaned out, under the ordinances of the Local Board of Health, and removed beyond the borough limits.

There are two slaughter-houses, which are properly supervised. There are only three factories here—a milk-cooler and a jewelry-box factory, and a pottery, from which there is no deleterious refuse.

During the past year there have been nine complaints of nuisances, which have been promptly abated. No epidemics of disease have occurred, but measles have been unusually prevalent. Ordinances have been passed.

JOHN R. STEVENSON,
Secretary.

TOWNSHIP OF HADDON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTORS.

John Stoy, Haddonfield; Samuel Wood, Haddonfield; R. T. Collings, Collingwood; Geo. T. Hains, Haddonfield; Dr. W. B. Jennings, Haddonfield; Dr. W. B. Jennings, Health Inspector.

Water-supply. The water-supply is from wells, except in the borough of Collingswood, where a private company introduced water from an artesian well about two years ago, and about one-third of the houses take it. It had a peculiar taste at first, but that has disappeared. It is hard water.

Surface drainage is all that is used. The cellars throughout the township are generally dry, with few exceptions. No swampy land, and we have been comparatively free from malaria.

The houses have cellars, and many are used among the farmers for storing vegetables. No tenement house with more than two families. No yearly house-to-house inspection.

The prevalent diseases of the year have been measles in May and June, and a few cases of diphtheria and whooping cough.

The West Collingswood Land Co. are putting a system of sewage with flush tanks and all of the latest improvements under the charge of a civil engineer.

GEO. T. HAINES,
Secretary.

MERCHANTVILLE BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. D. H. Bartine, President; Dr. J. W. Marcy, Medical Inspector; Arnold H. Moses, Plumbing Inspector; F. W. Kleinz, Sanitary Inspector; H. L. Perett, Sanitary Inspector; W. B. Stewart, Secretary and Treasurer.

In Pensauken township, Camden county; ninety-nine feet above high-water mark, lying upon a ridge of very porous or sandy soil, of an average of one mile in width, which gradually descends toward the Delaware river to the south and east to Cooper's Creek valley. Beneath this ridge runs a sub-stratum of marl at a depth of from twelve to twenty feet.

Some wells, with an average depth of sixteen feet. There are also a few cisterns, but the principal supply is from a reservoir of excellent spring-water at a distance of nearly two miles from the town, which is brought through pipes to our citizens. From biennial examination of reservoir water it has been found to be of excellent quality.

Sewerage runs into cesspools constructed according to Board of Health rules governing the same.

Dwellings are well separated with large surroundings, and mostly have but one family to a dwelling.

Principally gas and electricity used for lighting. Some little petroleum is used, which is gradually giving way to the former.

There are no public markets.

Several good general stores; well kept, clean and wholesome. No manufactories.

One public and two private schools, and two public halls. All are in good sanitary condition.

One day and two night policemen, and one jail.

One fire-escape to public halls, and front and rear exits.

The public health since last report up to October 1st, 1893, has been very good. No epidemics of contagious diseases have prevailed. In fact, there has been but five cases of scarlet fever up to October 1st, 1893; three cases of measles, one of typhoid and one case of diphtheria, which case proved fatal. So successfully has been the efforts of the Board, each case having been quarantined closely and thorough fumigation ordered, that no spread of the diseases have occurred.

The Board, in view of the possible visitation of cholera during the past summer, early took the precaution to have every property in the borough thoroughly inspected by a special agent, who was provided by the Board with a series of questions to propound to property owners, as well as to make personal inspection of drainage, plumbing, &c., and report in writing to the Board the exact condition of every property. By this it will readily be seen that a most thorough and decidedly satisfactory condition of affairs could be obtained, and where it was deemed essential peremptory orders were issued by the Board for the immediate correction or abatement of any possible nuisance that might exist, and the Sanitary Committee personally supervised the carrying out of the Board's orders in every instance.

The Board also issued a pamphlet circular which was mailed to the residents, detailing in as simple manner as possible the method of preventing disease by the free use of such disinfectants as prescribed, also with some cautionary advice relative to the proper care and diet of children.

The Board have reason to be highly gratified with the result of their labors during the season embraced in this report.

D. H. BARTINE, M. D.,
President.

W. B. STEWART,
Secretary.

STOCKTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles W. Scott, Cramer Hill; David B. Ristine, Cramer Hill; Charles Isle, North Cramer Hill; Charles Pedigree, Cramer Hill; Dr. L. Reese, Cramer Hill; Charles Isle, Health Inspector.

The health of the township has been above the average, owing, no doubt, to ample supply of pure water being introduced from artesian wells.

No system of drainage or sewerage yet, although the subject is being agitated.

But few complaints were made to the Board, which were easily remedied.

WATERFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

B. W. Bennett, Berlin; Jacob L. Bate, Berlin; William Haines, Marlton. Crawford W. Githens, Assessor, Berlin.

We have not had any prevailing disease this year. This neighborhood is called a healthy one, as we are on the highest point between the Delaware river and the Atlantic ocean.

Our water-supply is from wells, and generally good; houses, frame, and mostly occupied by owners.

Cesspools are usually cleaned twice a year.

We have one slaughter-house, but in good condition.

Our school-houses are all new and in first-class condition.

Our Board has not been called out to abate any nuisance or for any other cause. Upon the whole we consider it very healthy.

CRAWFORD W. GITHENS,
Assessor.

WINSLOW TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Firman Peacock, Chairman, Wilton; Charles Albright, Elm; Enoch Cordrey, Elm; M. J. Burdsall, Wilton.

The general water-supply is by wells. As a rule, cellars are used for storage. There is no yearly house-inspection. Cesspools are usually open bottoms and sides, and contents used for fertilizers on land. There has been no prevalent disease in our township. The Board has passed ordinances. The township has been healthy. We have had no cases to investigate.

CAPE MAY COUNTY.

BOROUGH OF ANGLESEA.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Ludlam, President *pro tem.*; George W. Dougherty, Secretary and Treasurer; Bernard Long, Thomas Hutchinson, George W. Dougherty, Secretary. Post Office address of all, Anglesea.

We ought to have an inspector on our island (Five-Mile Beach), who can act for our three towns, Anglesea, Wildwood and Holly Beach, in all about 800 population.

The Borough of Anglesea occupies a higher portion of the northern end of "Five-Mile Beach," and at Hereford Inlet. This island is beautifully wooded with pine, cedar, oak, sassafras, cherry, magnolia and gum, showing our climate to approximate towards a semi-tropical one. Climate is temperate; summers delightfully cool and winters mild.

Water-supply is chiefly cisterns or tanks of rain-water. Wells of surface water are found good and wholesome when kept clean and constantly in use. No springs are found except by drive wells, at a depth of about eighty feet.

Our drainage and sewerage is in a sad state of natural nothingness, although the fall is ample towards the meadow thoroughfares.

Streets regular, of good width; sidewalks mostly wooden curbs in built portions, with gravel surfaces.

Houses mostly two-story, of wood, and occupied by one tenant or family.

The borough Council fails to supply the Health Board with funds to have excreta and garbage removed.

No market-houses except general stores and hucksters from mainland.

One public school and *well* kept.

No prevailing diseases.

One lock-up. Two prisoners had to be taken from it and quartered at one of our hotels for comfort during the bitter cold of Sunday night, 19th, no fire being allowed in their cells, as no insurance was upon the borough hall in which these cells were.

Public health good. Regulations are difficult to make when, after repeated notices of meetings, I fail to get a meeting of the Board, no meeting since October, 1892, being held. Members take no interest.

Several deaths this year, two adults and two infants.

GEORGE W. DOUGHERTY,
Secretary.

CITY OF CAPE MAY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alonzo L. Leach, M.D., President; Walter S. Ware, Charles P. Foster, Lewis T. Stevens, Secretary; Thomas W. Millet, George Young, Health Inspector. Post-office address of all, Cape May.

Southern end of N. J., three miles north of Cape May. Population, 2,150. From five to ten degrees cooler in summer and from three to ten degrees warmer in winter than any other place in the State twenty miles north of the place. Water-supply from water works at the famous Cold Springs, three miles north of city, where water is pumped from wells in which these natural springs flow.

The surface of the town generally level; sandy soil, with gravel in main part about three feet from surface.

The town has perfect system of natural draining by Cape Island creek in the rear, which, during past year, has been thoroughly cleansed and planked on sides, made a free water-way for all refuse. All the sewers have been thoroughly cleaned and several new ones laid by suggestion of the Board of Health.

Streets and public grounds are clean.

Houses are all inspected, and those unoccupied during winter are all taken care of and there is no danger, as all have complied with new ordinances adopted the present year.

Streets are lighted by electricity. Public and private houses by gas and electricity.

Refuse hauled away to meadows and burned.

Markets are kept clean by ordinance compliance.

No slaughter-houses, manufactories, almshouse or hospitals in city.

Public schools are thoroughly heated, in perfect sanitary condition and well ventilated.

Charitable institutions (one, St. Margaret's House), only open in summer. Kept in best of order.

Police are efficient, and prison in fair condition, not excellent, might be better.

All larger buildings have fire escapes, by order of city authorities. No cemeteries in city.

A new code of health laws have been passed by Board in past year, which is very thorough.

The City Council provides the Board's expenses by appropriation. The Board has done much work in past year by usual routine services in repairing drains, sewers, water-ways, enforcing the regulation according to the new ordinances which were passed last March. About \$800.00 has been expended by Board alone for sanitary purposes, besides that spent by other bodies, which goes toward the better condition of the city.

There have been no prevailing diseases the past year.

The Recorder of the city collects the vital statistics of the city.

To sum up, the city is in better sanitary condition than for many years past.

LEWIS T. STEVENS,
Secretary.

DENNIS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John F. Goff, President, East Creek; George M. Post, South Seaville; Edward W. James, Dennisville; Morris Warwick, Secretary, Dennisville; Eugene Way, M.D., Health Inspector, Dennisville.

There is little of importance to report this year, but we are happy to note the fact that the thorough work done by our Board last year has borne fruit, the suggestions made having been effectually carried out, and no complaints have reached us.

We report the sanitary condition of our township as very good.

An epidemic of whooping-cough has prevailed, a few cases terminating fatally.

Sporadic cases of scarlet fever have occurred, but by prompt quarantine and careful disinfection the disease has not spread.

EUGENE WAY, M.D.,
Inspector.

HOLLY BEACH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Francis D. Rhodes, President; Joel C. Woodmansee, William Paul, Inspector; Henry Ludlam, Martin L. Harrison, Secretary. Post-office address of all, Holly Beach.

The Local Board of Holly Beach City has just been re-organized, and a little too late for any very effective work this year. They have re-adopted the code of ordinances that were in operation under the old Board. They have had four (4) low, marshy lots filled up, and have several more under way; have stopped the throwing of fish and fish refuse on the beach and in the surf, and have attended to a great many nuisances of minor importance. We are about to have all the children living in Holly Beach vaccinated through the co-operation of the School Trustees.

MARTIN L. HARRISON,
Secretary.

LOWER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Dickerson, Jr., Chairman, Erma; William L. Cummings, Fishing Creek; W. A. Lake, Physician, Green Creek; William L. Ewing, Cold Spring; A. B. Walters, Cold Spring.

Cesspools and vaults are cleaned twice each year and contents used on farm.

Very few losses of animals this year.

WILLIAM L. EWING,
Assessor.

MIDDLE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Andrew J. Tomlin, Goshen; V. N. Erricson, Dias Creek; T. W. Garretson, Cape May Court House; Julius Way, M.D., Cape May Court House; Stillwell H. Townsend, Burleigh; Julius Way, Health Inspector.

A small percentage of the houses have cellars, in most cases they are used for storing vegetables. Ten houses with two families.

The health of the people of this township, in general, has been good. We have had no contagious diseases either in man or animal. The Board held a meeting in June and passed resolutions calling upon the people to dispose of all matter detrimental to health; they were obeyed very promptly with but very few exceptions.

STILLWELL H. TOWNSEND,
Secretary.

OCEAN CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. S. Waggoner, M.D., President; W. Lake, Secretary; Jesse Conner, Inspector; Benjamin Newkirk, Jacob Steelman. Post-office address of all, Ocean City.

Location upon the seashore, at the mouth of Great Egg Harbor river, in Cape May county. An area of about 3,000 acres.

Cisterns, and artesian well 721 feet deep, good, pure and wholesome water.

Surface drainage of 20 feet per mile. Sewage drainage of 10 feet per mile.

Streets are covered with gravel, and one park. Streets and many houses are lighted with electricity.

Refuse gathered up daily and removed about one and a half miles from town.

One large school-house, with three teachers; scholars may be prepared to enter college.

Had all garbage gathered regularly each day, Sunday excepted, and removed about one and a half miles from town. All alleys cleaned up, &c.

Last spring we put in an electric road, two miles long, and carried over 40,000 people. Always looking not only after the general health but morals of the place.

W. LAKE,
Secretary.

SEA ISLE CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles H. Clouting, James I. Scull, E. J. Reeves, J. D. Morcam, Thomas Whittington, L. J. Spear. Lawrence Cauffman, M. D., Health Inspector. Post-office address of all, Sea Isle City.

Location, latitude, 39° 15'; longitude, 74° 45'.

Climate, temperate.

Number of acres, 1,310.

Resident population, 500 to 600.

Water-supply by brick cisterns.

Drainage natural.

Houses all frame, and of good build. Required to be three feet from grade.

Lighting by electricity.

One school-house, of modern style.

The Board has \$500 appropriated, and use it mostly in filling up ponds and low places about the island.

The Board has filled up a number of low lots, and have had a general overhauling of water-closets; have filled up under some of the large hotels, and cut the drainage from the surface.

There has been but few cases of sickness for the Board to notice. One of diphtheria, last March, was reported, and the Board took proper care of the patient; three cases of measles, and a few of whooping cough. But none have been carried from one house to another.

We have a banked meadow back of the town that the Board have had considerable trouble with, and, in their judgment, it should be well sluiced, and let the tide rise and fall in the ditches. But so far have been unable to do anything with it. The owner of the property seems to want to fight to keep it his way, but the Board will endeavor to have it put in better shape by another season.

C. H. CLOUTING,
Assessor.

UPPER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Belford E. Smith, Tuckahoe; Reuben S. Robinson, Tuckahoe; James Smith-Petersburg; Albert Corson, Palermo; Randolph Marshall, M.D., Health Inspector, Tuckahoe.

We have been particularly exempt the past year from epidemics. The health of this community has been such as to require no action of the local Board.

RANDOLPH MARSHALL, M.D.

WEST CAPE MAY BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas H. Hughes, President; John Reeves, Secretary; Henry H. Eldridge, Livingston Eldridge, David Hughes. Post-office address of all, Cape May City,

The boundaries of this borough include a space of two miles square. The population per acre is not known to me, but I think the entire population is 600.

The water-supply is obtained entirely from wells either driven or dug. The dug wells average a depth of 16 feet and the driven wells run from 24 to 30 feet in depth. We have no water company, each one having their own well. Sometimes after heavy rains the water in dug wells is discolored. In some dug wells, as a rule, the water is hard, in others soft. The water in driven wells is generally soft.

We have no system of drainage in the borough. The majority of the citizens can have dry cellars. We have considerable low ground which does not seem to cause malaria or any increase in other diseases.

Houses do not generally have cellars, and I do not know of a basement in the borough that is occupied. There is not a house occupied by more than two families and not more than six houses which have two families. Nearly all of the residents own their houses.

Our cesspools are dug about three feet deep, with the sides and ends of boards and no bottom. They are cleaned out about twice a year and the contents carted to different farms in the adjoining township.

We have had no prevalent diseases this year. The assessor does not inquire as to losses of animals and as to contagious diseases.

We have no slaughter-houses in the borough.

Our Board passed ordinances at the commencement of the present year and have strictly enforced them.

About the worst trouble our Board had to contend with in the past years was with hog-pens. Cape May City drives them all out during

the summer and they formerly would locate in West Cape May and Lower Township, adjoining us. The Board passed an ordinance last spring forbidding any non-resident placing hogs in the borough and not allowing residents to keep more than three in one pen, and compelling them to keep their pens in a good and clean condition. In former years the Board had from five to six or more complaints in regard to hog-pens and this summer we have not received any, so you will perceive we have not been asleep.

We have no almshouse, no police, no prison, no hospital, no cemetery.

For protection from fire we have ladders and buckets.

JOHN REEVES,
Secretary.

CUMBERLAND COUNTY.

BRIDGETON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

P. Kennedy Reeves, President; Theodore B. Woodruff, Secretary; Jesse C. Davis, Health Inspector; Charles F. Reeves, Plumbing Inspector; Theodore G. Davis, M.D., Physician; David R. Streets, M.D., Philip E. Souder, Isaiah F. Barnes, Alfred S. Sharp, Joseph H. Powell. Post-office address of all, Bridgeton.

Full particulars were given in our last report concerning location of our city, water-supply, etc., a repetition of which is unnecessary.

The past year has not been marked by anything unusual, unless the healthy condition of the city, shown by small number of cases of contagious diseases reported to the Board by local physicians, could be mentioned as unusual. There have been no epidemics of any kind, and an almost entire absence of even the ordinary diseases of children, such as whooping cough, measles, scarlet fever, etc.

Acting on the suggestions of the State Board, extraordinary efforts have been made to raise the sanitary condition of the city to a high standard. Circulars were left at every house notifying inmates to have their premises freed from all deposits of garbage, dirt, fecal matter, etc., by a certain time, under penalty, advising them that the Inspector would make a personal inspection by that time. These instructions were very generally obeyed, the delinquents being spurred

to action by the Inspector. As a result, the city was in an excellent sanitary condition at the beginning of last summer. The members of the Board think it is no more than fair to ascribe the unprecedented small amount of contagious disease to their action in having the city thoroughly cleaned. The unusual energy of the Board in this direction was undoubtedly caused by the cholera scare, but the good results have been apparent.

Bridgeton was the healthiest city of its size in New Jersey last year, and the members of the Board will be much disappointed if it does not head the list again this year.

P. KENNEDY REEVES,
President.

COMMERCIAL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Seth Bowen, Mauricetown; Dr. Samuel Butcher, Mauricetown; Eph. J. Cook, Port Norris; Norton Lore, Mauricetown; Harry C. Mayhew, Mauricetown; David McElwee, Sr., Haleysville.

Water-supply obtained by wells.

Swamps and meadows near and in township. But little malaria.

Houses usually have cellars.

Slaughter-houses are inspected and kept clean.

Board has taken official action as to sanitary condition of township.

The township has not had in it during year any malignant disease.

DEERFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elijah R. Parven, Deerfield street; Pierce A. Krespack, Rosenhayn; John S. Woodruff, Woodruff's Station; James Hand, Seeley; Charles C. Phillips, Deerfield street. Elijah R. Parven and Pierce A. Krespack, Health Inspectors.

As the time approaches to make a report to the State authorities, I find upon examining the records that there is nothing new, but as on previous occasions would report the health for the past year has been very good. There has been no epidemic, and there are no causes to

produce endemic diseases. Sickness has been less than in former years, and but few deaths, and those in elderly persons with chronic complaints.

The local Board of Health have had several meetings both in the village of Deerfield and in the Jewish colonies of Rosenhayn and Carmel. They have appointed two inspectors, one for the eastern and one for the western part of the township.

Besides, the whole Board has made a house-to-house inspection of the Jewish settlements, and we think that their condition is at least fifty per cent. better than one year ago.

One great trouble with the Jewish people is that they do not remain long in a place, but remove frequently without cleaning their surroundings, and those that take their places think it not their place to do it; but I think in time we will get them to see the necessity of good sanitary conditions for their own welfare as well as for that of their neighbors. We intend to keep a sharp lookout upon them.

The slaughter-houses and canning factory of the township are looked after and kept in as good condition as possible.

Upon the whole, we think that the sanitary condition of the township is second to no other in the State, and its death roll will be less than many other places more favorably situated.

CHARLES C. PHILLIPS, M.D.

DOWNE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter C. Henderson, Newport; Reuben H. Leaming, Newport; Nathaniel Lore, Dividing Creek; Sheppard Campbell, Assessor, Newport; Dr. A. P. Gladden, Newport; George E. Butcher, Clerk.

No epidemic or contagious diseases have prevailed in this township during the past year. The cessation of "Grip" and diseases following it have disappeared and the general health of the inhabitants is up to the highest standard. While the surface is quite level and surrounded by immense bodies of marsh, the drainage is sufficient to remove all surplus accumulations of water, and no malarial influences present to produce diseases.

GEORGE E. BUTCHER.

FAIRFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. Coates Swing, E. O. Davis, Wm. M. Sheppard, John B. Thompson, W. D. Straughn, M.D., Health Inspector. Post-office address of all, Fairton.

Our Board held two meetings during the year. Passed no ordinances.

Special attention has been paid to improvement of our streets and roads.

No epidemic of any kind.

Vaccination is still neglected.

General condition of affairs as regards our Board and township remain much the same as at last report.

W. D. STRAUGHN, M.D.,
Inspector.

GREENWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel R. Mills, Chairman; John Tyler, Jr., William P. Test, John N. Glasspell, Secretary; Dr. S. M. Snyder, Inspector. Post-office address of all, Greenwich.

The township is in good healthy condition. The Board has not been called out during the year. There has been very little sickness.

There has been no epidemic.

What deaths have occurred have mostly been very aged people.

HOPEWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

M. M. Johnson, Seeley; Cornelius Sharp, Bridgeton; J. F. Glaspey, Bridgeton; W. L. Minch, Seeley; Dr. J. G. Swinney, Shiloh.

LANDIS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. L. Beck, M.D., President; Frank Bingham, William E. Biglow, O. F. Rexroth, William W. Whiting, Secretary and Health Inspector. Post-office address of all, Vineland.

The Local Board of the township has been active and watchful of all sanitary matters. All slaughter-houses, cesspools, and other dangerous places have been carefully watched. Our regular meetings are with the Township Committee, the first Monday in each month and at the call of the President. The general health of this township is good. There has been no epidemics of any kind this season. In June and July I visited every household in this township and a copy of the code of health laws was placed in the hands of the heads of each family.

All complaints have received the personal attention of the inspector and can with pleasure report township as healthy.

WILLIAM W. WHITING,
Inspector.

LAWRENCE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles G. Diamant, Peter Johnson, H. O. Newcomb, C. C. Foster, Assessor, H. S. Long, Clerk. Post-office address of all, Cedarville.

You have on file in your office, all the information under the schedule of subjects that I am able to give you. My predecessor in his several reports has fully covered the ground, and anything I might add would only be a repetition.

A revolution has taken place in the mode of heating our private houses. Many dwellings are now heated throughout with hot water from furnaces in the cellar. A new heating process has recently been introduced in the shape of an "oil gas burner," which quite a number of families are using. The burner is set in an ordinary stove or furnace, and supplied with the oil from a tank on the outside of the house. The gas in the burner is generated from ordinary illumi-

nating oil. Those who have tested this arrangement speak in high terms of its ability to do all that is claimed for it.

The health of the township has been unusually good. We have no epidemics to record. Summer diseases, especially among children, quite rare, and easily managed. The death rate for the past year the lowest on record.

FRANK M. BATEMAN,
Inspector.

MAURICE RIVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. W. B. Vanaman, Port Elizabeth; Thomas S. Shaw, Dorchester; Charles G. Carlisle, Delmont; Henry Reeves, Jr., Leesburg. S. M. Wilson, M.D., Health Inspector.

The general state of health during the season has been good, excepting with the advent of the autumn there has been an excess of malarial tendencies greater than for the past few years.

There have been no diseases prevailing epidemically among either horses or hogs.

The water-supply is generally of good quality, is mostly soft and is palatable and good for culinary purposes.

The public buildings, which consist almost exclusively of churches and school-houses, are in good condition.

There has been no cause for special action of the Board during the year.

MILLVILLE CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edwin Conover, President; Silas C. Smith, J. W. Simmons, R. B. Radcliffe, L. H. Hogate, Secretary; J. W. Wade, Physician. Frank Bullock, Health Inspector. Post-office address of all, Millville.

In reviewing the events of the past year we have abundant reason for believing that the existence of an active Board of Health in this city is appreciated by the people. The Board have been frequently congratulated upon the very evident results of their efforts towards

keeping the city clean, preventing contagious diseases and abating nuisances.

Our city of ten thousand and more, just about half way between Philadelphia and Cape May, on the West Jersey Railroad, seems to be out of the usual course of the destructive storms, and singularly free from the visitation of epidemics.

Our soil covers large deposits of clay, sandstone, glass sand and gravel.

Our present drinking-water is obtained from wells. We also have had since 1879 an abundant supply for all purposes from Union pond, at the head of Maurice river, owned by private company. Very few houses use city water exclusively. Some use both wells and cisterns. City water never discolored, except when main pipes are disturbed. Apparently same in quality all the year round. Stand-pipe cleaned regularly. The pond receives no sewage above point of supply.

Surface drainage is all that could be desired. Malaria unknown. Cellars generally dry. House-to-house yearly inspection. No tenements with more than two families.

The question of sewers has been agitated for years, and City Council have recently taken some action toward supplying the city with about ten miles of sewer-pipe.

Streets are in good condition, the city having recently laid thousands of feet of gutter-stone, paved the crossings and regravelled the principal thoroughfares. The gutters in central portion of city are flushed from the fire-plugs whenever occasion requires.

Houses built now are generally on high, solid ground, and ventilation is looked after. However, our city is sadly in need of a competent Building Inspector.

All houses have cellars, largely for storage of vegetables, etc.

All refuse and excreta is taken beyond the city limits and deposited in the woods. The removal of garbage has received a great deal of attention, and the Board has been considering plans for disposing of it in an economical and sanitary manner.

Grocers, hucksters and provision dealers supply all that the market affords. Fish peddlers are prohibited from throwing into the streets the heads, etc., of the fish they clean for customers.

Diseases of animals rare. Diligent inquiry fails to discover any particular malady worth recording.

Slaughter-houses are in excellent sanitary condition.

A new \$25,000 high school building is in course of erection, and will be supplied with all sanitary requirements.

The remains of a number of bodies buried many years ago in the old Presbyterian grounds were removed to Mount Pleasant cemetery to make room for the new school building.

The health of our city is generally good, and the death-rate low; yet, contrary to usual record, we suffered from an unusual amount of sickness during those long, cold months of last winter. "Winter cholera" was one of the complaints most frequently met with. During the warmer months and up to the present time a great many cases of illness have been characterized by gastro-intestinal disorders.

The collection of vital statistics is attended to by the City Recorder, who is also Secretary of the Board of Health.

Last spring the Board took a decided stand against the pollution of our city water-supply. For many years past hundreds of bathers habitually washed the filth from their diseased bodies in what is known as the Duck pond, a short distance above the supply pipes which carry the water directly to the stand-pipe, and from there into our homes. Upon discovering this, the Board at once placed a watchman on the premises, and placarded the trees and other conspicuous places. The scheme was successful beyond expectation.

We have been successful in preventing the spread of contagious diseases. The physicians promptly report all suspicious cases, and immediately our able Inspector (who is also a policeman, and whose uniform carries weight with his commands,) investigates and, if necessary, quarantines the premises. In all cases the Board's physician is consulted. The people are thus being gently interested and educated to the full importance of a proper sanitation.

JOHN W. WADE,
Health Physician.

STOW CREEK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward H. Sheppard, Roadstown; James R. Rainear, Shiloh; Lorenzo D. Horner, Roadstown; Ephraim Mulford, Assessor, Roadstown.

Water-supply by wells almost exclusively.

Many swamps in the township; very few cases of malaria, and cellars mostly dry.

Houses mostly have cellars, and largely used for storing of vegetables. Do not know of a single tenement house of more than two families. No house-to-house inspection.

Cesspools are not cemented; open bottom and sides. Contents used as fertilizer, and badly managed. No prevalent diseases. Nor does the assessor make inquiries. No slaughter-house in the township.

Board did nothing, as there has been no call; made no investigations or improvements.

EPHRAIM MULFORD,
Assessor.

ESSEX COUNTY.

BELLEVILLE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry W. Underwood, President; Percy Jackson, George W. Williamson, Alfred Lintott, Jr., James Boylan, Daniel M. Skinner, M.D., William Connolly, Assessor; James Flanagan, Health Inspector. Post-office address of all, Belleville.

There has been no prevailing epidemic or endemic during the past year. The Board of Health has held regular meetings. A thorough inspection has been made, and diligent effort has been directed to abate all nuisances which have been found to exist as well as to avoid conditions which might lead to the formation of a nuisance. Beyond what has already been reported to the State Board of Health in accordance with the Schedule of Subjects there is nothing of importance to report.

D. M. KINNEY,
Health Officer.

BLOOMFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James C. Beach, President, Bloomfield; Thomas Oakes, Bloomfield; G. Lee Stout, Bloomfield; Seymour P. Gilbert, Bloomfield; George Stohr, Brookdale; A. J. Lockwood, Glen Ridge; Charles W. Powers, Bloomfield; Wm. B. Corby, Health Inspector; Wm. L. Johnson, Secretary.

As township physician for the current year, I have to report an unusually healthy summer and fall. We have been free from all kinds of epidemics.

CHARLES H. BAILEY, M.D.

As township health inspector, I agree with the above statement of Dr. Bailey as to the general health in our township.

W. B. CORBY,
Health Inspector.

CALDWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. S. Francisco, Chairman, Caldwell; C. B. Crane, Caldwell; M. H. Cranfield, Caldwell; Leslie Gilbert, Fairfield; Theo. Vincent, Fairfield.

There was no organization of our township Board of Health either in 1892 or 1893.

CLINTON TOWNSHIP AND IRVINGTON VILLAGE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. C. Ward, President, Irvington; Dr. M. Osborn Christian, Inspector, Irvington; Wm. R. Ward, Newark; Jacob W. Fisher, Waverly Park; Merton B. Owen, Irvington; Lewis E. Voorhees, Irvington.

Our township adjoins Newark on the west and south, and was more fully described in a report of mine several years ago. The population has increased to nearly 5,000.

Water-supply as formerly, from wells.

Our streets, especially in the village of Irvington, are in very good condition, being constructed in most cases of crushed mountain stone.

Our township includes within its boundaries the village of Irvington, having a separate local Board of Health.

The village occupies about one-third the area, and contains about two-thirds or more of the population of the township.

The health of the community during the past year has been good. No epidemics, and but few cases of contagious or infectious diseases have occurred.

No epidemics of disease among cattle or horses have come to our notice within our limits.

Vaccinations have been insisted upon before admission of all pupils in the public schools, and the sanitary condition of the schools is good.

Very little slaughtering is done within our limits, and the places are inspected carefully.

The principal cause of nuisances is from the attempts of outsiders—scavengers and others—to deposit night-soil and other offensive material within our territory; this calls for more watchfulness than all other sources combined.

Our public school has had a large and commodious addition built during the past year so as to accommodate over six hundred pupils in the principal building, divided into ten classes. There are four smaller schools within the township, beside the parochial school which accommodates about fifty scholars.

The principal manufactories located here, employing numbers of hands, are the Irvington Smelting and Refining Co., The Alvin Silverware Manufacturing Co., and a new press manufacturing company which is to build printing and other presses.

In the smelting works everything possible is done to guard against poisoning by fumes, and for the last three years there has been scarcely any sickness from this source.

In the village of Irvington the trustees have inaugurated a system of garbage collection whereby garbage is collected three times weekly, deposited in low lands and covered with earth. I think this system has greatly improved the sanitary condition as well as the general appearance of the village.

The street lighting is done by electricity, while electricity, gas and kerosene are used for illuminating by the people.

The village Board of Health is composed as follows: Dr. M. Osborn Christian, President; John W. Wolf, Secretary; Ira Meeker, Treasurer; Wm. R. Adams, M. S. Drake, Dr. Joseph L. Wade, Sanitary Inspector. This Board holds regular monthly meetings.

Inclosed please find copy of township health ordinance.

M. OSBORNE CHRISTIAN.

EAST ORANGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. E. Joralemon, President; Francis Lang, W. T. Bowman, George Dorer, E. E. Bruen, F. Coyne, Jr., W. C. Schmidt, J. W. Ellor, R. Berry, T. A. Dates, Wallace Ouchtetra, I. L. Dodd, Giles Zimmerman, P. C. Williams, D. C. Whitman, W. F. Poucher, Assessors; F. R. Chambers, M.D., Town Physician, Secretary; Henry Blaurock, Health Inspector. Post-office address of all, East Orange.

Our population is steadily increasing as is shown by the growth of the public school system. A new eight-room brick building, called the Columbian School, was opened in September. The Eastern School, an old building, has at an expense of \$4,500, had a system of warming and ventilation introduced which promises to prove satisfactory.

The new drain in the southerly part of the town has converted a swamp into a healthy region which is fast building up with a fine class of dwellings.

There was some cause for complaint by our neighbors, with our sewer disposal works, but with a proper outlay of judicious management and money, the system is working well and effectively. There is a limited demand for the sludge which it is expected will increase until it may become a source of revenue. The connections with the sewer system now numbers 1,939, and we hope by means of a new ordinance adopted August 12th, 1893, to gradually drive out of existence all cesspools and privy vaults in the township.

We have had an unusual number of scarlet fever cases since January 1st. The disease was not confined to any one locality, but has been reported from all parts of the town. During January there were 24 cases, 27 in February, 19 in March, 19 in April, 21 in May and 7 in June. There have been apparently a less number than usual of the other children's diseases.

On February 26th a woman came to our town sick and broke out with an eruption which was recognized as variola on the third day of the eruption, but not till several people had been exposed. This original case died as did four others who caught the disease from her. One adult and two children had varioloid, seven cases in all and all colored people. All suspects were vaccinated immediately, several times and quarantined. The disease was confined to its original

quarters and none had it except those infected in the original building. Six hundred poor were vaccinated free of charge by the town. Compulsory vaccination in the schools was insisted upon.

Our neighboring cities of Newark and Orange allowed us the use of their pest houses and our cases as fast as they broke out were transferred in a properly equipped conveyance.

The Board has been alert to the necessity of vigilance during the summer and all questions concerning health matters have been investigated and promptly disposed of.

TALBOT R. CHAMBERS,
Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. W. Booth, Nutley; Joseph Searles, Nutley; Adrain Vreeland, Nutley; R. J. M. Chase, Nutley; John H. White, Avondale; G. B. Philhower, M.D., Health Inspector, Nutley; Amzi Coeyman, Assessor, Nutley.

The Report of the Board of Health the same as for 1892.

LIVINGSTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Burn W. Dickinson, Chairman, Chatham; Peter S. Meeker, Roseland; William Deicks, Jr., Livingston; Joseph Bear, Livingston; Jonathan Force, Livingston; George E. DeCamp, Assessor, Clerk; E. E. Peck, M.D., Health Inspector, Caldwell.

Lying on the west side of the Second Mountain; containing about 11,000 acres; population about 1,400.

Water-supply all from wells.

The drainage is natural and good, with the exception of the Passaic valley.

Cellars under all houses, and mostly used for storing vegetables.

No prevalent diseases.

But one complaint made to the Board, which was promptly attended to.

MILLBURN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. Fellows Morgan, Chairman; Mark T. Cox, George N. Reeve, John H. Schmidt, Daniel Hamilton, J. D. Polhemus, M.D., Health Inspector. Post-office address of all, Milburn.

Milburn, located in southwest part of Essex county, on line of Delaware, Lackawanna & Western Railroad.

Water-supply from wells, and of very good quality. Abundant.

Drainage good through gravelly soil, and has been improved by widening creek running through town. Have no sewerage.

Streets and public grounds are kept in good condition, and free from anything that would cause disease.

Mode of lighting by kerosene and gas.

Refuse and excreta thrown into vaults and carried away as often as necessary.

Public school in poor condition, and is not what it should be; much sanitary improvement needed.

Almshouse has been improved, and is at present in good sanitary condition.

All contagious diseases are thoroughly quarantined under care of Inspector, and all necessary care taken to prevent spreading of any disease.

Sanitary expenses will not exceed \$150.

Prevalent disease (diphtheria) which occurred on or about October 5th, in Short Hills, but by careful quarantining, and assistance of persons in affected homes, did not find its way out of that part of township. Aggravated by removing much earth in and around the Short Hills District.

The Board of Health has done much work during the year—the incoming of a large number of Italians to work on the railroad improvements necessitated much vigilance on part of Inspector, and the Italian quarters have been kept in a fair sanitary condition, and no disease has found its way in the colony.

Several privy vaults have been built, and other slight sanitary improvements made as found necessary. Several carcasses of dogs buried, and all necessary work done to make the township as healthful as possible. Several houses inspected as to plumbing work.

Water-supply tested by chemical analysis, and found as stated—good.

J. D. POLHEMUS, M.D.,
Inspector and Secretary.

MONTCLAIR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Wilson, Chairman, Montclair; Decatur M. Sawyer, Montclair; Chas. N. Baker, Upper Montclair; Hugh Gallagher, Montclair; I. Seymour Crane, Montclair; Charles B. Morris, Clerk, Montclair; James S. Brown, M.D., Township Physician, Montclair; Richard P. Francis, M.D., Health Inspector, Montclair.

Work on the new sewerage system was begun early in the year and is progressing rapidly.

The buildings of the Mountainside Hospital have been enlarged, so that there are now accommodations for thirty patients.

Encouraged by the satisfactory results of last year's work, the Health Board again ordered a house-to-house inspection this year. The general sanitary condition of the town was found to be excellent; various nuisances that were reported were promptly abated.

During the summer a slight epidemic of dysentery occurred in Montclair and some of the surrounding towns. The type of the disease was not virulent and but a small per cent. of cases ended fatally. During the epidemic careful analyses of the water supplied to the town were made and showed that the cause of the disease could not be found there; a fact that was borne out by the occurrence of the disease in families that used well water as well as in families that used town water. It was the general opinion of the medical fraternity that the low level of the ground water, incident to a dry summer, was a factor in causing the epidemic.

R. P. FRANCIS, M.D.
Health Inspector.

NEWARK CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles M. Zeh, President; Moses Straus, Treasurer; H. C. H. Herold, M.D., David L. Wallace, M.D., F. B. Mandeville, M.D., Edward Dunn, William B. Guild, John Furman, John Bruenig, Charles Lehlbach, M.D., Medical Officer of Health and Secretary; H. B. Baldwin, Chemist; Chauncey G. Parker, Attorney; D. D. Chandler, Chief Inspector.

The force consists at this time of two plumbing inspectors, two meat inspectors, one milk inspector, and seventeen district inspectors. There are also ten physicians, who treat the poor in their respective districts, and assist the executive officer in cases of contagious disease.

During the year considerable paving and sewerage was done. The following figures show this :

Number of miles of unpaved streets.....	137.39
Number of miles of paved streets.....	59.26
The latter are classified as follows:	
Granite-block paving.....	14.30
Trap-block paving.....	8.63
Telford-block paving.....	10.69
Asphalt paving.....	3.87
Asphalt block.....	0.14
Cobble stone.....	21.63
Total paved streets.....	59.26
Paved this year:	
Granite-block paving.....	3.56
Trap-block paving.....	1.62
Asphalt paving.....	0.87
Cobble paving.....	0.51
SEWERAGE.....	6.66
Length of sewers built in city to date:	
Brick sewers.....	52.09
Pipe sewers.....	59.34
Total.....	112.43
Length of sewers built this year:	
Brick sewers.....	0.29
Pipe sewers.....	8.05
Total.....	8.34

More sewers will be laid during the calendar year, and streets are now being paved which would augment the figures considerably.

The increase in tile pipe sewers is a step in the proper direction. In smaller lateral drains tile pipe should be used, as they are cleaner and more easily flushed than the brick sewer and are impervious.

CONTAGIOUS DISEASES.		
	Reported.	Deaths.
Scarlet fever.....	1,342	138
Diphtheria.....	486	140
Typhoid fever.....	162	68
Small-pox.....	7	1
Membranous croup.....	94	68
Total.....	2,091	415

Compared with last year there have been less cases, but the numbers are still proof that proper facilities of isolation and disinfection are not at the command of the department.

The disinfection station for which money was appropriated is no nearer completion than last year, mainly on account of two factors—politics and ignorance, there being more of the former, however, than of the latter in this case. Several good sites have been suggested by the Board of Health, but the above-mentioned factors have to this time stubbornly obstructed the commencement of building.

The cases of small-pox which occurred were all infected out of the city. Prompt isolation and disinfection by means of fire and chemical solutions prevented the spread of the disease. In no instance did the disease spread to others after the first case was isolated, and as all cases were brought to our attention during the papular or vesicular stage, it goes to show that the danger of infection during the first stages is slight. The experience of previous years corroborates this statement.

The new water which has been in use now over one and a half years is excellent. Chemical analyses have been systematically made by the chemist of this department, and the results show the water to be of excellent quality. A thorough inspection of the water-shed was ordered by the Board last spring. The result of this inspection made by Dr. A. C. Hunt and the writer was very satisfactory. The number of direct and indirect sources of contamination found were few. This, however, was owing to the sparse settlement in the Pequannock watershed, and not to any disposition on the part of the inhabitants to avoid contamination of various streams and their tributaries. The report of the inspection was transmitted to the proper authorities, and the passage of laws which will regulate the construction of all buildings and things through which pollution can take place will probably result.

Personally, the writer believes that the only way in which a water-supply of the size of the one on which Newark depends can be kept permanently free from pollution is by either the State or the municipality owning sufficient land adjacent to the reservoirs and all the streams and tributaries to insure forever non-contamination. In other words, to exclude habitation. Sanitary regulations may answer for a time in thinly-populated sections, but as human habitation increases these are no longer sufficient, for with increased population comes increased filth, and the latter must reach at some time in any given section what

may be called a point of saturation, and when that point is reached the surplus will find its way by natural means into the general drainage system of that section. Water-sheds should be free from human habitation and its accompanying filth, and in order to accomplish this State or municipal ownership of water-sheds is essential.

WELLS.

Total number of wells inspected.....	165
Total number of wells analyzed.....	137

RESULT OF ANALYSIS.

Very badly contaminated.....	26
Badly contaminated.....	25
Contaminated.....	26
Total.....	77
Very suspicious.....	20
Suspicious.....	18
Passable.....	21
Total.....	59

All those contaminated were closed. In all cases re-analyses are made from time to time. It is to be remarked that with the closing of wells in this city typhoid fever has decreased to an extent which clearly shows the connection between the two.

The following is a brief summary of the work done in the department during the year :

Nuisances and Complaints—

Citizens' complaints made.....	1,682
Citizens' complaints verified.....	1,304
No cause.....	378
Total number of notices served for nuisances.....	3,752
Total number of notices served for defective drainage.....	1,628

Abatements—

Total for nuisances.....	3,026
Total for defective drainage.....	1,514

PLUMBING DEPARTMENT.

Number of permits to construct plumbing systems.....	974
Plans and specifications filed.....	942
Plans and specifications rejected.....	113
Number of master plumbers registered.....	110

ATTORNEY'S REPORT.

Orders received for prosecution.....	146
Attorney's notices issued.....	31
Civil suits commenced for violation of ordinances (San. Code).....	128
Civil suits commenced for other causes.....	3
Nuisances abated after commencement of suit.....	60
Suits discontinued—by Board (the defendant agreeing to comply with notice).....	80
Judgments for department—civil suits.....	24
Judgments for defendant—civil suits.....	4
Papers drawn but no service, withdrawn by health officer.....	12
Civil suits now pending.....	19
Money collected and paid treasurer—civil suits.....	\$177.50

In many cases the fine was remitted after judgment had been obtained, the defendant agreeing to comply with the requirements of the notice.

MEAT INSPECTION.

Slaughter-houses—

Cattle.....	9,895
Calves.....	12,239
Sheep.....	13,231
Swine.....	3,732
Total.....	39,097

Condemned cattle.....	14
Condemned calves.....	14
Condemned horses.....	8
Total.....	36

Meat inspection (markets, butcher shops, &c.).....	12,356
Carcasses of beef.....	37,326
Carcasses of lamb and sheep.....	116,219
Carcasses of calves.....	24,521
Carcasses of swine.....	10,888
Total.....	201,310

Condemned—

Bob-veal, carcasses.....	65
Bob-veal, pounds.....	200
Poultry, pounds.....	1,076
Pork, barrels.....	2
Beef, pounds.....	947

Beef, hind-quarters.....	6
Mutton, carcasses.....	16
Mutton, quarters.....	200
Fruit and vegetables, wagon-loads.....	3
Bologna, pounds.....	100
Fish, pounds.....	250
Fish, barrels.....	2
Corned-beef, pounds.....	100
Veal, pounds.....	100

Milk inspection has been thoroughly enforced, and in general the milk supply of the city may be said to be very good.

Under the law passed last spring a thorough investigation of all cow stables within the city limits was made. Their inspection has just been completed, and it is impossible at this time to give a summary of the result. Appended is the form used in the investigation. The owners of stables were notified of any unsanitary condition found and compelled to remedy the same.

CHARLES LEHLBACH,
Medical Officer of Health.

BOARD OF HEALTH.

NEWARK, N. J., 189

Report of inspection of stable or premises, No. St.

Owned by

Distance of stable from dwelling houses,

Is there room for pasturage or exercise?

Do the animals get out of stable, and during which months?

Water supply,
Method of drainage,

Size of stable. Number of stories, and material built of,

Is the stable ventilated, and how?

Number of stalls,
Flooring,
What kind of fodder is used (be particular)?

How many cows are kept?

What is their condition?

Do neighbors complain of stables?

How is milk disposed of?

CITY OF ORANGE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. G. Gegenheimer, President; Michael Barry, John T. Platt, Louis Balbach, Stephen Collins, Augustus Eichhorn, James Brown, Health Commissioner; H. E. Matthews, M.D., Chief Health Inspector and Medical Officer; William Schluer, Assistant Health Inspector and Secretary; Thomas Shannon, Deputy Health Inspector; J. W. Stickler, M.D., Pathologist. Post-office address of all, Orange.

The condition of our water-works has been reported in previous years, and I can only add, that we use all endeavors to keep the water-supply as pure as possible. Throughout the city wells are being constantly abandoned and replaced by the public water-supply. During the past year the chemical examination of suspected well-water has been prosecuted, and a number of wells ordered closed as the result of our investigations.

The sewerage and drainage system, of which my predecessor reported, is still incomplete, and it will be some time before we can realize the benefits therefrom. Until then, we must depend upon cesspools and privy vaults for the reception of our filth. These are cleaned by licensed scavengers, and the contents removed to remote places outside of the city limits.

House-to-house inspections are being constantly made by our inspectors, and we have derived great benefit from this system. In the plumbing department much has been accomplished. With the improvements constantly taking place in plumbing, and with our present rules on this subject, this branch of the department has been very effective. Complaints of defective plumbing and drainage in old buildings reach this office frequently. The work of most of them was not constructed in accordance with any sanitary plan, and although it entails quite a heavy expense to owner, the majority are willing to make the necessary changes in the interests of public health. The number of permits granted to construct plumbing systems was 206;

master plumbers registered, 38 ; suits entered for violation of plumbing code, 3, in which judgment was obtained in all.

The whole number of contagious diseases during the year was 142, against 227 last year. They were as follows :

Diphtheria, 51, of which 7 proved fatal ; scarlet fever, 74, of which 4 proved fatal ; membranous croup, 9, of which 8 proved fatal ; small-pox, 8, of which 3 proved fatal.

One hundred and forty-two houses were fumigated.

There are no manufactories within the city limits that carry on a business which may become a nuisance. The main industry is the manufacture of soft felt hats. We have no slaughter-houses and but one wholesale meat concern, and this establishment is kept in a sanitary condition.

A supplement to the "Sanitary and Plumbing Code" was passed recently. This supplement regulates the keeping of cattle and their stables, and calls for the appointment of a veterinarian. A pathologist was also appointed, to carry on bacteriological work in case of the advent of cholera.

During the past year our inspectors have carefully looked into every nuisance that came under our observation ; the result has been that the city is, at present, in a better sanitary condition than in years, and with our sewerage system once complete we hope to successfully battle with any epidemic that may appear.

HARRY E. MATTHEWS,
Chief Health Inspector,
Per WM. SCHLUER.

SOUTH ORANGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alexander Melville, South Orange ; Charles H. Beach, South Orange ; Clinton E. Brush, South Orange ; Hugh Conlon, South Orange ; John Diefenthaler, Vailsburg. Wm. J. Heberton, Health Inspector.

The health of the township has been good the last year, and only a few cases of scarlet fever or diphtheria reported.

There has been very little complaint of nuisance during the year, all of which have been remedied by direction of the Board.

THOS. C. BAKER,
Secretary.

SOUTH ORANGE VILLAGE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. F. Church, President ; C. E. Billgrist, F. A. Wright, W. McCoy, A. C. Babson. Wm. J. Chandler, M. D., Health Inspector. Post-office address of all, South Orange.

No change from report of last year. But few nuisances to abate. Very few contagious diseases.

VERONA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Malcom Hioms, Chairman ; Austin G. Jacobus, Fillmore Condit, Gustave Cimmialter, Henry V. H. Jacobus, Dr. A. B. Whitehorn, Health Inspector. Post-office address of all, Verona.

CHARLES W. OUGNELSON.

TOWNSHIP OF WEST ORANGE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John B. Lander, President, West Orange ; Frederick Cummings, Treasurer, Orange Valley ; Simeon H. Rollinson, Secretary, West Orange ; Carl Fentzlaff, Pleasantdale ; John Harrison, West Orange ; John A. Brundage, West Orange ; William M. Brien, M.D., West Orange ; William M. Brien, M.D., Health Inspector.

The township of West Orange is located in Essex county ; the population is about 4,500, and the climate is variable.

Minerals of various kinds are to be found in small quantities, but granite and sandstone abound in large quantities. The county is mountainous.

Water is supplied the residents of the township by the West Orange Water Company, who get their water from the Pequannock watershed. As the water has lately been introduced, not more than fifty families are using it at present, but the number is increasing.

We have no drainage or sewerage system, each house owner provides for his drainage by cesspool or other ways.

The streets and roads are in good condition—a majority of them made with crushed stone.

There are few houses that have more than three families, most of them only one. As a rule they are well built and healthful.

The highways are lighted by electricity.

Refuse and excreta are provided for by vaults, and are emptied when necessary.

There are no markets in the township.

We have had no epidemic among animals during the past year.

There is one slaughter-house, mostly for sheep and pigs, in proper sanitary condition.

Hatting is the principal industry. The improved ventilation in the factories, and the reduced amount of mercury under improved processes, has greatly increased the average life of men employed at this trade.

The school accommodations are ample and inferior to none of similar grade.

There is no hospital in the township.

One police station is located in the township.

Fire-guards and escapes are on some of the larger buildings.

There are two cemeteries well and properly managed.

The ordinances recommended by the State Board for townships were adopted September 20, 1892.

During the past year there have been of scarlet fever 28 cases—21 recoveries, 7 deaths; diphtheria, 5 cases—4 recoveries, 1 death; membranous croup, 1 case—1 death.

SIMEON H. ROLLINSON,
Secretary.

GLOUCESTER COUNTY.

CLAYTON BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. H. Atkinson, President; A. G. Silver, D. W. Moore, Jr., H. J. Buckingham, Secretary and Health Inspector. Post-office address of all, Clayton.

The health of Clayton borough has been good during the past year.

No epidemics during the summer or autumn. During the winter and spring there were fatal cases of diphtheria in three different families. The Board of Health was prompt to take precautions to prevent its spreading; and thorough cleansing of the houses was ordered, as well as the use of disinfectants.

The garbage from back yards and excreta from privies have been removed oftener than in previous years, and utilized as farm fertilizer.

A large number of school children have been vaccinated by order of the Trustees.

The manufacture of glass is the principal business of the town. The factories and yards are kept in good sanitary condition.

The drainage and sewerage of the borough is improving from year to year.

The Board of Health have been kindly aided and encouraged in their work by the co-operation of the Borough Council.

H. G. BUCKINGHAM, M.D.,
Secretary and Health Inspector.

DEPTFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. M. Leap, Chairman, Wenonah; Joseph Noblit, Wenonah; Joshua E. Cunard, Almonesson; William C. Cattell, Assessor and Secretary, Wenonah; Harry A. Stout, Township Physician, Wenonah.

The Board passed a supplement to the ordinance this year prohibiting the keeping of pigs in towns, as there was a pen of about eighty hogs kept in Woodbury park which were not properly cared for, causing very much annoyance to the place; being left in such a state as to greatly endanger the health of the persons living in that vicinity. Not until the Board had served the regular notice and brought the attention of the State Health Inspector to the nuisance did the proprietor very reluctantly remove them.

The sanitary arrangements and the health of the township are in a very good condition at present.

WM. C. CATTELL,
Assessor.

EAST GREENWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Dawson, Mickleton; John Rambo, Jr., Paulsboro; E. H. Steward, Clarksboro; H. S. Haines, Clarksboro.

Water from wells. Dwellings occupied by one family. Whooping cough and measles have prevailed.

ELK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William H. Brown, Assessor, Hardingville; Damon Hitchner, Aura; Andrew J. Proud, Glassboro; Peter S. Scott, Ferrell.

Water is obtained by means of wells, with a few exceptions of springs. The water varies. In some wells it is soft, while in others it is hard. Greater care is taken of the wells than formerly, and almost every farmer has his well cleaned out every summer.

Drainage is done mostly by tile, but some open ditches are necessary where the stream is too large to be carried by means of tile.

Houses are large and commodious, well ventilated. But few are occupied by more than one family.

Refuse vegetables the farmers sometimes use as fertilizer. For example, rotten potatoes and all other refuse which can be used profitably is used in the same way. The remainder is buried.

No infectious disease has prevailed among the animals of township this year, and no special attention given to that subject.

We have but one slaughter-house, and that a small one, and kept clean and in good condition.

Factories are few, but trades or tradesmen are many. Basket factories constitute what are in the place.

Schools are in a thrifty condition. The school-houses and churches constitute what public buildings we have, which are in proper condition.

The cemeteries are not taken as much care of as they should be. The grounds are not kept trimmed properly, and the walks cleaned.

Heat is obtained by the use of stoves.

The Board has done but little the past year, as no contagious diseases have been among us, and no improvements have been made.

There is no resident physician in this township, and there is no medical member.

WILLIAM H. BROWN.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles D. Smith, President, Franklinville; Sam Lowden, Newfield; J. K. Richman, Malaga; Dr. A. A. Smith, Malaga; Joshua C. Richman, Assessor.

2,000 population. Very healthy for past year. Nothing to report. No school district with over 600 population.

We had one complaint about some Jew family living at Malaga. At one of the Committee sessions we went in a body and gave the premises a thorough inspection. Since that there has been no complaint.

JOSHUA C. RICHMAN.

GLASSBORO TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. H. Beckelt, M. J. Suffhazy, M.D.; Secretary; Thomas Allen, J. Z. Stanger, Edward Munyan, Health Inspector. Post-office address of all, Glassboro.

Population 1.9 to the acre.

Water good.

No sewerage; surface-water drainage and good. Cellars generally dry.

Houses with cellars. No basement. The cellars used exclusively for the storage of vegetables, &c. No cesspools. Common water-closets used. Contents above ground and used for fertilizing purposes.

No loss of animals from contagious disease.

No slaughter-houses in town limits.

Canning factory outside of town limits; kept in good order.

Expenses for sanitary purposes amounting to \$94.00 for past year.

Prevalent diseases about the same as last year, except slight increase of typhoid fever. At present the health of township very good.

General inspection by Inspector.

M. J. SUFFHASY, M.D.,
Secretary.

GREENWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Francis Tracy, Chairman, Paulsboro; Eli B. Allen, Gibbstown; Charles E Paul, Paulsboro; Jacob Ballinger, Secretary, Paulsboro.

Open wells; water discolored in times of heavy storms; generally soft.

Surface drainage; no swamps.

No house-to-house inspection.

No sewers; cesspools, open bottom; cleaned once a year and taken out in the country on farms.

No slaughter-houses.

JACOB BALLINGER,
Assessor.

HARRISON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jonathan Foster, President, Jefferson; Joseph Kirkbride, Richwood; James White, Mullica Hill; Eli Heritage, Secretary, Richwood.

Board met at Richwood station on complaint of the smell of manure being unloaded from cars. The Board notified the railroad company to have the grounds around the station cleaned up and the manure, which was about a foot deep, to be cleaned up and drainage opened, which they did. Our villages are small and there is not much to be seen after.

ELI HERITAGE,
Secretary.

LOGAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hance Helms, Repaupo; J. Clark Helms, Repaupo; Hewey McGlinsey, Bridgeport; Smith Shoemaker, Bridgeport; E. T. Oliphant, M.D., Bridgeport; E. T. Oliphant, M.D., Health Inspector.

Nothing special to report, except we have had no epidemics of any kind.

E. T. OLIPHANT, M.D.,
Health Inspector.

MANTUA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alfred Carson, Mantua; Jos. Lodge, Pitman Grove; John Sharp, Barnsboro; P. P. Watson, Pitman Grove; Dr. E. Z. Hillegass, Health Inspector, Mantua.

Water-supply from wells. No discoloration of water, nor any bad taste. It is hard and good at all times.

No system of drainage. Cellars always dry. No swamps near by.

Our houses generally have cellars. Some few are used for the storage of vegetables. No tenement houses. No yearly house-to-house inspection.

We have no sewers. Our cess-pools are built with open bottom. The contents are carted away and used as fertilizer.

No prevalent diseases. The Assessor does not inquire as to losses of animals nor to contagious diseases.

Our slaughter-houses are inspected regularly.

No new manufactories.

Our Board has passed ordinances.

Our Board met on several occasions, all being present. We had a few complaints of existing nuisances, but they were promptly abated after being notified by the Local Board of Health.

MONROE TOWNSHIP AND WILLIAMSTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. S. Champion, Chairman; R. F. Tice, William F. Tweed, John W. McClure, Secretary; J. Gaunt Edwards, M. D., Medical Examiner. Post-office address of all, Williamstown.

The population of Williamstown is about 1,600, and the surrounding district about 500 more, chiefly whites and Americans. The surrounding country is exceedingly level, no hills of any importance being found for miles around. The town is situated upon a table-land or the watershed between the Delaware on the west and Atlantic on the east, no creeks, ponds or water being near the town. The water supply is wholly from the wells, which average a depth of fifteen to twenty feet; the quality of the water is hard but excellent. No system of drainage is to be had. Some of the dwellings have water during the wet season in their cellars.

The streets are in bad shape, and ill fitted for drainage. The town being unincorporated the lights are wholly private. The refuse and excreta are gathered by private parties and removed for fuel, &c.

The chief business interests are the glass manufacturing, three pickling and canning factories.

Two school-houses are used, the larger one of which in some of its apartments is very poorly arranged for ventilation, &c.

The police lock-up quarters are under ground and very damp.

Three cemeteries exist, two of which are in the midst of the town.

The Board adopted a rigid code of laws, and all efforts made to enforce them, and all nuisances and complaints promptly investigated.

No epidemics have existed since last winter, when diphtheria broke out, but by active sanitary methods adopted by the Board the disease was greatly restricted.

The Board of Health held several meetings early in the spring, and took active legal measures to prevent the unloading of car loads of manure in the vicinity of the town. One of the glass firms has built a gas producer for the purpose of melting glass, which at times threatens to be unpleasant and annoying from the gas and smoke emanating therefrom.

J. GAUNT EDWARDS, M.D.,
Inspector.

J. W. McCLURE,
Secretary.

SOUTH HARRISON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alfred Lippincott, Charles K. Horner, Jos. Cheesman, Amos T. Eastlack, Samuel F. Stanger, M.D., Secretary. Post-office address of all, Harrisonville.

The health of South Harrison has been unusually good, considering the fact that our water-supply has been very poor during most of the summer months. The source of our supply is from wells and cisterns, and much of the time they have been nearly or quite dry. And when the water is low it is quite offensive and unfit for use.

SAMUEL F. STANGER, M.D.,
Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Evan Davis, Hurffville; B. Frank Allen, Hurffville; Alfred R. Randle, Hurffville; Cyrus B. Philips, M. D., Hurffville; Charles D. Nicholson, Turnerville.

WEST DEPTFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John C. Budd, John W. Leonard, Jas. M. Wilkins, Mark Clement. Dr. Wilson, Inspector. Post-office address of all, Woodbury.

There is very little to report from our township this year. The health of the township has been very good. No nuisances have been reported. The Board organized at the usual time. No meetings since.

MARK CLEMENT,
Secretary.

WOODBURY CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Warner Underwood, President; William M. Carter, Secretary; A. L. Terry, Treasurer; Dr. T. E. Parker, Inspector; Charles Walton, Dr. William C. Williams. Post-office address of all, Woodbury.

In early spring a house-to-house inspection was undertaken and all garbage ordered removed and water-closets cleaned. This order was promptly and generally obeyed and as a result there have been but few complaints made during the summer, and the city has remained in a good sanitary condition. At first the house-to-house visitation was

strenuously objected to in many cases, but by quiet persistence and a strict adherence to the code, the consensus of opinion has changed and praise taken the place of censure.

Water-closets, garbage and waste-water are our greatest trouble from want of sewerage. This question is receiving attention by Council and steps are being taken towards an early introduction of sewers. The health of the community has been good; no epidemics, a few mild but no fatal cases of typhoid fever.

We have plenty of good water and the city supply is growing into favor and wells are being abandoned and filled up. During the severe cold weather of last winter there was much complaint from the water having an unpleasant taste. A careful analysis was made, but nothing obnoxious was found. The distributing reservoirs had become completely closed over by a thick coat of ice, the removal of which purified the water, proving the advisability of open reservoirs.

There is no register made of horses or cows and the code forbids pigs in close proximity to houses.

New ordinances relative to the report of contagious diseases and separate ones for deaths from the same have been made, and care is taken to prevent the spread of such diseases by isolation and requesting members of infected families to remain from public gatherings, schools and workshops. Proprietors of factories show a willing co-operation and prefer to pay such employes full pay while they remain out rather than permit any possibility of contagion.

The Board of Health is receiving more support and is being looked upon as a necessary factor of good government.

T. E. PARKER, M.D.,
Inspector.

WOOLWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Meley, President; James Batten, Alfred A. Bradshaw, Samuel Avis, Secretary; Benjamin F. Buzby, M. D. Post-office address of all, Swedesboro.

No diseases of animals.

No complaints of slaughter-house.

Public health laws and regulations were read at a public meeting of the Board.

There has been no prevalent or contagious diseases.

The Board has held six meetings the present year, chiefly on account of complaints by the residents of Swedesboro, near Raccoon creek, of the offensiveness of the landing and storage of manure on the wharves by the owners thereof during the warm weather.

The Board decided that the landing of the manure during the summer months was detrimental to the health and comfort of the citizens of the township residing near the landing, and notified all owners of wharves in Swedesboro that they would not be allowed to land any manure for storage from May 15th to September 15th, under the penalty for violation of section 3 of the code of ordinances for the preservation of the health of the township.

One wharf owner persisted in bringing manure, and was arrested and taken before a Justice of the Peace, who declared him guilty and liable for the penalty, but allowed him to appeal to the Circuit Court, where the case has not yet been decided.

The same wharf owner brought another boat load of manure to his wharf, but had an injunction from the Court of Chancery served on him prohibiting him from unloading it, which was subsequently modified, so far as that particular load was concerned, allowing him to unload it in wagons or carts and haul it away immediately without delay, but not to deposit any of it upon the wharf.

The case is still before the Court of Chancery awaiting a final hearing. And since the 15th of September the business has been resumed by all the wharf owners without objection.

Several other complaints of nuisances were attended to, and said nuisances abated at once without trouble.

SAMUEL AVIS,
Secretary.

HUDSON COUNTY.

HUDSON COUNTY BOARD OF HEALTH REPORT.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. W. Varick, M.D., President; C. B. Converse, M.D., C. Holmes McNeil. Post-office address of all, Jersey City.

The Board took occasion, owing to certain complaints, to examine into the sanitary condition of a number of the schools of Jersey City. The findings of the Inspectors were duly forwarded to the Honorable the Board of Education of Jersey City.

Many complaints were received against the slaughter-house at Paterson Plank Road, at Homestead Station, North Bergen. It was declared a nuisance, and abated by the tearing down of the building.

By arrangement made with the United States Commissioner of Immigration the Board now receives promptly communications giving notice of arrival of any vessel at this port which may contain contagious disease, with lists of names and destination of passengers, when necessary. This renders it a comparatively easy task to keep under surveillance. Complaints were from time to time made of the garbage-encumbered condition of Railroad avenue, Jersey City. It was found to be in places much covered with filthy garbage. This condition of the street has since been much improved.

The section of Jersey City, in the neighborhood of Grand street and Pacific avenue, was being filled up by the L. V. R. R. and National Storage Company. By the action of the Board the whole was covered with clean earth and brought up to grade.

In Harrison a house-to-house inspection of Harrison avenue was ordered to determine if connected with the new sewer. Notices were sent out to those not connected, and a general compliance followed.

Complaint was received of cases of illness said to result from using the water of a well on Ocean avenue, Jersey City. The Board's chemist, Mr. Geo. W. C. Phillips, made an analysis and found the water to be bad. The Board ordered the well filled up. Some cases of typhoid fever were supposed to have arisen from the use of this water.

From January 1st, 1892, to November 21st, 1892, there were forty cases of small-pox treated at the contagious disease hospital at Snake Hill, of these five died.

At the outset of the small-pox outbreak much difficulty was placed in the way of the Board by the concealment of cases by certain of the Italian residents of Jersey City. They violently opposed removal. But after the persons (children) taken had returned home cured and reported the good care and treatment, the gratitude of these people was marked as their previous hostility.

A very large amount of vaccination was done; fumigation and destruction of bedding, &c., was practiced, so that, though one hundred

and forty-nine cases were reported at this writing, the disease is under control and practically stamped out.

The dumping of garbage, night soil, &c., on Orient avenue, Jersey City, and adjacent lots was complained of. It was found that only good dry earth was used for filling. The ground is low and water settles there, however further filling was forbidden.

The new contagious-disease hospital is approaching completion.

The report of Dr. Converse of cases of small-pox treated by him at the hospital at Snake Hill showed that 60 cases had been received up to January 3d, 1893, of whom 12 had died.

The large number of piggeries and cow stables in Secaucus, North Bergen, were visited by Inspector Allen and H. W. Winfield, Esq., counsel; to the number of twenty-four they were found to be in a filthy condition, and the matter was to be brought to the attention of the grand jury.

C. J. ROONEY, JR.,
Acting Clerk.

CITY OF BAYONNE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hon. Wm. C. Farr, Mayor, President; John W. Goddard, President of Council; Wm. Burrows, First ward, removed to Fanwood; F. F. Martinez, Jr., Second ward; S. V. Morris, M.D., Third ward; James Brady, Fourth ward; George A. Schmidt, Fifth ward. Robert G. Nolan, M.D., Health Inspector; Caspar Schmidt, Deputy Inspector; Charles H. Hosford, Sanitary Inspector.

The year just passed has been a busy one for our Board. The results are apparent in the improved condition of the streets and the low death rate. We are still suffering from want of good drinking water, as the Montclair Water Company have made no move to supply us with water from their works, and we are forced to the use of "Passaic soup."

The sewer system is being extended slowly, insuring better drainage.

We have this year adopted a set of rules to govern the plumbing and sanitation of dwellings, and its good effects are apparent even at this early date.

About one thousand complaints were received and investigated.

An attempt was made to establish a fertilizer factory in the city, but, after considering the matter, this Board refused to grant a license.

F. F. MARTINEZ, JR.,
Secretary.

TOWN OF HARRISON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. M. F. Squier, President; William J. Davis, Vice-President; Florence T. Van Doren, Secretary; Dr. H. Allers, Dr. H. E. Roth, John Callaghan, Health Inspector. Post-office address of all, Harrison.

The Board of Health of the town of Harrison has labored with zeal, fidelity and success to promote the sanitary welfare of the town during the past year. Its operations embraced a close supervision of every possible source of foulness and ill health. It has accomplished numerous important reforms, abated many nuisances, and successfully grappled with all cases of contagious diseases. Since the publication and distribution of the sanitary code, adopted by the said Board in October, 1892, it has had the effect as desired; that is to say, in abating nuisances and causing nuisances that existed to be abated, and which prior to the adoption of said code, had existed. We receive our water-supply from the Jersey City Water Company, and the same is taken from the Passaic river. It is no worse than it has been, for the past year, but think it will soon be unfit for use, owing to the fact of so much drainage from the sewers into said river at Passaic, which is a short distance above the intake. This is a question to which I think great consideration will soon be given, and some definite action taken in relation to obtaining a more wholesome and better water-supply.

During the past year about one and a half miles of sewer has been built and nearly every property owner upon the line of the sewers that have been constructed have connected with the same. The Board does not allow any cesspools to be built where sewer connections can be had.

During the past year the Board has been very successful in having much of the low land whereon stagnant water has been, filled in with good soil. This has had the effect of preventing malaria. About two hundred water-closets and cesspools have been cleaned during the past year, and every nuisance reported to the Board and known to said Board to exist have been abated.

Very few cases of contagious disease have existed during the past year, and as soon as a case is reported to the Board a card is placed on

the house immediately, where such case of contagious disease exists, thereby preventing the disease from spreading, and as soon as the disease has passed the premises are disinfected.

In conclusion, the Board of Health of the town of Harrison takes great pleasure in reporting to the State Board of Health that the health of the town of Harrison is better than it has been during the past twenty years, and said Board will so continue to act as to keep the health up to that standard, so that it may be said that it is one of the healthiest towns in the State.

During the summer the Board meets twice a month, and during the winter one meeting is held each month.

FLORENCE T. VAN DOREN,
Secretary.

GUTTENBERG TOWNSHIP.

Report not received in time for printing.

HOBOKEN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Palmer Campbell, President; E. T. Steadman, M.D., L. V. Hengstler, L. S. Fugazzi, John Tallon, D. B. Pindar, Health Warden; F. L. Laverty, Clerk; Antonio Granelli, Health Inspector.

The water-supply for Hoboken is drawn from the Hackensack river, at New Milford. It is supplied by a private company, and is of excellent quality. All the houses in the city are supplied by it.

On our recommendation the Council has ordered plans drawn for a new system of sewerage, which we believe will benefit the city, especially the lower section, which is at present without proper sewerage. During the past summer we had the houses in the lower or tenement section of the city inspected by our inspectors, which resulted in the abatement of about 600 nuisances. During the past year we have had three cases of glanders, among horses; in each case the affected animal was destroyed and the stable disinfected.

A "Plumbing Code" was passed during the year, by which we expect to improve the sanitary condition of all the houses in the city. We also passed an ordinance, regulating the registry of cows. An inspection is made of all cow stables every three months, and the physical condition of all cows is looked into at the same time by a regular veterinary surgeon.

All quarantine regulations are of the best. In small-pox cases, when it is impossible for us to isolate the patients in their homes, we remove them to the small-pox hospital at Snake Hill.

We have vaccinated 600 persons during the year, mostly school children.

The city appropriated \$2,500 to meet the expenses of the Board for the year 1893 and 1894.

There were 253 contagious disease cases reported during the year, as follows:

	Small Pox.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Membranous Group.	Total.
November, 1892.....		1	15	2	8	26
December, 1892.....		23	8	1	6	38
January, 1893.....		21	7		2	30
February, 1893.....	1	7	11		5	24
March, 1893.....	1	9	12		3	25
April, 1893.....		5	10	1		16
May, 1893.....		6	10	1		17
June, 1893.....		10	6	1		17
July, 1893.....		8	3	4		15
August, 1893.....		15	3	3	3	24
September, 1893.....		5		2	3	10
October, 1893.....		5	4	2		11
Total.....	2	115	89	17	30	253

F. L. LAVERTY,
Clerk.

KEARNY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

President, H. C. Green, Arlington; Health Officer, J. A. Exton, M.D., Arlington; Health Inspector, William Rarick, Kearny; Clerk, J. N. Mathews, Arlington; John F. Keymer, Kearny avenue, Kearny; George G. Stillwell, Tapan street, Kearny; Adam Gilbert, Harrison avenue, Harrison; James M. Cougleton, Beech street, Arlington.

All houses have cellars. Very few have basement kitchens, and very few are used for storage of vegetables, etc. There are, perhaps, not more than twenty houses in the township occupied by more than two families. A house-to-house inspection was made last year, but none so far this year.

According to the health ordinance, all houses which have the city water, and are on a line with the sewer, are obliged to connect with the sewer. The record of the street sewer system and water purveyor shows this. The cesspools are not, as a rule, connected, for the reason that they were in operation previous to the introduction of sewer system, or the organization of the Health Board, but ordinances are being framed by the Board which will control their future construction. They are emptied in the same way as water-closets, and the contents carried away to the country and used as fertilizer.

There has been a few sporadic cases of typhoid and scarlet fever occurring in the fall of the year mostly. There is a register kept by the assessor of all cows, horses, pigs, goats, etc., and persons are required to renew their permits to keep the same on the first day of June of each year.

Slaughter-houses are inspected twice a year or whenever in the judgment of the Health Inspector it may be deemed necessary.

The school buildings are the same in number as last year. One new one, to cost \$18,000, is to be erected in the spring, in a quarter of the township where, at present, there is none.

Our Board has passed all the ordinances suggested by the State Board in the formation of new Boards, and continues to pass new ones as the necessity for them seems to require.

The water-supply of this (Kearny) township is derived from the Passaic river at a point just north of the town of Belleville, where the large plant used in pumping water into the reservoir for Jersey City's

use is located. This source, the Passaic river, is constantly becoming more and more polluted by the different industries located upon its bank which discharge their debris into the river, to say nothing of the sewers from the cities of Newark, Woodside, Belleville, Orange, Bloomfield, Passaic and Paterson, which terminate at its convenient west bank.

In the township of Kearny about 5,000 houses make use of this water. It is discolored about one-half of the time, and has an iron taste; it is of that variety known as hard, and is especially bad in the spring and summer months. The reservoir has not been cleaned in many years.

A large number of the residents have cisterns which have acceptable filters and prove a healthful boon to the consumer. The Health Board have a list of those who do use the water-supply.

There is no special organized system, as the sewers and the natural level of the land is favorable to the requisite drainage. The flats, or meadows, as they are known throughout the State, lie adjacent to the whole east line of the township; but it cannot be said, with adherence to the truth, that these are productive of malarial diseases, as some of the oldest inhabitants have lived on this line all their lives and have never been sick.

With regard to sewers, Kearny township has eight miles of sewers; of this some four (4) miles is brick, 6 feet by 5 feet, and the balance pipe of the various sizes, according to the work intended for them to do. They are flushed only by the rains, and ventilated in the usual way, and have been in operation about two years. New sewers are being laid each year as the improvement of the township progresses.

The Board continues to congratulate itself upon the ready acquiescence of the people in obeying the health laws and regulations, and we can already see the good results accomplished by the steady enforcement of the same.

Some trouble has arisen in the past year with reference to the physicians sending in their reports, but a little persuasion and some threatening has brought about a good understanding.

By a special arrangement with the County Board the collection and collation of vital statistics is made by the latter Board, thus relieving us of a large amount of work, and having a headquarters, as it were, for such matters, free and convenient to the whole county.

With reference to the care of contagious diseases, and their quarantine, I would say, that all houses containing cases of contagious diseases are placarded at once, and this card is not allowed to be removed until the physician in charge reports the danger at an end.

Vaccination and re-vaccination is carried out to its utmost extent, and certificates to this effect are required of all school children.

The sanitary expenses for the past year were about \$800, including everything pertaining to the Health Board.

The Board have during the year had both chemical and bacteriological examinations made of the water from a number of wells in the township, with a view to ascertain more definitely the true constituency of the water of the town, as the subject of driven wells is now agitating the minds of the people, and the prospect of controlling our own water-supply will be the subject uppermost in our minds.

JAMES A. EXTON, M.D.,
Health Officer.

JERSEY CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Feeney, President; James E. Kelley, Benjamin Van Keuren, Dr. Hoffman. Daniel W. Benjamin, Inspector. Post-office address of all, Jersey City.

I herewith submit the following report of the business of this department for the year ending December 1st, 1893:

During the year we have visited 22,849 premises, finding 4,345 nuisances, and have been successful in securing the abatement of 5,443. Notices sent to owners and agents, 10,554.

What is needed most of all by this department is the enactment of such a code as will give more power to City Boards of Health in aiding them in the enforcement of ordinances and regulations thereto; also the co-operation of all citizens interested in the public welfare to aid us in our work of preventing sickness and death, and thus saving themselves trouble and the life, perhaps, of some member of their families.

The house-to-house inspection that was made during last summer accomplished valuable work, thereby practically proving the efficiency of the same.

CONTAGIOUS DISEASES.

	Membranous Croup.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Measles.	Small-pox.	Cholera.	Total.
December.....		9	4	2		25		40
January.....		2	5	2		26		35
February.....		5	6	1	3	20		35
March.....	1	6	2	1		23		32
April.....		5	2	1	2	12		22
May.....		5	6	1		12		24
June.....		4	2	2	1	3		12
July.....		5				6		11
August.....		2	1	10			7	20
September.....	1	2	10					13
October.....	1	10	2	3		1		16
November.....		14	2	1	2	2		21
	3	69	42	24	8	130	7	283

PERMITS GRANTED.

To clean privy vaults—

December.....	116
January.....	76
February.....	36
March.....	116
April.....	216
May.....	295
June.....	330
July.....	257
August.....	211
September.....	210
October.....	93
November.....	65
Total.....	2,221

Keep chickens.....	71
Rag pickers.....	65
Store rags.....	29
Hides and fat.....	7
Slaughter cattle and sheep.....	6
Slaughter chickens.....	1
To keep cows.....	146
To keep dogs.....	3,913

To build privy vaults.....	48
To build manure vaults.....	71
Unloading vessels.....	89
Swill wagons.....	12
Bone wagons.....	11
To cart hog hair.....	2
Wool pulling.....	1

Premises disinfected, 202.

Receipts, \$9,902.25.

Expenses, \$7,739.33.

Dead animals removed, 1,646.

VACCINATIONS.

December.....	391
January.....	590
February.....	510
March.....	481
April.....	325
May.....	10
July.....	25
August.....	6
September.....	30
October.....	123
November.....	169
Total.....	2,760

NUMBER OF NOTICES SENT.

December.....	301
January.....	535
February.....	87
March.....	519
April.....	514
May.....	2,019
June.....	1,675
July.....	1,290
August.....	1,875
September.....	1,305
October.....	133
November.....	301
Total.....	10,554

D. W. BENJAMIN,
Health Inspector.

NORTH BERGEN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Pinnell, New Durham; Abm. W. Duryee, New Durham; William Wilmington, New Durham; Romeo T. Churchill, New Durham; Edward Lusen, Fairview; George Bruce, Health Inspector, New Durham.

Northern part of Hudson county. Population, nearly six thousand. Climate, temperate.

Water supply from the Hackensack Water Company and wells.

We have no sewers.

Roads are in good condition.

Most of the houses have cellars.

We have no markets.

No contagious diseases.

The slaughter-houses are inspected.

There are six cemeteries in the township. There were interred from the first day of November, 1892, to September 1st, 1893 (ten months), one thousand seven hundred and ninety-three (1,793) bodies; there were disinterred from November 1st, 1892, to May 1st, 1893, one hundred (100) bodies.

The Board passed a cemetery ordinance regulating interments and disinterments.

The physician of the Board, Dr. Kortright, reports the present condition of the township is very good. Have had a very healthy summer, there being only a few cases of contagious diseases, and all necessary precautions were taken to prevent the spread.

The Board has inspected all the factories, swill-boiling and fat-rendering places several times during the summer.

J. CHARLES ENGLE,
Secretary.

TOWN OF UNION.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry Cohlmeier, Henry Gottlieb, John Merritt, Adam Miller, Assessor. Post-office address of all, Town of Union.

The above compose the Health Committee of the township.

TOWN OF UNION.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ord Darling, William Schmidt, Jacob Reihl, Francis Ryan, William Waller, Thomas F. Curry, Assessor. Post-office address of all, Guttenburg.

Population, 2,800.

Drainage imperfect.

Heating by stoves.

Water-supply from private company.

TOWN OF WEST HOBOKEN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William H. Righter, William H. Traune, John Tanner, John Traue, Henry Swaider, Clerk; Edward McDermott, Assessor; Dr. Meisgeier, Health Inspector. Post-office address of all, West Hoboken.

Water-supply by Hackensack Water Co., and is excellent.

Good sewerage system. About one-half of town drained, and being rapidly extended. The balance of town natural drainage.

About twenty-five miles of streets; mostly curbed; guttered; with macadam road-bed, and good sidewalks.

About 2,350 houses, majority frame cottages, with some three-story frame and some three-story brick tenement houses.

Refuse removed twice a week outside of town limits, and excreta by sewers where possible, otherwise by scavenger.

Vaccination compulsory in schools and factories.

Inspection and abatement of nuisances; enforcement of sanitary regulations, and quarantine; removing refuse twice a week in place of once; general compliance with sanitary regulations in tenements, and drainage of sunken lots.

WEEHAWKEN TOWNSHIP.

Report not received in time for printing.

HUNTERDON COUNTY.

ALEXANDRIA TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Weller, Chairman, Mt. Pleasant; E. H. Opdyke, Everittstown; David Phillips, Little York; M. D. Knight, Township Physician, Little York; Joseph P. Stout, Assessor, Everittstown.

Water-supply from wells and cisterns.

No prevalent diseases for this year. Health of the township usually good.

JOSEPH P. STOUT,
Assessor.

BETHLEHEM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. L. Shrope, Chairman, Junction; Stewart Rodenbaugh, Norton; J. V. Willever, Bloomsbury; G. A. Hackett, Secretary, Bloomsbury; E. L. Reigel, M.D., Bloomsbury.

We have had but one complaint to come before the Board this year, that was in connection with the L. V. R. R. Co. for dumping garbage along the railroad bank, which nuisance is now abated.

No contagious diseases in the township in the past year.

The Board has held two meetings since last year, the last one on September 30th.

TOWN OF CLINTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Eras. Runyan, President; E. O. Howell, Inspector; Wm. Knight, M.D., Physician; Charles Crampton, Secretary; Joseph Berry. Post-office address of all, Clinton.

The Board report the same as last year. No prevalent disease during the year. Very little of interest has come before the Board, as no occasion has required it.

CLINTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Case, Hamden; Luther Hoffman, Lebanon; George Cregar, Annandale; Bergen B. Berkaw, Annandale; W. E. Berkaw, Annandale.

No public water-supply in the township. Wells, cisterns and natural springs are the only means of water-supply.

Drainage is directed by the general contour of the surface.

Cellars are mostly dry.

"Malaria" is not at all frequent in this township.

No sewers constructed in the township.

Houses, generally, have cellars, a small proportion being built with basements. Cellars are largely used for the storage of vegetables during the winter time.

No tenement houses in township, and no yearly house-to-house inspection.

Cesspools—a few are cemented, but the greater per cent. of them are built with open bottom or sides. Some are emptied, and the contents acted upon by lime, and spread upon the surface of the ground; but more frequently, when filled, they are covered with earth, and a new cesspool dug in the ground.

Diseases have during the past year been only those such as are usually seen; no severe fevers or contagious diseases.

No complaints against slaughter-houses have been received during the past year.

No new manufactories built during year.

The Board have passed no ordinances during the year; but have had an understanding that, if necessary, prompt action would be taken.

The Board met in March, 1893, and organized.

One meeting was had during the summer upon complaint against the proximity of hog-pens to dwelling-houses in the village of Lebanon. The Board directed extreme care in reference to keeping the pen clean, and directed the person offending to cease keeping hogs after removing those in the pen.

B. B. BERKAW,
Secretary.

DELAWARE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Isaac Lake, J. H. Holcombe, George N. Best, Joseph Servis, Reading M. Dilts.
Post-office address of all, Lambertville.

EAST AMWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ira Higgins, Wertsville; Theodore Y. Craft, Wertsville; Andrew Blackwell, Jr., Ringoes; P. C. Young, M.D., Health Inspector.

My previous annual reports to you from this township have always been very favorable and at this time and for the past year I cannot report any material change.

The sanitary condition of the township is very good.

No invasion of any zymotic diseases.

No house-to-house inspection of the village or township has been made, as I did not deem it necessary.

We shall conform strictly to the law and act promptly in any case of emergency.

P. C. YOUNG,
Health Inspector.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. Van Kirrey, Sidney; A. C. Ward, Croton; Dr. Q. E. Snyder, Quakertown; E. B. Suydam, Quakertown; George W. Snyder, Quakertown.

MERCER COUNTY.

EWING TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel T. Atchley, President, Ewingville; James F. Herbert, Trenton Junction; Horace G. Hough, Trenton, Box 356; John Stockton Hough, Trenton; Harry L. Cornell, Clerk, Ewingville.

(Hunterdon County Continued.)

FRENCHTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. B. Nash, M.D., Geo. F. Bloom, Wm. P. Loper, Health Inspector; Robt. McIntyre, O. R. Kugler. Post-office address of all, Frenchtown.

Our report does not vary in any particular from last year.

O. R. KUGLER,
Secretary.

HIGH BRIDGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David M. Sharp, Chairman, Annandale; T. F. Budlong, High Bridge; J. N. Miller, Califon; L. W. Dorland, Secretary, High Bridge; W. C. Alpaugh, Health Inspector, High Bridge.

There has not been any epidemic during the year, and health has been universally good. The Health Board urged the importance that nothing rotten or offensive be left in the cellars. Hogs are allowed to be kept in the village. The Board has complaints from time to time of the filthy condition and bad odor from these pens. The owners are required to lay floors and use plenty of dry litter for absorbent.

The water-supply is mostly from wells. There is need of a more thorough system to prevent the accumulation of garbage and refuse in back yards and streets.

L. W. DORLAND,
Secretary.

HOLLAND TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Stern, President, Milford; Theodore Winters, Finesville; Ervin D. Huff, Warren Paper Mill; Dr. Charles R. Darnell, Milford; Matthias Wean, Assessor, Mount Pleasant.

No epidemic among our animals. One slaughter-house in the village of Milford, the only one in township, and is kept in good order. School-houses all right. No public buildings. Our poor are kept among their friends. Public health very good. Board has done nothing except to organize. No complaint has been made to the Board this year.

(Hunterdon County Continued.)

KINGWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. B. Chamberlain, President; George E. Dalrymple, Secretary; George Striker, Wesley Johnson, E. D. Leidy, M.D., Health Inspector. Post-office address of all, Baptisttown.

The report of this year is nearly the same as last year, except that we had an epidemic of whooping-cough during the past spring; also measles have been prevalent in the early part of the year. At present we have several cases of scarlet fever in a mild form.

E. D. LEIDY.

LAMBERTVILLE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Gervas Ely, President; W. H. Wilmot, Clerk; John L. Coryell, William A. Cole, G. L. Swallow, J. A. Horn, Dr. Peter McGill. Post-office address of all, Lambertville.

No sewers as yet, but there is a commission working upon a plan. No house-to-house inspection this year. Between \$75 and \$80 expended. Thirty-one cases of scarlet fever and sixteen cases of diphtheria. We have carefully watched all the cases of contagious diseases to see that a proper quarantine was preserved, and in case of death that no exposure of the body was made. The cleansing of cesspools and water-closets has been going on all the year.

LEBANON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

I. J. Eyears, Glen Gardner; Joseph Fritts, Glen Gardner; Andrew C. Cregar, Califon; A. S. Banghart, Secretary, Glen Gardner; Theodore B. Fulper, M.D., Health Inspector, Glen Gardner.

Our water-supply comes principally from wells; a few cisterns and springs. The water is pure and mostly hard. We are having water put in our town from a large spring, being done by a private company.

We have no system of drainage. No swamps to mention. Malaria infrequent. Houses have cellars; most of them are dry and used for storage for vegetables. No tenement-houses. No yearly house-to-house inspection. We have no sewers. Cesspools are built with open bottoms and sides. Contents are either buried or used as fertilizer.

No prevalent diseases of animals. The Assessor does not inquire as to losses of animals and as to contagious diseases. Slaughter-houses,

(Hunterdon County Continued.)

as a rule, are in good condition. The burials are performed in conformity to the law. The cemeteries are in good condition. Schools and public buildings are kept in first-class sanitary condition. Our township poor home is in excellent sanitary condition. Our Board has passed ordinances. The collections of vital statistics are reported monthly. Vaccination seems to have been almost entirely neglected.

Our dwellings are chiefly heated with stoves; some few heaters. Ventilation is good. There has been no prevalent diseases during the year. Have had few cases of typhoid fever, diphtheria, scarlet fever. Proper precautions were taken to prevent spread of diseases.

Our Board has done very little during the year. Had one meeting, and inspected a nuisance in the shape of stagnant water, produced by draining, so that it accumulated in one place, and no way being made to carry it away. No action has been taken in the matter, except notifying proper parties.

THEO. B. FULPER, M.D.

RARITAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Thatcher, President; Wilson B. Moore, E. S. Wyckoff, Andrew J. Green, Secretary; John H. Ewing, M.D., Health Inspector. Post-office address of all, Flemington.

The children attending the public school at Flemington were vaccinated during summer vacation by order of the School Trustees.

The expenses of the Board for the past year were about \$150. There were as many as seventy-five (75) cases of diphtheria in Flemington and township last winter and spring. No other epidemic. The commissioners of Flemington ordered a survey of the town for the purpose of building sewers. The question was submitted to the citizens and was rejected. The Board has inspected and abated a number of minor nuisances. There has been no improvement in the drainage of the town of Flemington during the past year.

ANDREW J. GREEN,
Secretary.

READINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cyrus A. Conover, White House Station; W. W. Pursell, M.D., White House Station; John V. F. Schomp, White House Station; David T. Stryker, White House Station; Wm. D. Emsoll, White House Station; Wm. M. Dalley, Three Bridges.

There has been but little sickness in our township during the past year. We had a few cases of scarlet fever, brought in here from one of lower counties, but it was confined to the one family. The Board has met three times on receiving complaints.

D. T. STRYKER,
Secretary.

(Hunterdon County Continued.)

TEWKSBURY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Benjamin W. Backer, Chairman, Califon; David C. Farley, Secretary, Mountainville; Francis A. Apgar, M.D., Health Inspector, New Germantown; Austin Clark, New Germantown; Abram A. Alpaugh, Cokesbury.

The above Board met at the hotel, in New Germantown, on April 1st, 1893, and adopted a code of ordinances, and posted the same throughout the township. The Board has not met since April 1st. There has been two complaints made, which have been looked after promptly by the Chairman and Secretary. The health of our township has never been better than it has been the past year.

DAVID C. FARLEY,
Secretary.

UNION TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Frace, Norton; Jas. H. Exton, High Bridge; Sylvester Taylor, Chairman, Pittstown; N. B. Bolieau, M.D., Health Inspector, Jutland; Morris Stockton, Clerk, Pattenburg.

The medical member of the Board states that the health of the township is at present good. No contagious disease. Our Board is well organized. No cases of any kind have been laid before the Board during the year. Our last meeting was held on October 21st, 1893.

MORRIS STOCKTON.

WEST AMWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. B. Drake, President, Lambertville; R. H. Fisher, Lambertville; Joseph K. Leigh, Lambertville; Geo. E. Van Buskirk, Secretary, Health Inspector, Lambertville; William Radcliffe, M.D., Woodville, Mercer county.

West Amwell township is situated in the extreme southern part of Hunterdon county. Its drainage is generally good. The health of the township is good, as a rule. Last December there were six cases of diphtheria in one family, of which three died. The Board of Health took action in the case and furnished medical attendance and nurse, and had the clothing of the family burned and the house cleaned. The Board of Health organized and passed a code of ordinances for the preservation of the health of the township, said code of ordinances being passed February 25th, 1893.

GEORGE E. VAN BUSKIRK,
Secretary.

Houses generally have cellars and are used for the storage of vegetables. No tenements with more than one family. No house-to-house inspection.

Hog-cholera in three herds and about thirty-five hogs of which died. All three herds were fed on kitchen garbage. The Assessor has not thus far made any inquiry as to the loss of animals and as to contagious diseases, but has been instructed to make inquiry in this direction when making next assessment.

The Hemacite knob works moved in the township and manufacture knobs from blood and sawdust. The neighboring households, in the month of July, petitioned the Board of Health to investigate and abate the nuisance, arising from decomposing blood. The Board met at the works and instructed the superintendent to abate the nuisance at once.

New cemetery, to be known as the Ewing Cemetery Association.

We have no practitioner of medicine in this township.

There were several cases of diphtheria in Frazier street in the fall of 1892, two of which died. Also another family in which there were five cases of diphtheria, three of which died. No other cases of contagious diseases have been known to exist in the township.

SAMUEL T. ATCHLEY,
President.

EAST WINDSOR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. H. Cunningham, Jasper Hutchinson. Post-office address of all, Hightstown.

We have not had any complaints to the Township Board.

Borough of Hightstown has done the work in the township of East Windsor.

ADOLPHUS MESSLOR,
Assessor.

HAMILTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Geo. R. Robbins, Hamilton Square; David Lee, Hamilton Square; Thomas Applegate, Allentown; Benedict Kuser, Trenton; Wm. A. Blake, Allentown.

We have had no meetings during the year to adjust any nuisances, as no complaints have been made.

The Board have formed and adopted a code of laws during the year, said laws being adopted in order to prevent prevailing nuisances that existed in the township.

WM. A. BLAKE,
Secretary.

HOPEWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. P. Hart, Pennington; N. Stout Voorhees, Woodsville; T. R. Voorhees, President, Harbourton; Wm. D. Hill, Secretary, Glenmoore; Wm. M. Radcliffe, Health Inspector, Woodsville.

Board met February 15th, 1893; formed a code of ordinances by which to be governed. A notice of said meeting and its object in full, including resolutions passed and ordinances agreed upon, were issued in the Hopewell *Herald* for two weeks.

March 1st, 1893, attention of the Board was called to sickness existing in a tenement house situate near the Raymond Rubber Works, Titusville, N. J., which proved to be typhoid fever of a low type. The premises, also those adjoining, were placed under strict quarantine until all danger of further trouble was over. Five patients were found, two women and three men; one of each succumbed to the disease; were interred privately during the night. The premises throughout were thoroughly cleansed and disinfected.

The quarantine was raised and occupants released on March 18th. From facts obtained by this Board the impression was that germs of said disease were carried from New York city by a Scotchman who secured accommodations in said house, where over-crowding and filth existed.

The water from a well situate on said premises and used by its occupants, on examination, showed animal matter in great quantities, which was at once condemned and the well ordered cleaned thoroughly, which order, after some delay (through obstinacy), was executed.

The attention of this Board has not been called to any other contagious diseases.

The borough of Hopewell has a Health Board organized about August, 1893.

The borough of Pennington has none.

WM. D. HILL,
Secretary.

LAWRENCE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Clark Flock, Lawrence Station; William C. Brearley, Trenton; Samuel H. VanCleve, Lawrenceville; Isaac B. Baker, Lawrence Station; Edmond DeWitt, M.D., Lawrenceville.

We met the last Saturday in each month during the past year. Have had no nuisances of any kind, and the township is in an excellent sanitary condition. There were no complaints of any kind, and the township is in better health than it has been for several years past.

ISAAC B. BAKER,
Secretary.

BOROUGH OF PRINCETON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. E. H. Bergen, President; Prof. H. B. Cornwall, Thos. R. Hartpence, A. L. Rowland, W. B. Harris, H. H. Farr, Secretary; Jared D. Woolf, Sr., Health Inspector. Post-office address of all, Princeton.

Population, about 4,000.

City water works—artesian wells and small number of ordinary wells.

Good drainage; sewer undergoing construction.

Streets, about two-thirds macadamized, and curbed; the balance is hard bottom, and fair condition; lighted mainly by electricity (arc).

Garbage carried off by persons employed for the purpose—both by private and public moneys.

No epidemics.

Regular meetings on the first Monday of each month. Special meetings at call of President or Inspector.

All nuisances are promptly looked after, and abated in all cases as far as possible.

PRINCETON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. E. H. Bergen, President, Princeton; W. M. Wright, Secretary, Princeton; H. B. Bayles, Princeton; H. L. Robinson, Princeton; B. F. Gulick, Kingston; Dr. E. H. Bergen, Health Inspector.

The Township Board meets monthly from April to October, and everything is closely looked after.

The Borough Board meets monthly and for full report of above questions see their annual report, as they take in the largest part of our township.

WILLIAM M. WRIGHT,
Secretary.

CITY OF TRENTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. D. W. Vroom, President; Dr. Cornelius Shepherd, Thomas P Chambers, Samuel Walker, Jr., George W. McGuire, Dr. Charles P. Britton, Dr. Wm. McD. Struble. Wm. Cloke, Secretary; Wm. H. Mickel, Health Inspector; Daniel Freal and Harry Huff, Assistant Inspectors; Joseph Schaefer, Inspector of Plumbing. Post-office address of all, Trenton.

The most important work done by the Trenton Board of Health during the past year was the adoption of an ordinance to regulate the plumbing and drainage of buildings. The model ordinance prepared under the auspices of the State Board of Health was adopted as the basis, although a large number of other ordinances, including those of Asbury Park, Newark, Paterson, Washington, D. C., New York and other cities were studied and some of their best features incorporated. The ordinance has been in effect since July and is being energetically enforced by the Inspector of Plumbing, Mr. Schaefer.

The Board has been considering the subject of garbage disposal, in connection with a committee of conference appointed by Common Council. Several systems were examined, joint committees of the Board and Common Council having visited Richmond and Norfolk,

Va., to examine the Engle crematories in operation in those cities. It was the unanimous and enthusiastic testimony of the health authorities and other city officials of both places that the system was efficient and satisfactory in every way. It creates no nuisance, consumes the garbage completely and is economical. The Board also gave hearings to the representatives of several other crematory companies. But inasmuch as the destruction of garbage in this way is new, and rapid improvements are being made in the systems employed, it was deemed wise to go slow and wait a little before adopting a costly plant that might soon be rendered obsolete by improved systems.

The construction of sewers under the Hering plan is making rapid progress. The annual report of Mr. J. R. Fell, the engineer of sewers, shows that there had been built up to the close of the last fiscal year 65,978 feet of sewers. Since that time 20,539 feet more have been built, a total of 86,517 feet, or sixteen and two-fifths miles. The contract has also been awarded for a large brick sewer, 4,000 feet in length, on Clinton avenue. This is intended as an outlet sewer for all East Trenton, that will be shut off from sewerage until this outlet is provided.

The general sanitary supervision of the city by the Health Inspector and his assistants has been thorough and efficient. The city is in good sanitary condition. A careful oversight of the almshouse, hospitals, police stations and other institutions has been maintained, and all are well conducted and in excellent condition.

There is some uneasiness in regard to the water-supply. Investigations made by the State Board show that the source of supply is somewhat tainted by streams that flow into the river above the city's jurisdiction.

The Board has taken special action in compelling sewer connections and prohibiting sewerage into the streets. It has also shut off all private drainage into water-ways, and has looked after the cleaning of alleys, yards and premises generally.

During the year 54 cases of typhoid have been reported to the Board, 84 of scarlet fever, 11 of scarlatina, 5 of measles, 109 of diphtheria, 1 of diphtheritic croup, 2 of laryngitis, 1 of enteric fever, 2 of varioloid and one of small-pox.

WILLIAM CLOKE,
Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Forman Hutchinson, Windsor; Harrison Yard, Robbinsville; George Ford, Allentown; James P. Hutchinson, Secretary, Windsor; George A. Silver, M.D., Health Inspector.

Houses are all in good shape.

Water-closets outside of houses regularly cleaned.

Nothing has been done during the year.

WEST WINDSOR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob R. Wyckoff, Dutch Neck; Jasper H. Allen, Dutch Neck; David D. Bergen, Dutch Neck; S. Judson Allen, Lawrence Station; G. H. Franklin, Hightstown.

We have no organized Board of Health, therefore no report to make.

S. JUDSON ALLEN,
Assessor.

BOROUGH OF WILBUR.

The following letter has been received from the Borough Clerk:

E. M. HUNT, Esq.,

Secretary State Board of Health,

DEAR SIR—Yours of the 19th inst. received, also previous communications regarding Board of Health reports, which have been brought up before the Borough Council, and referred to committee, but no action having been taken at present towards organizing a Board of Health in the borough, I waived a reply till I could hear from the committee.

I would say that we have no report to make other than that the general health of the borough is good. The names of the borough officials are, respectively:

Mayor—Harry E. Barlow; residence, Greenwood avenue.

Councilmen—Fred Dawson, East State street; A. E. Carnagy, East State street; J. E. Stevenson, East State street; C. H. Christopher, Olden avenue.

Hoping the above may meet your requirements, I remain,

Yours very truly,

C. ERNEST FOX,
Borough Clerk.

MIDDLESEX COUNTY.

CRANBURY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Chamberlin, W. Elmer Bergen, Abram Voorhees, Frank A. Brown, Henry C. Symmes, M.D. Post-office address of all, Cranbury.

The Board has passed several ordinances during the last year in accordance with law, and have been active in their attention to the removal of all that might be detrimental to health. The township has been very free of epidemics.

EAST BRUNSWICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John O. Cozzens, Spottswood; John H. Perdun, Milltown; Conrad Kohlhepp, Milltown; George Roeder, Assessor, Milltown; S. M. Disbrow, M.D., Old Bridge.

The water-supply is from wells and cisterns for the most part. A few residences are supplied from the small streams or ponds of water near them. The borough of Helmetta is supplied from the pond of the George W. Helme Company in the borough.

The drainage is mostly natural and is good for the most part. There is very little sewerage in the township at present.

The most of the houses are occupied by one family only, and in most cases are owned by the occupants.

The health of the inhabitants of the township for the past year has been generally good.

There have been very few cases of contagious diseases. Animals have been free from contagious diseases, also; and the Board of Health and its officers have not had many meetings, but have been at all times watching over the welfare and health of the whole township.

The town of Washington, which is within the limits of the township of East Brunswick, has its own Board of Health.

GEORGE ROEDER,
Assessor.

BOROUGH OF LITTLE WASHINGTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Thompson, President; David Serviss, Secretary; Henry Herman, Charles Whitehead, A. C. Price. Post-office address of all, Washington.

No meetings during the year. No special organization. Have passed ordinances.

MADISON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cornelius Burlew, James Fountain, John C. Dill, S. M. Disbrow, D. H. Brown, Health Inspector. Post-office address of all, Old Bridge.

In its infancy our Board of Health has exercised every effort to watch over the health of the people of the township.

Six school-houses are situated in our township; all are in good condition.

Good water is obtained from wells and cisterns. There is no system of drainage but natural.

Small-pox is the only contagious disease that has been in our township, of which we have had five cases; of these one proved fatal; but by diligent efforts on the part of the Board of Health it was soon abated. The township at present is in good condition.

D. H. BROWN,
Secretary.

MONROE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Butcher, Hightstown; Samuel Perrine, Jamesburg; Charles A. Stults, Jamesburg; Charles Edwards, Jamesburg; C. G. Hoffman, Assessor, Jamesburg.

CITY OF NEW BRUNSWICK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry R. Baldwin, M.D., C. H. Voorhees, M.D., H. Brewster Willis, P. A. Shannon, M.D., George Litterest, H. B. Tindel, and A. V. N. Baldwin, M.D., Health Inspector. Post-office address of all, New Brunswick.

We have nothing of special interest to communicate to your honorable body, as the careful supervision of health matters of our city has placed the general health of our city beyond that of the past years.

The Board had a plan of separate pipe sewerage carefully prepared, embracing all that portion of the city not heretofore sewered under the supervision of the Commissioner of Streets and Sewers, which plan was approved by the Mayor and Common Council. The outlet for many blocks through Burnet street to the Raritan river, has been completed, and two mains therefrom, running up New and Oliver streets respectively, are now under way. This work has been done according to the aforesaid plan, under the control of the Common Council, and the money required therefor has been cheerfully appropriated by the citizens at the annual spring election. The illy-fitted, inadequate and unfortunately located City Hospital has been sold, and the proceeds, together with an appropriation of \$1,500, expended in the erection of a most approved pest-house, on the poor-farm outside the city limits.

This plan was prepared by the Board, and approved by the Mayor and Common Council. The building is sixty by thirty feet, and is well calculated for the purpose intended.

Hundreds of written complaints of the existence of nuisances have been received during the year, and in every instance has the nuisance complained of been removed or abated, to the satisfaction of the

Board, without any legal difficulty. The work of the Board is being more and more appreciated by our citizens.

The health report of the city for the year is of necessity very short and unusually good.

No epidemic has visited us, and the number of contagious diseases has been smaller than in any year in which the Board has kept a record. There have been fifteen cases of diphtheria reported, with seven deaths. Scarlet fever, ten cases reported and two deaths. Typhoid fever, four cases and three deaths. Measles, seven cases reported and no deaths. Small-pox, two cases and one death.

In March a case of small-pox appeared in the city, having been contracted somewhere near Princeton. Quarantining and all precautionary measures were adopted, and with the exception of another case in the same house, the disease was stamped out. The Board of Health has continued the same system of disinfection of streets as before reported, and we can only still further endorse the good effect of the method.

NORTH BRUNSWICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John N. Bodine, President, New Brunswick; Harry Dennison, New Brunswick; Charles Hoddapp, Milltown; Edwin Allen, Secretary, New Brunswick; F. E. Riva, M.D., Inspector, Milltown.

Water-supply by wells.

Drainage—No system, except by owners of dwellings; pipes are laid to carry off the surface waters and cellars are dry. There is very little malaria in the neighborhood.

Houses occupied by their owners, although two families are found in one house occasionally.

Refuse is looked after by the Board of Health whenever necessary. Most country houses have their "dumping grounds." The refuse in the borough of Milltown is carted away from the first of May to the first of November.

There has been no disease among animals.

Slaughter-houses are suspected and also the "tannery." This last has been a great annoyance to the neighbors as well as to the Board

of Health. A few weeks ago it was destroyed by fire, and all nuisance abated.

The schools are frame buildings heated by stoves and well ventilated as far as the building will allow it. There are no ventilators in any of the schools but the rooms are large enough to prevent the deterioration of air, as the rooms are not overcrowded.

The New Brunswick poor-farm is located in North Brunswick township, and this is the only building of its nature in the township.

There are five cemeteries in the township.

The public health has been good. There have been no ordinances passed by the Board of Health.

Vaccination is compulsory in the schools, and contagious diseases are quarantined.

There has been no sanitary expense by the Board, only in case of small-pox, which occurred in one family, then the Board of Health took the necessary steps to control the disease.

Remittent fevers, scarlet fever, measles, whooping cough, have prevailed.

The Borough Commission of Milltown is within the township and is an organized body.

CITY OF PERTH AMBOY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Patrick Convery, President; Herbert Dayton, Louis Fade, St. George Kempson, James V. Langan, William E. Ramsay, W. Guy Weaver. F. W. Kitchel, Secretary; W. A. McCarthy, Health Inspector. Post-office address of all, Perth Amboy.

The number of acres in this city is 2,700.

The water-supply is taken from Sennett's brook, Madison township. It is brought to the city under the Raritan river through eighteen-inch iron pipe. Its capacity is 3,000,000 gallons per every twenty-four hours; consumption, 900,000 gallons every twenty-four hours. It is perfectly clear and healthy, as the following analysis will show: Appearances, clear; odor, none; traction, neutral; the samples contained small traces of chlorine; small traces of sulphuric acid; very small traces of ammonia; very small traces of organic bodies; it was found

to be perfectly free from nitric acid and nitrous acid. In a one-thousandth part the sample contained--

Total solids.....	0.03675
Volatile matter.....	0.01500
Mineral solids.....	0.02175

The solids consisted of—

Silica.....	0.0059
Oxide of iron.....	0.01109
Lime (oxide calcium).....	0.0017

There were no traces of magnesia found. According to the results of the above analysis, I regard the water perfectly healthy and good and fit for all domestic purposes, and on account of its very low degree of hardness also very well fitted for all technical purposes, boiler filling, &c. About one-third, or five hundred and twenty-five houses, take it and they are putting it into the other houses at the rate of two taps a day. After a heavy shower it is slightly discolored for about five or six hours.

The brook receives no sewage. The Board of Health has no list of houses not using it.

We have sewers; no swamps; no malaria.

Previous to last July the sewers were not flushed, except when it rained, as the water was scarce. Since then they have been flushed regularly twice a week, as we have an abundance of water now.

The houses are about equally divided as to basements and cellars. Those having basements in most cases use them for kitchen and dining rooms, and in all cases are neat and dry. Those having cellars use them for furnaces and storage rooms, viz., for coal and wood, potatoes, turnips and apples, and in mostly all cases are dry and clean. Two-thirds of the houses have two families or more. We make a house-to-house inspection every winter.

About seven-eighths of the houses are connected with the sewers. We have no record.

We have about six cesspools in the city, they are cemented on the sides, bottom open. They are emptied at night, the same as privies, carted about a mile out of the city, mixed with stable manure and clay and used as a compost for the land.

In the past year we have had 121 cases of contagious diseases, as follows: Diphtheria, 66; scarlet fever, 51; measles, 4. At no time was it epidemic.

We have two slaughter-houses, which are kept in very good order and well watched.

We have three new terra cotta factories; no nuisances.

There is no record kept of persons keeping animals.

The Board has accomplished a great deal this past year. They have recommended and had built the extension of Fayette street sewer, which drains all that part of the city known as the Paterson tract and Dublin, and it receives all the surface water from Hatch's lane to Smith street and to within two hundred feet of Sohman's ravine at Eaglewood. They also have had Railroad avenue, Catalpa avenue, Hartford, Cortlandt and Charles streets sewers built the past year and have others under way. They have built an emergency hospital that will accommodate twenty patients. They have recommended and had appointed by the Government a Health Officer for this port, who is also a member of the Board. They have also added a new committee to their standing committees, known as Committee on Sanitation, which is very important.

The president has had the well and cistern waters in different parts of the city analyzed where there has been more than two cases of contagious diseases at one time and found it perfectly free from anything connecting them with those diseases.

There were five hundred and thirty-five nuisances abated the past year, viz., privy vaults, cesspools, filthy cellars, stable overflows, &c.

W. A. MCCARTHY,
Inspector.

PISCATAWAY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Noah Gray, Dunellen; S. R. Dayton, New Market; A. S. Conell, New Market; W. L. Smalley, New Brunswick; M. J. Whitford, M.D., New Market.

One nuisance, occasioned by dumpage of garbage from Plainfield over the line into our township, has been abated. There has been no other cause for action in this respect. The borough of Dunellen has a separate Health Board.

Malarial diseases have been especially present, but from climatic causes rather than from local conditions of an unsanitary nature.

There have been no diseases of an epidemic nature.

W. J. WHITFORD, M.D.

RARITAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. J. McGann, Luther H. Teppen, William McAdams, A. Clark Hunt, M.D., Theodore A. Wood, Secretary, Health Inspector. Post-office address of all, Metuchen.

Two dwellings disinfected for diphtheria. A general inspection of cesspools and drains. Private drains from dwellings to streets have been closed up, and cesspools constructed.

SAYREVILLE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. M. Blair, President, Sayreville; Leferts Smith, South River; J. H. Beekman, Secretary, Sayreville; Conrad Albert, Sayreville; John Heston, South Amboy.

Nothing special to report.

Two nuisances reported and promptly abated.

J. H. BEEKMAN,
Secretary.

SOUTH AMBOY BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hon. D. C. Chase, President; James H. Gordon, Stephen Martin, Cornelius McGonigle, Ward C. Perrine, Michael Welsh, William Birmingham, Secretary; P. J. Walsh, Health Physician; Edward McDonough, Health Inspector. Post-office address of all, South Amboy Borough.

Population, about 5,000.

Water-pipes for the introduction of water have been laid and it is only a question of time when we will have sewerage.

This borough is growing fast. Side-walks are being laid, streets opened and graded, low and swampy parts are being filled in. Everything possible has been done by the Board of Health to add to sanitary conditions.

There has been no epidemic of any contagious diseases. A few families have suffered severely from diphtheria, but the disease has been promptly arrested and proper disinfectants applied.

The Board of Councilmen have just completed a home for the indigent poor of this borough, and it reflects great credit on the generosity of the people as well as the Borough Council, and especially to the committee which has had the immediate charge of it.

P. J. WALSH,
Health Officer.

SOUTH BRUNSWICK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. C. Griggs, Chairman, Dayton; J. G. Wilson, Deans; D. G. Rowland, Dayton; G. D. Van Derver, Dayton; Edgar Carroll, Physician, Dayton; F. G. Stevenson, Assessor, Dayton.

Our local board held a meeting on May 26th, notice of the meeting having been posted at all the prominent places in the township. There was no complaint made at the meeting. There has been but one complaint in our township, and that of a dead animal. The party was promptly notified by the Secretary to have the same buried at once, which was done. The general health of the township for the year has been excellent.

F. G. STEVENSON,
Secretary.

WOODBRIIDGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Albert D. Brown, South Woodbridge; Franklin Moore, South Woodbridge; Arthur E. Berry, South Woodbridge; Samuel E. Freeman, South Woodbridge; C. P. Christie, Sewaren; S. E. Freeman, M.D., Health Inspector.

The population of township about 5,000. Its location on Staten Island Sound and the Raritan river.

The soil is of a clay nature; land level.

The supply of water is mostly obtained from wells—except in the village of Sewaren they have water-works.

The towns depend on surface drainage.

The township is largely a farming community, with common country roads. In the township, Woodbridge is the largest town.

In the towns the houses are largely owned by those that inhabit them. What tenant houses there are are in fair condition.

The town is lighted by kerosene lamps.

The refuse and excreta is collected in cesspools and carted on farm land.

There are no regular markets. The inhabitants depend on stores.

There is no slaughter-house in the township; the meat comes from the West.

The school-houses are large and in good order. We have an almshouse. No hospital. No regular police is maintained. No prison.

The health protection is under the direction of this Board of Health acting under the State law.

The dwellings are mostly heated by furnaces and stoves. The township has been generally healthy. In December, 1892, there was an outbreak of diphtheria that resulted in five deaths. A thorough examination was made by the Health Board in the house where it originated. The family was removed. An examination of the premises revealed a foul drain in the cellar, from which arose a foul odor. The house was thoroughly fumigated, the beds and bedding burned, as was also the clothing used in the house, and no new cases occurred. In June, 1893, a case of small pox was reported at Cartaret. The house was placed under care of officers, and no communication allowed; the disease was confined to one house; there were at the time the disease appeared nine persons boarding at this house; they were immediately vaccinated, and all escaped except one, a light case of varioloid. After the recovery of the patients the house was fumigated, and all the goods and clothing destroyed. The township has been unusually healthy.

No especial improvement has been done during the last year. The Board has caused the drains to be kept clear, the privies and cesspools to be emptied and cleansed.

MONMOUTH COUNTY.

BOROUGH OF ASBURY PARK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry Mitchell, M.D., President; James A. Bradley, N. E. Buchanan, D. Harvey, Jr, M. L. Bammann, John Rockafeller, Theodore H. Beringer, Randolph Ross, Treasurer; D. C. Bowen, Clerk. Post-office address of all, Asbury Park.

When the Board of Health of Asbury Park was established, June, 1880, it began operations by making a record of conditions affecting health, which were found by inspection to exist on each of the premises in the borough. During the past thirteen years this service has been continued, and it has become the distinguishing feature of the local sanitary administration. Each building, and all its belongings, has been repeatedly inspected, and all facts relating to its sanitary status have been recorded, and the records have been from time to time corrected, thus creating a history of the hygienic merits and defects of every dwelling in the borough. This record is growing more valuable with each succeeding year, and in course of time every house-owner will become interested to learn how his property is rated concerning its healthfulness, for these records will in the future have an important relation to the renting and selling value of dwellings. They will be consulted by would-be tenants and purchasers, and by persons who are selecting a stopping-place for the summer, and imperfections which have been reported and recorded will weigh against the desirability of the house, while the meritorious qualities will assist in finding tenants and buyers and boarders.

These records guide the Board of Health in its work. Dangers to the public health can be arranged in groups, and all cases belonging to each class can be attacked simultaneously and in the order of their importance.

Garbage.

Until within a few years the collection of garbage was conducted by the commissioners through the committee on streets. The wagons were owned by the borough, and the men and teams were employed by the day or week. Volunteer collectors were allowed to assist

whenever they chose to engage in the business. The service was not uniform, and the cost was believed to be unnecessarily large.

The contract system was then introduced, and it, too, speedily developed serious objections. The contractor was under no very particular supervision, and he often proved to be regardless of the public interests. Wagons were filthy and leaky; the collector was slovenly and neglectful, and the final disposal created a nuisance.

Under the contract made in June, 1893, supervision of the collection of garbage and rubbish was assigned to the Board of Health, and a study of the service and an effort to learn the method by which it may be improved has been made during the past four months. Through its inspectors, the Board of Health has been kept informed of nearly all of the shortcomings of the contractor, and complaints from householders have supplemented the inspectors' reports. It is found that the defects and difficulties attending the present system of garbage collection are mainly as follows:

1. The sudden increase in the population of the borough during the month of July necessitates the employment of many new and untrained men who, with all the indifference of persons of their class, often skip a house in making their rounds.

2. Garbage receptacles are often too large or too small or they are leaky. Kerosene barrels, butter-tubs, tin pans and peach baskets are provided indiscriminately. The collectors therefore carry pails, and garbage is transferred upon the premises with much spilling and stirring up of the stuff, and again transferred from the pails to the garbage wagon. The larger receptacles are never completely emptied, and few householders ever cleanse or deodorize a garbage barrel. Garbage barrels are rarely tightly covered, and every shower adds to the cost of collection and transportation.

3. The wagons in use are large and consequently they are loaded slowly, meantime emitting the odors of garbage which has been stored in unclean receptacles.

With the purpose of making a basis for estimating the actual cost of collecting and transporting garbage, as the service is now performed, the following data have been gathered during the past season:

The wagons now in use by the contractor are fitted with water-tight bodies and have hinged wooden covers. The dimensions of the wagon boxes are as follows: length, nine feet; width, three feet and three inches; depth, one foot and eight inches, giving a capacity of 48.75 cubic feet, or 1.80 cubic yards.

The average weight of one load (1.8 cubic yards) of garbage was found to be 2,650 pounds, or 1,472 pounds for each cubic yard, or seven and one-quarter pounds for each gallon.

The distance from the dumping ground is two miles, and the time consumed in transporting a load of garbage and returning the empty wagon to the borough is two and one-half hours.

Four loads were taken out by each wagon daily, at a cost of \$1.18 $\frac{3}{4}$ for each load. The total number of loads of garbage removed from the borough from June 1st to October 1st was 1,092, at a total cost to the contractor of \$1,296.75.

If a furnace should be erected within one-half mile of the borough boundary for the cremation of garbage, it is estimated that two-fifths of the time for each wagon, and of its team and crew of two men, would be saved—or forty-seven cents for each load—thereby reducing the cost of each load to seventy-one cents, and reducing the cost for four months from \$1,296.75 to \$778.15, thus making a saving in transportation of \$518.60 during that period.

The final disposition of the garbage during the past season has been by depositing it upon the surface of the ground and ploughing it under daily. No nuisance has been created by this operation.

For the improvement of some of the defects of the present system of storing, collecting and disposing of garbage it seems desirable:

1. To cause the general use of metallic receptacles with tight covers, for receiving and storing garbage on premises, and to require that every such receptacle shall be emptied directly into the garbage wagon without transfer of its contents into pails.

2. To secure the use of smaller wagon-bodies which can be emptied by dumping, thereby saving the time now caused by throwing out the garbage with shovels, and also shortening the time of loading, thus diminishing the time between the emptying of each garbage receptacle and removal of its contents from the borough.

3. To require that the bodies or boxes of garbage wagons or carts shall be made of metal only.

4. To burn the garbage in a suitable furnace.

Rubbish.

Rubbish is kept separate from garbage and ashes. It is collected by contract, carted two miles away and burned in open fires. The

wagons used in the collection of rubbish are unsuitable for the purpose. The sides are too low, permitting more or less material to fall off or be blown off by the wind.

Ashes are collected on improved streets at public expense, and used for roadmaking.

Stables.

Early in the season the Board of Health pointed out to all owners of stables the importance of protecting the soil against the pollution caused by permitting excreta from horses to fall upon the ground. Written notice was sent to the owners of all stables which were not already suitably constructed, requesting that solid excreta should be stored upon a water-tight floor, and be covered by a roof. A second notice was sent to persons who had not yet complied with the request above referred to.

Plumbing and Drainage.

Four hundred and eighty nine plans and descriptions for the plumbing and drainage of buildings have been filed in the office of the Board of Health. The necessity for the service which is rendered to house owners by this department may be estimated when it is known that not a single one of the drainage systems thus far examined was made air tight until it was first tested for leakage and defective joints or cracks were filled up. Satisfactory progress has been made in Asbury Park in securing safety in the construction of this part of dwellings, and the work has been brought up to a fair standard, but still better results should be, and doubtless will be reached in the future.

Sewers.

The sewers of Asbury Park have continued to satisfactorily carry off all waste matter which they receive. They have proved themselves, during thirteen years of service, to be well and carefully laid and properly adapted to the use for which they are intended. They are designed for the removal of domestic fluids only, and do not carry off storm water. This "separate" system of sewerage was in its infancy when it was adopted in Asbury Park, but during the past ten

years it has become the most popular method for the sewerage of towns. The advantages of the separate system of sewerage, briefly stated, are:

1. Sewage is more quickly carried off when conveyed in smooth earthenware pipes than when passed through brick sewers large enough to also carry gutter water.

2. The rapid flow of sewage scours the pipes and prevents accumulations.

3. Gases do not form in large volume in small pipe sewers because the sewage in such sewers is always fresh, and has not undergone much decomposition.

The number connections made during the past year is thirty. Total number to date, nine hundred and fifty-eight.

Water Analysis.

Thus far 548 wells in Asbury Park have been examined and those found polluted have been closed.

The annoying discoloration during the past summer of the water furnished by the public works, was due to stirring up of the mud contained in the street mains.

It was caused by the maintainance of a high water-level in the stand pipe when the consumption of water was very great, thereby creating a rapid flow through the pipes.

If the street mains had been kept clear and free from sediment there would not have been any discoloration of the water. The whole trouble was therefore preventable.

Kerosene Oil.

Eighteen samples of kerosene oil were purchased from dealers in the borough during the past year. Examination with the closed tester showed that the flashing point of all of the samples was above the standard required by law.

The citizens of New Jersey are to be congratulated upon the effect which legislation has had upon the sale of dangerous kerosene oil. It has been driven out of the market.

Fourteen years ago thirty-six samples of oil were examined in Asbury Park, and seventeen of them flashed below 100°, and some of them were little better than benzine. The agitation begun here assisted in securing the enactment of chapter 168, Laws of 1882, which, with subsequent amendments, has put an end to the wholesale destruction of human life and property which the use of a low grade of kerosene had caused.

Sanitary Inspection.

To assist the small corps of inspectors employed by the Health Department, the police officers of the borough have been made special sanitary inspectors by an ordinance of the Mayor and Council, and they are under instructions to report all violations of the health ordinances of the borough. Their service in this particular has not thus far been as active as it should be, and the interests of the borough demand that the police officers shall make themselves more familiar with the Sanitary Code, and take more interest in observing and reporting nuisances and all unhealthful conditions.

Vaccination.

During the year free vaccination was offered as usual by the Board of Health. An order issued by the public school trustees, requiring that all pupils should be vaccinated caused a large number of children to apply.

Total number vaccinated.....	667
“ “ revaccinated.....	104
	771
Number of vaccinations made.....	771

Of the 667 persons vaccinated 480 of them were primary vaccinations. The number of primary vaccinations known to be successful is 216. The opportunity for subsequent examination of persons vaccinated depended entirely upon the voluntary action of the applicants, consequently the results in very many of the cases cannot be stated. No case of a serious or alarming character resulted from the vaccinations.

The lymph employed was obtained from the New York City Health Department and only bovine virus was used.

Asbury Park has always obtained recognition as a clean town, and we are now being watched by many hopeful sanitarians who will give us full credit for every step made in still further protecting the lives and health of our summer guests. The public may be slow in comprehending the value of measures for the protection of health, but if we pursue a course which will place us far in the lead in this particular, the reward will surely come.

HENRY MITCHELL, M.D.,
President.

ATLANTIC HIGHLANDS.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William M. Foster, William T. Franklin, George D. Fay, M.D., M. Edward Curtis, Somers T. Champion, Frederic Roberts, Health Inspector; James H. Leonard. Post-office address of all, Atlantic Highlands.

Located on the Sandy Hook bay. Climate, moderate. Number of acres, about 500; number of population, about 2,000 in winter; about 5,000 in summer.

The town has, this year, almost completed a system whereby the supply of water will be ample for all needs. At the present wells are used in part. The public supply is taken from wells; four are sunk about 150 feet, and one 450 feet. The deepest does not show better water than the others. The water in all contains some iron, but a filter recently purchased removes all traces, so that a pure, soft water, will be furnished. The question as to the number taking water cannot be correctly answered, as work is being done in making connections as fast as possible. It is furnished by the city.

The system of drainage for the ground is used as distinct from sewerage.

The usual water-level is such as to secure dry cellars over nearly the whole town.

Very little swampy ground in city limits, and seldom a case of malaria.

The houses generally have cellars, but only a few basements for living purposes.

No tenement houses. There is a yearly inspection.

Not over half of the houses are connected with the sewer as yet, but connections are constantly being made. Many cesspools are still used, and will be until connection can be made with sewers. Cesspools are cemented; they are emptied by odorless excavators, and carted outside of city limits.

No prevalent diseases this year.

I do not believe that there is a record of all persons keeping animals.

There are no slaughter-houses in town; no manufactories, or nuisances from any.

Our Board has passed ordinances.

Public school building accommodates 250 children.

Cemetery, containing 50 acres, just outside city limits.

All children in school vaccinated during year.

A house-to-house visitation has been made during the year. All garbage has been removed regularly by persons appointed for that purpose. All complaints made have been punctually attended to, so the town has been kept in a cleanly and healthy condition. On account of sewers and water-pipes having been laid during the year, the streets have not been kept in as good condition as they otherwise would have been, but are now being properly cared for.

When sewer connections have been made, the use of cesspools will be discontinued.

As the filtered water gives general satisfaction, the wells will gradually be given up.

ATLANTIC TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel T. Vanderveer, "Colts Neck;" L. Schanck, Holmdell; W. N. Walling, Red Bank.

This township committee has never organized a Board of Health.

LEVI SCOBY,
Assessor.

BELMAR.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Rev. S. M. Nichols, President; Dr. F. V. Thompson, Joab Titus, F. P. Philbrick, Recorder Vital Statistics; William M. Bergen, John O. Herbert, Assistant Health Inspector. Post-office address of all, Belmar.

Our report remains about the same as last year.

We have as yet no public system of water-supply. Our water comes from wells, some surface water, some 100 feet deep, and some from 500 to 800 feet deep.

As to drainage, one portion of the borough is sewered, emptying in the ocean; the other portion uses vaults and cesspools.

Houses, generally, have cellars. There are no tenement houses. There is not a yearly house-to-house inspection.

Only a small portion of the houses use the sewer. The cesspools are in nearly every case cemented tight and are emptied by night scavenger and contents carted outside of limits.

No prevalent diseases.

No slaughter-houses.

Our Board has done nothing of particular mention. They have done what could be done to keep the town in a healthy condition and looked promptly after any sickness which would tend to spread itself, and on the whole have had very little sickness during past year.

NEIL H. MILLER,
Clerk.

EATONTOWN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. W. Crater, M.D., President and Inspector, Oceanport; W. R. Stevens, Assessor and Secretary, Eatontown; R. F. Hopper, C. O. McFaddin, Oceanport; George Gibbs, West Long Branch.

Wells and cisterns supply water; former both dug and driven. Plenty of malaria.

No large tenements; few containing more than two families.

No contagious or infectious diseases.

No new industries since last report.

Strict quarantine is observed in all cases of contagious disease.

Bills are promptly met by the Township Committee; these gentlemen deserve great credit for prompt and efficient action, under circumstances to be detailed later.

Malaria and rheumatism have prevailed; a dozen or so cases of diphtheria, otherwise no noticeable predominating diseases.

In March a case of small pox was found; within forty-eight hours the Health Board had purchased a small farm (eighteen acres), with house and stable in good condition; patient was transferred there immediately, and no new cases appeared; this case occurred on *Monmouth Park Race Track*, and over thirty men and boys were exposed to contagion; all were vaccinated, and quarantined for two weeks. The property purchased has been deeded to the township, and will be used permanently as a pest-house. A portion of the land has been opened as a public burying ground for the poor of this and adjoining townships. It is admirably situated for quarantine purposes, being off the lines of ordinary travel, still accessible.

E. W. CRATER.

TOWN OF FREEHOLD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Bowden, O. R. Freeman, M.D., J. O. Burt, Jr., Theo. Fields, W. J. McClure, Inspector. Post-office address of all, Freehold.

For the year ending October 1st, 1893, the usual amount of work and inspection has been accomplished, meetings have been held when necessary, action taken when complaints have been made and, on the whole, our town continues to improve.

Some delay is experienced relating to enforcement of ordinances, as many persons find it quite a tax upon them to connect with the water and sewer systems, consequently slow progress is made and to the present time but 59 permits have been issued to connect with the main sewer. Cesspools are being abandoned, as they undoubtedly are sources of foulness and dangerous to the public health.

The town is amply supplied with wholesome water, and is found far preferable to that afforded from wells; the examinations of samples from different sections leave very little doubt that much of it is

contaminated and unwholesome. Chemical analysis of water from two wells has been made and it was found somewhat impure.

A recent inspection of the jail, the new addition, sanitary arrangements, particularly that of sewerage, which is not yet fully completed, was fully approved and commended by the State Inspector, who will make a full and extended report for the present year. An examination of the sewer system was also made, and a complete inspection of the sewer-deposit farm satisfied the Inspector of the satisfactory working of the same, and further time would demonstrate the practicability of the system.

The town has been free from contagious diseases.

A few cases of scarlet and typhoid fever have been reported, and some have proved fatal.

Several deaths from diphtheria, the cause for which was unaccountable. The premises and occupants were quarantined and disinfected.

W. J. McCLURE,
Inspector.

FREEHOLD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Andrew J. Buck, President; Chas. D. B. Forman, Millard E. Conover, Joseph Erickson, Assessor; A. C. Hart, Town Clerk, Secretary and Treasurer; O. R. Freeman, M.D., Health Inspector. Post-office address of all, Freehold.

The Board respectfully reports as follows:

The general health of the township for the year has been good, there having been no prevailing diseases. In February diphtheria in a malignant form appeared in a newly-settled district, a little outside of the town. There were two deaths of children, but by strict quarantine measures it was soon checked.

There were complaints of a slaughtering establishment, but this was soon abated.

There have been no complaints of any disease of animals.

The cemeteries in the township are in good condition and well cared for.

The school buildings throughout the township are in good condition. There have been some complaints of the sewer farm, which has been

constructed within the year. On examination I think they are without foundation. This is located outside the limits of the town, at least four hundred yards from any dwelling, on a piece of low meadow land. The receiving tank is fifty feet square and automatically discharges itself every thirty hours of 36,000 gallons into channel pipes which are fitted with gates, so that it is distributed on different parts of the farm (now using some eight acres) at each discharge of the tank. This ground has under-drains from four to five feet in depth every twenty-five feet, which convey the water into a running stream, which carries it off for miles without affecting any water-supply whatever. The ground receiving the contents of the tank is cultivated, and the tank when empty is thoroughly cleansed once each week. Instead of a nuisance, I think it a model plant.

The borough of Freehold is included in the township and has another organized Board of Health.

O. R. FREEMAN, M.D.,
Inspector.

HOLMDEL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James W. Hoff, John J. Beer, Theodore Therne, Aaron Longstreet, Assessor;
Dr. H. G. Cooke, Holmdel, Health Inspector.

HOWELL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Lutz, Farmingdale; Charles Donohay, Turkey; Benjamin M. Cooper, Southard; James H. Butcher, Assessor; Jacob Lutz, Health Inspector.

We having no towns in our township of any size to need very much sanitary attention, have nothing of much import to report, only that our Board have carefully given attention to all matters brought to our attention and adjusted same without any great difficulty.

JAMES H. BUTCHER,
Secretary, &c.

LONG BRANCH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Brown, M.D., President; E. B. Blaisdell, Clerk; H. H. Pember-ton, M.D., J. W. Taylor, M.D., J. M. Hopper, Wm. J. Smythe, I. P. Goldy. Post-office address of all, Long Branch.

During the past year we have had but one affair to deal with, which will cause this report to differ from that of 1892. Early in April last, a case of small-pox was reported to the Board, which, upon investigation, was found to be in an Irish family of five members, occupying one-half of a double house on Morris avenue near our High School. Each apartment of the house consisted of one room on the first floor and two on the second. The other half was occupied by seventeen Italians.

We immediately quarantined, by placing two policemen there for day and two for night, for twenty-one days. In the meantime we removed the entire Irish family to a pest-house, which was kindly rented to us by the Eatontown Township Board of Health. Other members of the family developed the disease, but all recovered.

Owing to the great difficulty in getting doctors and nurses we were compelled to pay such large prices for salaries, and also everything we needed, that the entire cost amounted to nearly \$1,700. Half of this amount, however, was very generously paid by the Ocean Township Board of Health, for which our City Board wishes to express much appreciation.

All of our local physicians complain of having had very little to do during the past year, which we claim was due to the efficiency of our Board of Health.

GEORGE W. BROWN, M.D.,
President.

MARLBORO TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

P. C. Vanderveer, Wickatunk; R. W. Herbert, Wickatunk; J. T. Quackenbush, Freehold; J. J. Rue, Clerk.

BOROUGH OF NORTH SPRING LAKE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Middleton, Spring Lake Beach ; James E. Reed, Spring Lake Beach ; George Height, Spring Lake Beach ; Charles R. Brahn, Lake Como.

Our Board has been organized one year. We at once adopted a code of ordinances, &c., and have been doing our best to have them carried out, such as preventing the dumping night-soil, or other refuse, on vacant lots, so as to avoid their becoming a nuisance. Since we have completed our sewer it will relieve us of a good deal of that.

In connection with the Local Boards of Wall township, Manasquan, Spring Lake and Belmar we made an attempt to secure ground and build a hospital near Blancingburgh, Wall township. Had a good offer for a site, on high grounds, and a permanent stream of water which could be utilized at a small expense. But it fell through. At present we have no provision for a sudden case of contagious disease.

We have no resident physician in our borough.

JOHN MIDDLETON,
President.

OCEAN GROVE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Rev. E. H. Stokes, D. D., President, Ocean Grove ; Rev. A. E. Ballard, Ocean Grove ; P. Hinan, Ocean Grove ; Hon. James L. Hays, Newark ; Hon. Holmes W. Murphy, Freehold ; David H. Brown, Brooklyn ; Rev. J. R. Daniels, Ocean Grove ; J. H. Alday, M.D., Inspector, Ocean Grove.

Unremitting attention is given to the thorough sanitation of Ocean Grove.

The usual spring inspection of the homes of the people obtains, and whenever it is deemed necessary, a proper examination of the same is made by the Inspector ; also all requisite instruction in healthful sanitation given to the occupants thereof.

We are endeavoring to have all the premises in the Grove properly connected with the sewer and water systems. During the past year, there has been made fifty-one additional connections with the sewer

and fifty-eight with the water system, making in all 1,049 sewer and 1,047 water connections.

During the past summer, notwithstanding the great influx of visitors, the health of the community was remarkably good.

There were no epidemics at the present date.

The town is in a very healthy condition.

J. H. ALDAY, M.D.,
Inspector.

MANALAPAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. H. Reid, Tennent ; Daniel S. Aumack, Englishtown ; Edward Hendrickson, Englishtown ; Asher T. Applegate, Physician, Englishtown ; S. C. Bown, Assessor, Englishtown.

No prevalent disease.

No change from former reports.

There is a Local Board of Health in the borough of Englishtown, in the township of Manalapan.

WM. H. REID,
Chairman.

MANASQUAN.

No organized Board of Health. The old Board is entirely inactive.

E. P. LONGSTREET,
Borough Clerk.

MATAWAN BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Isaac T. Rue, President ; Wm. A. Rodgers, Secretary ; J. Wm. Maggs, Health Inspector ; William Hardwick, Dr. A. J. Jackson, Edwin Lambert, Isaac W. Bedle. Post-office address of all, Matawan.

MATAWAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Isaac T. Rue, President; David G. Ryer, Edward Farry, F. C. Bedle, Assessor; William A. Rodgers, Secretary; Dr. C. Kuecht, Health Inspector. Post-office address of all, Matawan.

There is a house-to-house inspection when needed.

Sewers, same as previous report.

Prevalent diseases, none.

Slaughter-houses are inspected.

We have no water-supply, except by wells, cisterns and springs. The water is quite pure and good, and this year have had plenty of it. The most part of the township is rolling land and is well drained by tile and terra cotta pipes. There is no swamp but what has a drainage from it. We have a few damp cellars in a wet season. There is a ravine on either side, east or west of the thickly settled part of our township.

There has been no contagious disease this year.

Cellars are used for storage of vegetables.

The drainage and cesspools, water-closets, garbage of all description and pig-pens are carefully looked after by our Inspector and his orders have been obeyed, so there has been no trouble nor annoyance to any one.

Our Board has monthly meetings and every complaint that has been made has been looked into at once, and the cause abated in all cases.

Our township is in a good, healthy situation, as it is constantly looked after by our Inspector and Board of Health, who take pride in the health and prosperity of our inhabitants.

WM. A. RODGERS,
Secretary.

MILLSTONE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Albert Thompson, Chairman, Clarksburg; Curtis B. Forman, Smithsburg; George H. Hartman, Perrineville; Dr. William T. McMellen, Medical Director, Perrineville; George J. Ely, Secretary and Inspector, Perrineville.

No source of contamination by sewerage.

Drainage such as to produce dry cellars.

No swamps and no malaria.

Houses constructed without basements, but with cellars.

No yearly inspection from house to house.

No sewers.

No prevailing diseases with man or animals.

Slaughter-houses in good condition.

Number of dead animals buried, ten.

Dysentery quite prevalent during July and August.

GEORGE J. ELY,
Secretary.

NEPTUNE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. W. Kirkbride, President, Asbury Park; H. B. Johnson, Asbury Park; Amos Tilton, Hamilton; Alexander Williamson, M.D., Asbury Park; L. E. Watrous, Asbury Park; L. C. Hubbud, Health Inspector, Asbury Park.

Neptune township is in better condition than it has been for years. There has been very little sickness. The Inspector has been very strict, and kept things in very good condition. Last spring the Board had two small buildings put up on the sand hill back of Asbury Park, in case the small-pox got started here, but we were very fortunate that it did not reach us.

L. E. WATSON,
Secretary.

OCEAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. B. Sherman, President, Long Branch City; Howard A. Brinley, Clerk, Long Branch; James Dangler, Deal; Levi G. Irwin, Sea Bright; George W. Brown, M.D., Health Inspector, Long Branch.

Nothing to report, as our township is so largely covered by the two city Boards. Our Board assisted the Long Branch City Board in

management of an outbreak of small-pox, and shared one-half the expense.

We have had a few small nuisances to abate during the year, but none of sufficient importance to report.

GEORGE W. BROWN,
Health Physician.

KEYPORT AND RARITAN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

President, Frank P. Holmes; Secretary, E. D. Petteys; Inspector, James M. Walling; William Con Smith, Abraham Huyler, Timothy Mount, John S. Hendrickson. Post-office address of all, Keyport.

Location, on the south side of Raritan bay.

Population, about three thousand (3,800).

Climate, mild.

Topography, level, about twenty feet above the bay.

Water-supply, artesian wells.

Drainage, limited.

Streets, good and well laid out.

Houses, about one-third tenant.

Mode of light, gas.

Refuse and excreta, removed by garbage-man.

Markets, meat, 5; vegetable, 2; fish, 1.

Disease of animals, none.

Slaughter-houses and abattoirs, none.

Schools, 1 graded school, 1 public building.

One almshouse, no hospital.

One jail, 1 marshal, 2 assistant marshals, 1 police justice.

Cemeteries, 2, Greengrove and Raritan Cemeteries.

Quarantine in case of contagious diseases.

Sanitary expenses, about \$250.00.

Nothing additional in sanitary improvements during past year.

The above report was made out by the Health Inspector, and, I think, states the facts in reference to our locality.

JOHN V. ARROWSMITH,
Assessor of Raritan Township.

RED BANK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. B. Warner, M.D., John Sheehan, A. F. Trafford, M.D., James Walsh, Health Inspector; James Cooper, Jr. Post-office address of all, Red Bank.

There are no changes in our sanitary condition since the small-pox of last winter, of which our former Secretary, Mr. John H. Cook, furnished you a full report. The Board is working in full harmony, and the sanitary condition is of the best.

JAS. COOPER, JR.,
Secretary.

SHREWSBURY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles B. Parsons, Red Bank; W. T. Parker, Red Bank; Borden Hance, Red Bank; Thomas P. Brown, Assessor, Red Bank; Dr. W. S. Whitmore, Township Doctor; Albert C. Harrison, Clerk, Red Bank; William Henry Smith, Fair Haven, Health Inspector.

Last summer a company of inhabitants on the Rumson road established a system of water-supply by boring wells and laying pipes the whole length of the road to furnish the cottages and barns with water. The water is good and the pipes are kept in perfect order by being run out every few days.

There is no system of drainage that I know of in the township.

The houses mostly have cellars and are used for general family purposes, such as storing vegetables. Very few houses in the county are occupied by more than one family.

There are no public sewers. The cesspools used by private houses are most of them cemented and are emptied by means of a steam pump into tight barrels and carted away to be used as a fertilizer.

There has been no prevalent disease this year in the township outside of Red Bank, where small-pox was prevalent for about six weeks.

There are no slaughter-houses here.

THOMAS P. BROWN,
Assessor.

BOROUGH OF SPRING LAKE.

The Board appointed in June, 1892, met and organized on the 11th day of that month, by electing Charles A. Bye, President, and J. M. Goddard, Secretary. At a subsequent meeting J. Stults was elected Treasurer, and upon the resignation of J. M. Goddard, as Secretary, before the expiration of the year, J. Stults was appointed to the place made vacant by Mr. Goddard's resignation.

On the second of July a code of health was adopted, and it was subsequently printed in pamphlet form for circulation.

At a meeting held in the fall of 1892, a proposition was made by this Board to the several Health Boards in the township to unite and build a hospital at some central point to be used when the prevalence of contagious diseases rendered the isolation of patients necessary. This proposition met with favor from the several borough Boards of Health, and a site was selected and plans adopted for a building, but the project failed of accomplishment on account of the opposition of the township authorities of Wall township.

Reports have been made from time to time since the organization of this Board, of the bad condition of the sewer plant in this borough, not only of the outlets thereof, but of the pipe at certain points, which were either defective or had been broken.

As early as April 17th, of this year, notice was served on the Spring Lake and Sea Girt Company to repair and extend their sewer outlets on the beach, and the company was also notified at a later day to make said repairs and extensions, but in neither case was the Board able to secure the attention demanded. The Board finally resolved to order and superintend the work required, and the expense attending the repairs amounted to the sum of \$243.90.

During the existence of the Board a large amount of work has been done.

Numerous complaints have been answered by the Sanitary Committee, and in company with Dr. Mitchell, of the State Board of Health, the condition of Wreck pond was examined into during the summer of 1892.

The sanitary condition of a cottage occupied by Mrs. A. K. Dickson was condemned by Dr. W. W. Trout, and at a meeting of this Board, held August 29th, 1893, two communications were read, in which he stated that he had examined the premises, and found the

drainage imperfect and the water-supply deficient; and, furthermore, that he had advised the tenant, as her physician, to vacate said cottage. A resolution was thereupon adopted by the Board, directing the tenant to move out of the cottage at once, and another resolution was adopted, ordering the Secretary of this Board to notify the owner of the action it had taken upon the recommendation of Dr. W. W. Trout, the Inspector.

A house-to-house inspection was made by Health Inspector Van Cleaf, by order of the Board, and the work was begun in September last, and completed in April of this year. As a rule, the properties were found to conform with the regulations of the health code; and in all cases where they did not conform to the code, owners were notified to remedy defects reported.

No contagious diseases have been reported to this Board, and the health of the borough of Spring Lake has been unusually good during the past two seasons. There has been less sickness within our borders than at any other point on this portion of the New Jersey coast, so far as this Board has been able to ascertain. The healthfulness of the place cannot be questioned; and many invalids who have come here seeking restoration and renewed vigor have not been disappointed.

Many complaints having reached this Board concerning garbage which has been allowed to remain for days at a time at some cottages, during the past season, impels this Board to recommend the necessity for taking some action in this matter before the opening of the season of 1894. Something better than a voluntary system is needed, such as that now in vogue. It is the opinion of this Board, that some person should be employed by the Mayor and Council to remove the garbage daily.

J. STULTS,
Secretary.

UPPER FREEHOLD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles C. Wyckoff, Allentown; I. S. Daws, Imlaystown; E. A. Hyers, Red Valley; William Quicksell, Assessor, Hornerstown; F. C. Price, M.D., Imlaystown.

Wells are the common water-supply and the physician and owners have examined very many of them and pronounce them usually good and safe to use.

Cellars are usually dry.

Board has had one meeting (September 30th). Made one investigation, the only instance that seemed needed: Inquiries by individual members have been made in the neighborhood near their homes.

The general health of our township has been good for the past year. Very few cases of typhoid fever and still less of malarial fever.

F. C. PRICE,
Secretary.

WALL TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. P. Philbrick, Belmar; George P. Wooley, New Bedford; Charles Gifford, Allenwood; Dr. A. A. Higgins, Manasquan; John M. Allen, Health Inspector, Manasquan.

The Board of Health of Wall township has but little to report.

There are three separate boroughs in the township.

The township Board met early in the spring and organized, adopted ordinances concerning garbage and carting of the same, appointed Health Inspector and the township has been kept in good condition.

A few cases of typhoid fever have occurred.

JOHN M. ALLEN,
Secretary.

MORRIS COUNTY.

BOONTON CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. A. Norris, Wm. Grubb, G. H. Fitzpatrick, Wm. Brown, Dr. N. E. Carpenter, Oscar P. Whitehead. Post-office address of all, Boonton.

BOONTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Horace Ford, Thomas Byard, Edmund H. Stickle, Gilbert D. Crane, Clerk; Dr. G. W. Wigg, Joseph Steventon, Inspector. Post-office address of all, Boonton.

About four-fifths of the township is within the corporate limits of the city of Boonton, which has its own Board of Health.

All depend on wells and springs.

Drainage, natural and good. Cellars, mostly dry. But little swampy ground. No malaria.

Houses have no basements, but good cellars, some of which are partly used for storage of vegetables; but very few houses have over one family in them.

No sewers. Contents of cesspools put on the land.

No prevalent disease this year. The Assessor inquires yearly concerning losses of animals and as to contagious diseases.

No slaughter-houses.

Two school-houses in good condition.

No ordinances passed.

No preparation for contagious diseases.

Heat, mostly from stoves. Ventilation, good.

Board organized.

CHATHAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Baldwin, Chatham; Charles Genung, Inspector, Chatham; Eugene Hopping, Afton; Dr. W. J. Wolfe, Chatham.

The health of the township has been good.

CHESTER TOWNSHIP.

Report not received in time for printing.

TOWN OF DOVER

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. S. B. Johnson, President; A. J. Titman, Jos. V. Baker, Secretary-Treasurer; William H. Byram. James Hagan, Health Officer. Post-office address of all, Dover.

Dover is located in Morris county, New Jersey, about twelve miles from Morristown, north—the county seat—and about forty-two miles from New York city, on the line of the Delaware, Lackawanna and Western Railroad and the High Bridge Branch of the New Jersey Central Railroad, besides the Morris canal.

Dover is now an enterprising town of five thousand inhabitants and is growing vastly and at the present outlook will soon reach that of Morristown, which is but twice us now.

We have a very healthful and delightful climate, the death-rate not exceeding ten to the thousand the past year, and with this and other natural advantages of beauty, healthfulness and location Dover should become a most prosperous city in the near future, and it indeed has a great outlook.

The soil is chiefly yellow earth, with but very little rock and gravel, and is generally fertile.

The situation is particularly attractive, the ground forming a succession of mountains and ridges, separated by valleys, being within about eight miles from the famous Lake Hopatcong and about twelve miles from Budd's Lake, and having most picturesque mountain drives.

We have an excellent water-supply, but by private company. The water comes from two large reservoirs situated on a hill at least two thousand feet above the town. These are supplied by means of numerous mountain springs. The water is used by nearly one-half of the residences and business places in the city, it being introduced in the year 1887.

The city has no system of sewerage, which is badly needed.

We have wide and well-kept streets, which are replete with handsome shade-trees. No public grounds are maintained, though the city is greatly in need of something of this sort. We should have a public park.

Houses, generally, have cellars, and are extensively used for storage purposes. There is not a yearly house-to-house inspection.

Electric light is used for street lighting by means of incandescent lights, and most business places and a few private dwellings use them; others use kerosene lights.

Refuse and excreta is collected by the street commissioner by the direction of the Common Council. This is done weekly and used for filling vacant lots, and the present Board of Health is paying much attention to this matter.

We have no slaughter-houses or abattoirs within the city limits, and therefore these cause no trouble.

The police force consists of a chief and three assistants, and is well managed at the present time. Have no prisons, except a small lockup, which is not at all times in the best condition.

We have but two buildings equipped with fire escapes, but have several that should be.

There are two cemeteries within the corporate limits, and they are kept in good condition.

Generally the public health has been good. The Board has adopted laws or ordinances and has been most regular in protecting the public health during the past year.

Under the rules of the Board contagious disease must be reported to us, and in case of death the Inspector directs that the funeral be held privately.

Heating is mainly by coal stoves, hot air, steam and hot water, and all dwellings are generally well ventilated by means of windows.

Have had no prevalent disease for the past year.

The Board is active, and doing its best to protect the health of the county of which we form but a little part. We hold meetings at such times when complaints are made, and at times when the members seem to be losing sight of their duty, or when they seem to be drifting from one another. Every yard, barnyard and outhouse has been inspected twice by our active Inspector during the past year, and everything was found to be in a clean, healthy condition. We have now on hand the abating of a nuisance arising from a swamp on the North Side Shoal hill, which we think will very soon be settled with but very little trouble.

JOSEPH V. BAKER,
Secretary.

HANOVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Walter H. Mitchell, Whippany; George Cook, Hanover; C. A. Reed, Morris Plains; Harrison Quinley, Parsippany; Jos. H. Bastedo, Assessor, Boonton.

JEFFERSON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Newton Weaver, Chairman, Oakridge; Charles Jennings, Milton; Horace Pulis, Milton; W. J. Tremmey, Secretary, Woodport; H. W. Kice, M.D., Medical Member of Board, Port Oram.

The Board of Health met at Berkshire Valley for the final action on code, May 27th, 1893, for preservation of health of the people of Jefferson township.

W. J. TREMMEY,
Secretary.

MADISON BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Calvin Anderson, M.D., President; Henry M. Sacks, Secretary; Charles E. Cook, I. N. Van DeWater, Samuel Brant, F. E. Day, Clerk of Borough. Post-office address of all, Madison.

Population, 1,800; area, four square miles.

Water supply from well, 30x32. Daily capacity, 1,000,000 gallons to stand-pipe, 25x75. Borough plant.

Number of houses taking water, 285. No color; no taste; medium hard; never bad.

No malaria; no swamps.

Cesspools emptied by boxed wagons. Dumped on farms outside borough limits. No prevalent disease. No slaughter-houses.

MENDHAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

M. Robinson, Chairman, Mendham; Peter F. Hill, Mendham; Fred. H. Garabrant, Brookside; Dr. John S. Stiger, Mendham.

We are still blessed with exceptional good health. There have been no contagious diseases during the year to afflict either man or beast.

M. ROBINSON,
Chairman.

MONTVILLE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Copstick, Montville; Walter A. Young, Boonton; Fred Van Duyn, Glen View; J. W. Van Duyn, Pine Brook, Assessor.

There have been but two complaints before the Board within the last year. One in regard to a water-closet located too near the public road and needing cleaning and the other a dead horse not having been properly buried. Notice was given to the property owners and the nuisances were abated at once.

The general health in the township is good, no epidemic of any kind having occurred within the last year.

J. W. VAN DUYN,
Assessor.

MORRIS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Charles F. Halstead, Health Physician; George C. Smith, Edgar F. Randolph, Nicholas Arrowsmith, Thomas F. Clifford, Health Inspector. Post-office address of all, Morristown.

Part of the township is supplied by water from the Morris Aqueduct Company, a corporation which furnishes Morristown with water; the balance of the township is dependent upon cisterns and wells for water-supply. The Morris Aqueduct Company obtains its supply of

water from streams and springs, the water is clear and is free from pollution.

The town of Morristown, which is part of the township, is supplied almost entirely by the Aqueduct Company.

There is no public system of sewerage or drainage, the ground being high. The cellars of the houses are usually dry.

Nearly all the houses in the township have cellars, which are used for the storage of vegetables and other household goods. In the town of Morristown there are a number of tenement houses and are usually in a good sanitary condition.

Garbage is collected by private individuals. Almost all houses have cesspools connected with them, usually built with open bottoms or sides; they are emptied by a private individual with a patent deodorizing apparatus. The solid part is used as a fertilizer, while the liquid part is emptied on sandy ground and is immediately absorbed.

There have been no prevalent diseases among the animals.

No hogs are allowed to be kept within the city limits of Morristown.

Slaughter-houses are conducted so as not to be a nuisance in the neighborhood.

A manufactory for the trying out of fat and lard, which was formerly located in a section of the township thickly populated, and against which complaint was made, has been removed to an entirely different portion of the township, away from all dwellings, and no complaint has been made this year of odors arising from it.

Public school buildings are commodious and well ventilated, as are also the other public buildings.

There are two hospitals in the township, well conducted.

Burials in the old grounds inside the corporate limits of Morristown are rarely made, almost all interments being in the cemeteries located outside the corporate limits.

The Board of Health inside the corporate limits of Morristown, which is a separate institution from the township Board, has passed ordinances, but the township Board has not.

There has been no neglect of the vital statistics.

There has been during the year no contagious diseases over which the Board of Health has been called to exercise its supervision.

Coal is generally used as a fuel; most all the buildings are heated by hot air or steam, but fuel is used in stoves.

There has been no prevalent disease during the year outside the Town of Morristown. The City Health Board take cognizance of all contagious diseases within its limits.

This Board has little to do during the year. It, however, stopped the dumping of garbage in public places, and also caused the practice of persons throwing slops into the gutters to cease, and all nuisances of that character to be abated.

THOMAS F. CLIFFORD,
Assessor.

MORRISTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James S. Adams, President; Henry P. Witte, Thomas Martin, Thomas Malley, Stephen Breese, Secretary; James Douglas, Health Physician; William Mulford, Health Inspector.

Population about 10,000. Situated among the hills of Morris county, at an elevation of about 300 feet above the level of the sea. The climate is very suitable for invalids, so much so that Morristown has become quite a sanitarium.

The water is exceptionally pure and good. It is collected into reservoirs direct from the springs. The reservoirs being situated among the hills, the water is free from all contamination and surface drainage. The supply is abundant for all purposes. A few wells are still in use.

There is no system of drainage or sewerage, cesspools being used. The town is built on dry ground, with good, dry cellars. No malaria. All kinds of refuse removed by private parties. Excreta is still carried outside the city limits by odorless excavators and there mixed with sand and buried or otherwise disposed of.

The town has been in very good sanitary condition and remarkably free from all diseases of a contagious nature during the past year.

No slaughter-houses or manufactories within the city limits.

There are two hospitals open to the public for all cases except contagious cases, and an especial building or annex, for treatment of contagious cases only, is just completed with all the latest improvements.

All quarantine is attended to by Board of Health.

No epidemic prevailing during past year.

The town has been very thoroughly examined by the Health Inspector and all nuisances removed.

JAMES DOUGLAS, M.D.

MOUNT OLIVE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. J. Clift, Chairman, Netcong; M. T. Thomas, Draketown; Samuel Bartley, Bartley; A. H. Bartley, Assessor, Bartley; C. N. Miller, M.D., Flanders, Health Inspector.

Health has been generally good. No contagious diseases, except some two or three cases of scarlet fever.

No complaints have been brought to the notice of the Board, so that it has done nothing the past year. Some complaints were made to Inspector, but upon investigation were so trifling they were not brought to the notice of Board.

A. H. BARTLEY,
Secretary.

MOUNT TABOR.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry L. Coit, M. D., President, Newark; Robert M. Ekings, Vice-President, Paterson; Charles E. Fisher, Secretary, Newark; Rev. James Montgomery, Brooklyn; Stephen M. Long, East Orange; J. S. Richardson, Jersey City; J. S. Whitney, New York; A. A. Campbell, Jersey City; James H. Cox, Health Inspector, Mount Tabor.

Mount Tabor is located six miles west of Morristown, and about thirty-five miles from New York, on the Delaware, Lackawana and Western Railroad. It has a resident summer population of from twelve to fifteen hundred. These people are mostly from the cities adjacent to New York, and reside in their own cottages, which range in value from five hundred to five thousand dollars. Among the advantages enjoyed by the people are, the altitude of this point, which is about seven hundred feet, and the equibility of the climate, with its even, low temperatures in summer. The hilly character of Morris county makes it impossible for surface-water to get a hold upon the soil; this, together with the foregoing, makes the place a desirable health resort.

Mount Tabor, proper, lies upon an elevated tract of land, and includes about one hundred and sixty-six acres. The older portion of settlement is in a chestnut grove of about forty year's growth.

Twenty years ago it was purchased by the Newark Conference Camp Meeting Association for a camp meeting resort, and since that time the meetings have been held regularly each season. The rapidity with which cottages have multiplied shows that the place offers many attractions for residence, and now about two hundred and fifty families make it their summer home.

With the increase of population, from year to year, has come the necessity for sanitary regulations. For several years the governing body here have had a sanitary committee to look after these matters, but, after taking competent legal advice, this committee have added to their body several private citizens and have organized a Local Board of Health under the State law.

During the present season this Board have adopted and published a code of ordinances, and have undertaken the work of carrying the same into effect. In addition, it is their purpose to issue, from time to time, circulars of information to the people concerning questions of sanitation or hygiene. During the past summer the health of Mount Tabor has been unusually good. No contagion or epidemics have appeared. One death only has occurred during the season, which covers a period of four months.

The water is taken from several deep springs, owned by the corporation; the supply is abundant, very pure, and does not seem to be materially affected by the variation in the rainfall. The springs are protected from surface drainage, and are on a different slope from that on which the people dwell. The water is pumped into two large distributing reservoirs, from which the supply is delivered to the cottages through iron pipes.

The plumbing and drainage have been defective in the houses formerly constructed; but the more recent dwellings are larger, and the plumbing is made to conform to sanitary models. The Board have adopted the laws recommended by the State authorities, and all plumbing will hereafter be made to fulfill these requirements. For the disposal of liquid house-waste, the cesspool has hitherto been found to serve the purposes of convenience and health. By a system of cleaning, and the frequent disinfection of these vaults, the method will be sufficient for several years to come. Improvements along the line of a sewerage system are under contemplation by the Board of Trustees.

The streets are regularly cleaned by men employed for this purpose, who daily gather up litter, and animal and vegetable waste, and remove it.

The coarser house-refuse is collected daily, and before being taken up the garbage is properly separated from the ashes and other waste. The former is mixed with quick lime for fertilizing purposes.

The food supply, especially the milk supply, is under strict surveillance. The plan of protection against tuberculosis, and endemic diseases from this source, includes an annual inspection of the dairy herds by a competent veterinary surgeon, paid by the Board. A permit, including requirements, granted after a sanitary inspection of the stables and surroundings; and a weekly inspection of the milk supply by an officer of the Board. The result is returned to the dairyman in the form of a certificate.

The improvements made at Mount Tabor during the past year, on the recommendation of the Board of Health, are as follows: First. The proper protection of the springs against contamination by surface water; and a change in the course of the overflow from the new collecting reservoir, in order that when not used, the whole body of water shall be in motion. Second. The removal of old buildings adjacent to the water supply, which were prejudicial from a sanitary point of view. Third. The removal of the garbage from its close proximity to the springs to a place remote from both water supply and dwellings.

The people of Mount Tabor are justly proud of their summer home on account of its healthfulness; both as regards its natural features, and its freedom from preventable causes of disease.

*HENRY L. COIT,
President.

PASSAIC TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Veader, Green Village; Jacob Ogden, New Vernon; Andrew S. Bird, Stirling; F. L. Hendrickson, Madison; Dr. S. H. Reed, Medical Member, Madison.

The Board of Health organized this year and passed a code of ordinances, taking circular No. 60 as a model. We have not had any complaints made before the Board.

The people of the township are very healthy at present. There was a few cases of diphtheria this spring and we investigated but could not find any cause for it.

F. L. HENDRICKSON,
Secretary.

PEQUANNOCK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph R. Miller, John Cullen, Dr. Coales and J. Rogers, Butler; Thomas Benjamin, Lincoln Park; A. E. Zelif, Lincoln Park.

We have had three complaints, all of which we have investigated. No contagious diseases, except a few cases of diphtheria. The township is healthful.

J. ROGERS,
Assessor.

RANDOLPH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Philip J. H. Bassett, Dover; John Downing, Port Oram; Frank A. Hedden, Dover; Isaac Hance, Assessor, Dover.

We have no report to make.

PHILLIP J. H. BASSETT,
Chairman.

ROCKAWAY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Agustus Munson, Rockaway; C. L. Beach, Rockaway; Jas. B. Tonking, Mount Hope; M. Hoagland, Jr., Rockaway; F. W. Flagg, M.D., Rockaway.

Slaughter-houses are inspected. They are in good condition. No new factories.

We have adopted the code of ordinances as advised by the State Board of Health, as far as it pertains to townships.

Vaccination not compulsory.

The year has been a healthy one.

C. L. BEACH,
Secretary.

ROXBURY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. F. King, Ledgewood; John L. Taylor, M.D., Succasunna; Judson Cook, Ledgewood; Thomas Allen, Port Morris.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry Wiley, Drakestown; Elijah Dufford, Middle Valley; F. A. Apgar Parker, Committee. Stewart Neighbour, Township Clerk, German Valley; Elmer E. Hoffman, Secretary and Assessor, Middle Valley; Edward Sutton, M.D., Health Inspector.

The sanitary condition of the township is as good as can be expected. All rules and regulations for the benefit of the people, and their health, have been attended to by this Board, and it affords us great pleasure to make this report.

Also, further state, that we have not had any epidemics during the past year.

(Signed), BOARD.

OCEAN COUNTY.

BAY HEAD.

There is no Local Board of Health in Bay Head.

BEACH HAVEN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert B. Engle, Richard McCunney, Ferdinand C. Hardt, Samuel Ashhurst, James Welsh, Health Inspector. Post-office address of all, Beach Haven.

Population, 1,200 in summer; 200 in winter.

A sand-bank resting on meadow, between the ocean and Little Egg Harbor bay.

Water by artesian wells, and a few by surface wells.

Streets from 33 to 100 feet wide, covered in part with gravel over their entire surface.

Has never been contagion, except scarlatina. There is urgent need of vaccination, it being entirely neglected, though the attention of some of the inhabitants has been repeatedly called to the subject by the reporter in his capacity of physician. There should be a law requiring evidence of vaccination as a preliminary to admission to school.

Prior to October 1st, 1892, the Board met frequently and distributed circulars concerning precautions against cholera. In one case the Board visited a stable, poorly located but unnecessarily complained of, and its Inspector visited every house repeatedly and urged the importance of cleanliness and emptying of cesspools. During the past year there was no formal meeting, but the Inspector was directed to visit and urge the emptying of all cesspools and their disinfection and of the discharges from a case of typhoid fever.

Two cases of typhoid occurred in 1892 in close proximity to each other, and in 1893 two cases, far separated from each other, occurred.

During the winter the place is visited by the physicians from adjacent towns on main land.

SAMUEL ASHHURST.

BERKELEY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cornelius Lawrence, Thomas J. Harvey, Clark F. Jeffrey, Devine Butler and Henry Williams. Post-office address of all, Bayville.

Population small.

The surface is descending so as to have dry cellars. Nearly all cellars, and used for storerooms.

There are only three sewers in the township and they are from hotels. We had trouble with one in August.

There has been no prevalent diseases this year.

No slaughter-houses in the township.

The township is large, with very few people, and is very healthy.

DEVINE BUTLER.

BRICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. C. Pearce, Burrsville; A. W. Downey, Assessor.

This township for the past year has been in a healthy condition, there having been but three cases of contagious disease. We have had several complaints of persons carting and dumping garbage in West Point Pleasant during the past summer.

This garbage is brought from the hotels in Point Pleasant borough, and is very offensive when allowed to lay too long. The Board immediately notified the parties of the nuisance and they covered it over with dirt or straw, which stopped the smell.

As the soil in this locality is sandy there are no stagnant pools to breed disease.

C. C. PEARCE.

DOVER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Adolph Ernst, Toms River; John Tilton, Silverton; James I. McKelvey, Toms River; A. W. Irons, Assessor, Toms River.

Water from wells.

No sewers; no swamps near town.

Cellars dry.

Most houses have cellars, used for general purposes.

On April 22d, 1893, the Board adopted a health ordinance similar to the one published in Circular No. 60.

On June 13th last the Board made a house-to-house inspection of cellars, privies, cesspools, &c., and also the slaughter-houses, jail, school-houses, &c., and found in most cases everything in good order. Where there was any neglect the parties were so informed and afterward put in perfect order and kept so during the summer.

The Board held regular monthly meetings during the summer to receive complaints, &c.

There are two boroughs in Dover township, viz., Island Heights and Lavellette City, each having their own Boards.

A. W. IRONS,
Clerk.

EAGLESWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

P. R. Sprague, West Creek; C. H. Seaman, West Creek; E. P. Cramner, West Creek; S. P. Cramner, West Creek; Dr. W. M. Reeves, Tuckerton.

There is no material change in our report from last year.

S. P. CRAMNER,
Secretary.

ISLAND HEIGHTS.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. C. Parsons, D. H. Shock, President; Wm. T. McKaig, Secretary; Morris Hallock, F. G. Stanwood, Dr. Aug. Koendoffer, Dr. M. F. Middleton, Wm. T. McKaig, Health Inspector. Post-office address of all, Island Heights.

High elevation. About 400 winter and 2,000 summer population. Climate, mild.

Water-supply, from wells from 16 to 50 feet, good springs.

JACKSON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Johnson Bills, Vanhiseville; Joseph T. Clayton, Jackson Mills; Harry Applegate, Bennetts Mills; C. M. Thorn, Vanhiseville; John W. Jaminson, Cassville; I. W. Kirk, Manchester.

Jackson township is situated in the northern part of Ocean county, bounded as follows: on the north, by the county of Monmouth; on the east, by Laurel township, *lately set off from Brick*; on the south, by the township of Manchester, and on the West, by Plumstead.

The population is about two thousand.

The climate is mild.

Water is from wells and springs.

No diseases among animals.

There are four places of burial.

There has not been any contagious disease in the township this year.

There is not a physician in the township. The health is so good that they do not wish to locate here.

JOHN W. JAMISON,
Town Clerk.

LACEY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas C. Van Arsdale, Lanoka; A. G. Wilbert, Forked River; B. F. Mathews, Forked River; B. F. Holmes, Forked River; O. A. Wood, M.D., Health Inspector, Forked River.

Increased attention is given each year to sanitary matters.

Dr. O. A. Wood met with the Board early in the summer to give advice in regard to a place likely to need drainage and other matters pertaining to the general health of the village.

Two cases of scarlet fever occurred the past year. Complaint was made to the Board, and measures were taken to prevent the spread of the disease, which were successful.

A notice was posted on the stream that flows through the village to prevent throwing dead fish and other refuse therein.

B. F. MATHEWS.

LAKWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Luke Johnson, Walter Shinn, John B. Peters, Charles H. Dix, H. H. Cate, M.D., R. B. Robbins, Health Inspector. Post office address of all, Lakewood.

Situated in the Pine Belt in the central eastern portion of the State. Population about 1,600.

Climate temperate, slightly warmer than New York. Average about 12° F. warmer than that city.

Sandy, flat and slightly rolling.

Water-supply pumped from a lake near village, filtered through sand, charcoal and sulphite aluminum.

Town fully sewerred; gravity system.

Streets wide, clean and kept so. No public grounds.

Houses mostly tenanted by one family; all wooden with one or two exceptions.

Refuse and excreta moved by private parties; not many out-houses in the village.

We have full health laws and regulations, which are well enforced.

La Grippe, bronchitis and sharp siege of measles and scarlet fever last spring.

Full report was sent last year and will be found in that report. There has been practically no change since then.

H. H. CATE, M.D.

LITTLE EGG HARBOR TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph I. Smith, President; Theo. T. Price, M.D., Secretary; Alexander Cowperthwaite, Charles M. Berry, James Rose. Post-office address of all, Tuckerton.

The general description of the township has been given in former reports. As little or no changes have taken place for several years it seems unnecessary to repeat what has already been reported.

The Board passed some regulations at its meeting, June 10th, in relation to drainage from kitchens and concerning hog-pens and slaughter-houses in the village of Tuckerton and published them in the local paper. The recommendations have been fairly well observed.

No contagious diseases have been prevalent during the year.

Our township is exceedingly healthy, and but little service is required of a Board of Health.

THEOPHILUS T. PRICE, M.D.,
Secretary.

MANCHESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. Montgomery, C. A. Wilbur, Dr. I. W. Kirk. T. Dowd, Jr., Assessor and Health Inspector. Post-office address of all, Manchester.

The report I sent you last year will cover all for this year. This is a healthy town, located in the Pines, about eight miles south of Lakewood.

No prevalent diseases this year.

Very little improvements done this year on streets or buildings.

OCEAN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William B. Wilkins, President, Watertown; Charles Bowker, Inspector Watertown; William Gray, Brookville; Z. H. Wilkins, Watertown.

Ocean Township is in perfect health. No contagious diseases during the last year. Our water-supply is mostly from driven wells and very good. Last meeting of Board was October 24th, 1893.

Z. H. WILKINS,
Secretary.

PLUMSTEAD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ivins Davis, Wm. A. Parker, George H. Ivins, Jr., Howard Allen, M.D., Aaron Bronson, Assessor. Post-office address of all, New Egypt.

Our Board has passed ordinances.

No prevalent diseases.

One complaint received and ordered abated. No epidemics of any kind.

STAFFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles H. Cranmer, Manahawkin; Thos. H. Letts, Manahawkin; Lewis A. Cranmer, Mayeta; John B. Courtney, Manahawkin; S. B. Irwin, M.D., Manahawkin; Ezekiel L. Reeder, Health Inspector, Manahawkin.

Location, slightly rolling.

Population, about one thousand.

Climate, slightly damp this fall, generally mild.

Water-supply, from wells.

Drainage, natural and sufficient.

Streets, graveled and in good order.

Houses, frame, generally occupied by owner.

No diseased animals.

Slaughter-house, well kept.

Public health, quite good and seen after by Board of Health.

Very little contagious disease. Very deficient in vaccination.

Sanitary expenses, forty dollars, including Health Inspector.

Our township has been examined from house to house by the Inspector of the Board of Health, and found in good order generally.

UNION TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edmund Bennett, M.D., George H. Van Note, Joseph O. Elberson, Andrew F. Kilpatrick, Emmor R. Wills, Edmund Bennett, M.D., Health Inspector. Post-office address of all, Barnegat.

PASSAIC COUNTY.

ACQUACKANOCK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Nicholas Fredericker, Lyndhurst; J. H. Merculus, Clifton; D. Schoonmaker, Richfield; C. F. Hemmenway, Secretary, Clifton.

Population about 1,500.

Wells and cisterns supply water.

Six public schools.

No public buildings.

Alms-house of City of Passaic is situated in this township.

Public health, good.

Board was called on six occasions on complaints of citizens on minor charges. No sanitary improvements; none called for.

C. F. HEMMENWAY,
Secretary.

LITTLE FALLS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Crane, Richard Casson, Charles H. Booth, Walter Bott, Assessor; E. A. Keeler, M.D. Post-office address of all, Little Falls.

No public water-supply.

No sewers; cesspools used with open bottom and sides.

Board has passed ordinances.

No occasion for quarantine this year.

No epidemics.

MANCHESTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard E. Doremus, Chairman, Paterson; Adam Vreeland, Hawthorne; John Lotz, Haledon; S. Cyrus Townsend, M.D., Paterson; William D. Berdam, Secretary, Paterson.

Water-supply is from wells, springs, cisterns and brooks. A large majority of the people get their water-supply from wells.

No system of drainage other than natural surface drainage. Cellars are dry as a rule, the surface of the land is such as to secure dry cellars. No swamps to any extent in the township. No sewers in the township.

Houses are built of stone, brick and wood. A large majority are frame buildings. The most part of the houses are owned by the occupants. There are some tenement houses; they are kept neat and tidy.

There have not been any diseases among animals.

Slaughter-houses and abattoirs are all kept neat and clean, and no complaints from the same the past year.

There are three silk mills in the township.

There is one orphans' asylum of the Roman Catholic faith (for girls). The society have built a large addition to the asylum the past summer.

There are five cemeteries in the township. Inspection of the cemeteries was made in the month of August last and it was found that the graves at Goffle were not dug as deep as the law required, and at the next meeting of the Board the managers of both the cemeteries were requested to be present, and were ordered in the future to have all graves in their cemeteries dug as deep as the law required, otherwise we, as a Health Board, would have to resort to a more stringent course.

As soon as we hear of a case of contagious disease we have the house quarantined, and use every precaution. There has been reported to the medical member of the Board 2 cases of typhoid fever, 16 cases of scarlet fever, and 5 cases of diphtheria.

Dwelling-houses are heated with stoves and heaters.

At a meeting of the Board of Health of Manchester township, held in April of this year, there was ordered a number of bills printed on linen and posted throughout the township to the effect that the inhabitants have their cellars and yards and privies thoroughly cleaned from all decaying matter and rubbish of all sorts within thirty days, or be dealt with according to law. We have also ordered several nuisances abated and done all that we thought necessary for the health of the people.

WM. D. BERDAN,
Secretary.

PASSAIC CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Percy H. Terbune, M.D., President; John H. Bowker, Secretary; John J. Radcliffe, Rev. R. M. Offord, B. G. Volger, Chas. E. Denholm, G. J. von Schott, M.D., Health Inspector. Post-office address of all, Passaic City.

The present population is estimated between sixteen and seventeen thousand.

The city has a main water-supply from above the Passaic falls, at Paterson, by gravity, through a conduit four miles long and of about four or five million gallons daily capacity. The reserve supply is from an artificial lake that is pumped into a reservoir and from there distributed by gravity. The water has been examined and pronounced excellent.

The larger part of the city being on hilly ground the drainage is natural, and only in the level parts rain-water sewers have been constructed.

The Waring system of sewers are in vogue and are using eight hundred thousand gallons of water in twenty-four hours and they give good satisfaction, except on level stretches in some quarters, where the foreign population lives, who were in the habit of washing cinders in their sinks, thus obstructing the sewers with fine ashes. A house-to-house inspection has greatly remedied this evil. The grade of the sewers varies from five inches to fifteen feet in one hundred feet. All their contents flow into the Passaic river.

The hill section contains mostly fine residences, the middle section is the business part and contains smaller residences, mostly occupied by two families, and the Dundee section contains the foreign element and is consequently the tenement section.

The present Board of Health has largely improved the condition of these houses, so that now they are fitted with sanitary plumbing and are kept in good condition. It was, however, necessary to close several of them as unfit for habitation. It seems almost impossible to prevent overcrowding. Night inspections revealed this evil. All tenements have now sanitary closets, the so-called "Royal Flush Valve" being used extensively. The method of illumination is electricity and gas.

A new two hundred and fifty thousand foot gas holder was recently added to the local plant. At the instance of this Board an ordi-

nance is now being considered by the City Council requiring householders to keep garbage and ashes separate. A bid has already been received for the use of the ashes to fill in low ground, while the garbage will be disposed of outside the city limits. There are about forty-five cartloads of ashes, &c., per day, and it is gathered by a scavenger under the supervision of the Health Board. The old-fashioned vaults and cesspools are emptied by licensed scavengers, who are required to take out a permit for each vault, and they dispose of the refuse mostly to farmers. No diseases of animals were reported, but Dr. W. H. Lowe, our Veterinary Inspector, inspects all cattle and stables, and keeps a lookout for infected or diseased meats, &c.

The Board has also abolished all slaughter-houses inside the city limits.

The Litho-Carbon factory, The McLean Mill and the Botany Worsted Mills have been largely extended. The latter, containing twelve acres under roof, is a model as to ventilation, lighting, artesian water and private sewer systems.

The capacity of School No. 2 has been doubled, and contracts are out for replacing No. 4 by a fine brick structure. The Board ordered School No. 1 closed unless sanitary closets, &c., were put in, which was done. A fine brick parochial school was also built during the past year, also a new poor-house and farm at a cost of \$5,000. The new emergency hospital is used frequently, and the dispensary treated about 550 separate cases.

The public health has been excellent for the past year. The health laws and regulations were rigidly enforced; parties violating the sanitary code have been sued and convicted and fines collected.

The Board of Education has caused four hundred children to be vaccinated. Last year during the small-pox epidemic all school children were vaccinated, and also almost everybody in the city. We have a well-appointed small-pox hospital, and nurses and guards can be had at short notice. Last summer ten thousand cholera circulars were printed and distributed in different languages. Only thirty-three cases of contagious diseases were reported, of which twenty-five were diphtheria and eight scarlet fever, all of which were duly reported, and the principals of the schools notified, and the houses placarded, quarantined and fumigated.

The sanitary code requirements are strictly enforced in all new buildings.

No prevalent diseases.

Collection of meat offal, junk, rags, &c., have been brought under registry. Four obnoxious dumps in the city limits have been abolished and covered with soil. A stream flowing through the city was condemned, and the flow diverted into the surface water sewer; upward of three thousand inspections were made, and two hundred and forty notices for violations were served. Two hundred and twenty-six plumbing permits were granted.

One hundred and seventy-five building permits were issued, and all were duly inspected. Two hundred and eleven connections with sewer were made, and the Board is still very active in doing away with the old vaults and cesspools. Eighty-seven licenses for collecting rags and junk, &c., and for cattle and other animals. On the whole, it may be said that the Board has, during the last year, developed an activity resulting in a general cleaning up of the city and establishing the prerogative of the health authorities. The sessions of the Board are held twice a month during the summer months and once a month the remainder of the year.

PATERSON CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. C. Agnew, M.D., James Mills, Esq., Ph. A. Harris, M.D., B. C. Magennis, M.D., T. Y. Kinne, M.D., John T. Pollitt, Esq., Joseph B. Mills, Secretary; J. L. Leal, M.D., Health Inspector; J. W. Smith, M.D., Assistant Health Inspector; William I. Lewis, Counsel. Post-office address of all, Paterson.

Contagious Diseases.

Our showing as regards preventable disease is much more favorable than was that of our previous report. Scarlet fever decreased over 25 per cent. in the number of cases and the death rate 33 per cent. Diphtheria increased about 47 per cent., the death rate remaining about the same. Typhoid fever was slightly more prevalent, the death rate being a little less. During the year four cases of small-pox occurred, with one death. These cases had no connection with each other, but all undoubtedly arose from different sources of contagion. The disease developed in two of the patients within two weeks of the time of their landing in New York, from emigrant ships, on which

the disease had existed; the source in another case was Passaic, N. J., where the disease was very prevalent at the time; the origin of the other case could not be satisfactorily traced. The method adopted by the Board in order to limit and eradicate the disease was the same in all the cases. The patients were removed to the contagious disease hospital premises, from which they were taken fumigated and disinfected, and all inmates of said premises vaccinated and quarantined for fourteen days under police guard. All people in the neighborhood, and all who by any possibility could have been in contact with the patients or their families, were vaccinated and kept under observation for two weeks. In all, over seven thousand people were vaccinated.

From the above it will be seen that a great deal of labor was devoted to, and the strictest measures used in stamping out the disease. The Board finds its reward and justification, however, in the fact that, from four separate and distinct primary cases, not a single secondary case developed. The results have given confidence to the people, and have robbed the disease of half its terrors. An old-fashioned "small-pox scare" is now an impossibility in this city.

During last fall, when this country was seriously threatened with an outbreak of Asiatic cholera, this Board took energetic measures in preparation of its coming. The Board of Aldermen freely furnished the extra funds needed, the Police Commission gave their powerful assistance, and the Board of Public Works, called upon for an extra effort, responded by giving us, as a result of two weeks' almost superhuman effort, a city as clean as man and money could make it. An immense amount of work was also done by this Board in cleaning yards, alleys, cellars and houses of private premises. When necessary, such premises were disinfected by the sanitary corps of this Board. Over three thousand house-to-house inspections were made.

Although, fortunately, the dreaded cholera did not reach us, yet the vast amount of work was not wasted. In the first place, its moral effect was most valuable, as it shows us what it is possible for us to accomplish again in a given time. In the second place, the city was put in almost perfect sanitary condition, and this condition, to a great degree, exists at the present time. We feel that we are justified in attributing to the improved condition of the city the great reduction in the number of cases of preventable disease during the past year. We are confident that the same expenditure of work and money every year would repay the city a hundred fold. Though the cholera did

not reach the city, yet it did exist very near to us. By the order of the State Board of Health, the executive officer of this Board took charge of premises in Athenia, which had become infected through one of the New York cholera patients going there. Said patient on first becoming ill had gone to Athenia, in hopes that the change would be beneficial to him. Remaining there two days, and not becoming benefited, he returned to New York, where he died forty hours afterward with what was proved by the microscope to have been Asiatic cholera. No time was lost in removing all danger of infection from the premises in Athenia. All clothing used by him was destroyed, house was fumigated and disinfected, privy was disinfected and filled up, and all persons exposed were quarantined under guard for the proper time. No secondary cases developed.

Sewage System.

Our sewage system has been greatly extended during the past year. Over four miles of sewers have been completed and an immense amount of work started since our last report. The main "Totowa sewers," therein mentioned, are now completed. The one running through Paterson avenue and Front street is especially valuable on account of the protection afforded the fore bay of the water company. The great "East Side sewer" is nearly completed and will soon be disposing of the refuse of a large and growing section of the city. It is hoped that during the coming year measures will be taken to turn into this sewer, by means of a Clay street lateral, all water from south of Clay street which now enters the Vine street sewer. By this means the "Sandy Hill" system, which is very much overcrowded, may be relieved, and the sanitary condition of that large and populous section may be materially improved. Another improvement which is now imperatively demanded is a main trunk sewer for South Paterson. Probably no section of the city has grown more rapidly in the last three years than has that section. Its condition, with its rapidly increasing population, is really becoming alarming. The necessity for prompt action will impress itself upon anyone passing through that section. It is to be hoped that the Board of Public Works will see the way clear to undertake this work during the coming year. Before leaving this subject, allusion must again be made to the condition of the Passaic river between the Passaic Falls and Dundee dam.

For years this Board has been calling attention to the same condition. Whether this nuisance can be endured for another summer is doubtful, however, so we hope that in our next report we may be able to state that it is in a fair way of *solution*.

Collection and Disposal of Garbage.

During the past year 2,756 tons of garbage have been disposed of at the Paterson Sanitary Works in a manner satisfactory to this Board. Said works have been kept in good condition and so operated that no grounds for complaint have been given to the people living in the neighborhood. Not one complaint has been made to this Board against the garbage works during the past year. We would be pleased to say as much concerning the system of collection, but, unfortunately, are unable to do so. The complaints concerning that have been many and well founded. There is no use of entering upon details when one chief fault is the root and foundation of all others. This chief fault is the sub-contract system. As long as that system stands, so long will our garbage not be properly collected. This is not a personal complaint against the sub-contractor, for, under the present system, the same faults will exist no matter who the sub-contractor may be. Change the system and all other faults can be easily eradicated. This Board has endeavored to grapple with the matter by passing new ordinances, under which individual employees of the sub-contractor can be reached for violation of the law, and will enforce the said ordinances to the best of their ability. Still, satisfactory results can only be obtained by a complete change of the system.

Water-Supply.

Analyses of water taken from our public supply has been made at different times during the year, with satisfactory results. Particular attention will be given to the matter during the coming year, as a part (and a very important part) of our preparation against cholera. Most of our public surface wells are now rooted out, and action will be taken with those remaining, when satisfactory evidence of pollution is shown. Many private surface wells still exist in the suburbs, though some have been closed during the past year. These wells will also be closed when shown to be polluted. Some suspicion having arisen con-

cerning a part of our ice supply, both chemical and bacteriological examinations were made. The result showed that the ice was pure.

In conclusion we wish to state, that besides the routine work of the past year, shown in the above report, much has been done by this Board in preparation for what may be before us in the coming year. Those preparations are now completed. We feel that all has been done that should be done until further occasion arises. We hope that our next annual report will tell the story of a year free from pestilential diseases and of steady sanitary progress; but should it be otherwise, we are confident that it will show us to have been prepared for whatever might come, and to have faced the situation with the courage which only comes with the knowledge of full preparation.

JOHN L. LEAL, A. M., M.D.
Health Officer.

POMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Silas Mead, Bloomingdale; H. J. Smith, Pompton Lakes; D. A. Wheeler, Erskine; Lemuel Van Ness, Pompton; John C. Morgan, M.D., Pompton.

Water-supply is from wells and natural springs.

No drainage. Cellars generally dry. Malaria infrequent.

Dwellings generally have cellars; used mainly for vegetables.

Yearly house-to-house inspection by the Assessor.

Cesspools built with open bottoms; contents used for farm fertilizers.

No prevalent disease.

No slaughter-house nuisance.

Have not had cause to take any action.

WAYNE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Garret Berdan, Jr., Paterson; George W. Van Ness, Mountain View; David F. Duncan, Paterson; John G. Merselis, Assessor, Paterson.

Water for family use is obtained from wells and springs. Water is abundant and extra good; clear, moderately soft, and free from iron or other mineral taste.

The drainage is chiefly natural, the township being somewhat hilly and having considerable general elevation.

No sewerage system; land drained by natural streams, open ditches and tile underdrains; cellars dry. The greater portion of township is almost entirely free from malaria.

The modern houses are chiefly of wood and the older ones of stone. Not generally close together. Occupied mostly by farmers. Cellars are often used for the storage of vegetables. Do not know of any houses occupied by more than two families. There is no house-to-house inspection other than the Assessor makes in his rounds.

No sewers. Cesspools mostly open at bottom and sides. Excreta mixed with earth or ashes and spread upon land.

No prevalent diseases of animals.

There are but two places in township where animals are slaughtered; they are not close to dwellings and refuse is properly taken care of. Meat is usually brought ready-dressed from Paterson markets.

No new manufactories. The Rend Rock Powder Company has moved away.

Five school buildings and two churches.

One burying-ground adjacent to First Reform Church of Preakness. Grounds kept in good order. A few old homesteads have private burying-ground, but these are very seldom used.

Board has passed no ordinances.

No prevalent diseases.

There has been nothing of importance done by Board.

There is one physician resident in township.

JOHN G. MERSELIS,
Assessor.

WEST MILFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Henion, Chairman, Echo Lake; Sylvanus E. Gregory, West Milford; Oscar F. Smith, West Milford; Joseph H. Schulster, Echo Lake.

Water generally soft.
 Cellars used for storage of vegetables.
 No sewers.
 Prevalent disease, whooping cough.
 No nuisance.

SALEM COUNTY.

ALLOWAY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. M. Sickler, Yorktown; Joseph G. Kerlin, Alloway; John D. Drummond, Alloway; J. F. Ayres, Assessor, Alloway; W. L. Ewen, M.D.

Have no organized Board.

ELMER.

The following communication has been received:

ELMER, N. J., Dec. 4th, 1893.

STATE BOARD OF HEALTH:

TRENTON, N. J.

DEAR SIRs--Yours of the 28th inst. at hand and contents noted. The Council have under way an ordinance in regard to the Board of Health. Owing to the death of Mayor Becket, and electing a new Mayor, so much time was lost, and we are just getting in good working condition. Will let you know just as soon as ordinances are passed.

Yours truly,
 HIRAM VAN METER,
 Clerk of Borough.

EL SINBORO TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. H. Lippin, E. Waddington, Samuel P. Smith, J. W. Smith, Assessor, Elsinboro.

LOWER ALLOWAYS CREEK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Waddington B. Ridgway, Hancock Bridge; William D. Baker, Canton; John Anderson, Harmersville; Dr. F. B. Harris, Canton; Mark T. Hilliard, Hancock Bridge.

We are in about the same shape as usual. We have no Health Inspector; we have no contagious diseases. Our township is in a healthy condition. The Board has not been called on in but one case in six years. I try as I go over the township to see there is nothing that is injurious to health.

MARK T. HILLIARD,
 Assessor.

LOWER PENNS NECK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Lindae, Salem; Charles W. Powers, Pennsville; Richard D. Batten, Pennsville; Wm. H. James, M.D., Pennsville; Eph. Fowler, Assessor, Pennsville.

The health of the township has been very good. Only two mild cases of scarlet fever have occurred.

The sanitary condition of our school is good.

Water is supplied by wells only, and they are about twelve to fifteen feet deep.

The attention of the Board has not been called to a single case during the year.

The village of Pennsville, being situated on the Delaware, is subject to the very high tides which occur sometimes and fill some wells and also cellars, but do not cause any sickness.

Refuse and excreta collected and used for fertilizers.

No disease among animals during the year, except hog cholera in a few cases.

The canning factory for tomatoes is located on the Delaware river and the refuse passes into it.

There have been very few deaths in the township, most of them being aged persons.

EPH. FOWLER,
Assessor.

TOWNSHIP OF MANNINGTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. Smith Bassett, Barclay Griscom, David A. Fogg, William H. Acton, Assessor, Salem.

The health of the township has been unusually good. Very little disease of any kind prevailing.

The late heavy storm having broken many of the meadow banks along the Delaware and Salem rivers caused the overflow of several hundred acres of low land. It was thought there would be a great amount of malaria, but this has not been the effect.

WM. H. ACTON,
Assessor.

OLDMANS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. F. Hunt, Assessor, Pedricktown; Frank Gaventa, Pedricktown; Josiah Crispin, Pedricktown; Jacob J. Hunt, Auburn.

Water-supply is from wells from ten to eighteen feet deep.
Drainage by tile. Cellars in some localities damp.

Houses have cellars generally used for storage, but few houses have more than one family.

No prevalent disease among animals.

Has been very healthy the last year. There have been but few deaths. There has been no complaint to the Board the last year.

WM. F. HUNT,
Assessor.

PITTSGROVE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John G. Barton, Woodstown; George B. Grier, Woodstown; C. H. Wriggins, Sharptown; C. H. Richman, Assessor, Woodstown; P. G. Sowder, M.D., Woodstown.

Water-supply from surface and artesian wells. Artesian wells 150 feet deep. Water contains a small trace of iron, also of lime. Is being extensively introduced for household purposes.

Drainage and sewerage mostly surface. An artificial drain was laid through a part of the main street during the past year by private parties.

Streets cleanly and well cared for. Have no public grounds.

Houses well cared for, and principally occupied by owners.

Refuse and excreta left to the management of individual property-owners. Excreta usually composted with soil or coal ashes and used as a fertilizer.

Have had no prevalent disease among farm stock during past year.

School buildings well cared for, well equipped, and schools well attended.

Board of Health has sanitary laws, but are not often called upon to enforce them, as the borough of Woodstown has ordinances regulating sanitary matters.

Lighting, by lamps; heating, by stoves and heaters.

General health of the township good. Had a number of cases of scarlatina during the summer, but nothing of an epidemic nature.

Have had no business of importance before the Board.

PITTSGROVE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. M. Hitchner, Elmer; W. W. Golder, Centreton; J. M. Clark, Norma; J. W. Golder, Centreton.

There has been no disease of an epidemic nature the past year. The Board of Health have met twice during the year to enforce the proper burial of dead animals.

J. W. GOLDEN,
Assessor.

QUINTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. F. Anderson, President, Quinton; Charles Fox, Secretary, Quinton; Wm. T. Good, M.D., Quinton; Jno. G. Fowser, Quinton; Watson Davis, Shiloh.

We organized last May a Local Board of Health according to law. Held two meetings, but have had no work to do.

Our township has been very healthy the past year, no epidemics of any kind visiting us, and the people all seem to take interest in preventing any nuisances of any kind that would be detrimental to the health of the inhabitants.

SALEM CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

L. B. Sickler, Thomas Hewes, Clinton Bowen. Post-office address of all, Salem.

The report from this locality states that the Board is somewhat disorganized and at present there are but three members.

We hope before another year to report the re-organization of the Board and that effective work will be done as in the past.

UPPER PENN'S NECK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Bevis, Chairman; Edward E. Smith, William Hutchinson, Dr. N. H. Barnart, Medical Member; Amos Morris, Assessor. Post-office address of all, Penns Grove.

Location on Delaware river opposite Wilmington, Del.

Population 2,300. Land average about 20 feet above high water mark, and is mostly level, interspersed with swamps and meadows.

The water is supplied by driven and dug wells, some soft and good, others hard and poor. Drainage is but partial and in wooden trunks.

Streets and roads are good.

Houses occupied by single families, some few in rows.

Refuse and excreta taken care of by individuals by hauling it away or burying it.

No epidemics among animals.

No slaughter-houses in use.

Gun cotton and smokeless powder manufactory situated in lower part of the township, employ about 25 men.

School-houses in good condition.

Cemeteries well located and cared for, and burial regulations strictly followed.

Code of health ordinances adopted at spring meeting of Board and no violations reported.

Public health has been good throughout the year.

No epidemics of importance have occurred excepting one of dysentery in July.

Very little typhoid fever, and that imported.

Several cases of diphtheria and scarlet fever in outlying districts.

At the spring meeting, the township was laid off in three districts and each one of the committee agreed to attend to all complaints in their districts. They report they have had no trouble to get the nuisances removed that were complained of.

The Board have had a few objectionable places cleaned up.

AMOS MORRIS,
Secretary.

UPPER PITTSBORO.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hiram W. Smith, President, Whig Lane; Thomas Y. Hackett, Daretown; Henry Coombs, Elmer; M. J. Paulding, Physician, Daretown; Joseph N. Gray, Secretary, Pettigrove.

There is nothing new to report this year on the line of sanitary conditions.

The physician informs me there has been no epidemic this year to report; in fact, there has been less sickness in the township than usual.

The Board of Health for the township was organized in April last, but there has been no matter come before them requiring their attention.

Part of the township is now incorporated into a borough (Elmer) having a Mayor and Council and other officers incident to incorporated towns.

JOSEPH N. GRAY,
Assessor.

SOMERSET COUNTY.

BEDMINSTER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ralph Davenport, Pluckamin, Chairman; Erastus Randall, Bedminster; Lewis Van Dorn, Peapack; William P. Sutphin, Assessor (Secretary), Bedminster; Edwin F. Farrow, Peapack; I. B. Buckman, Pluckamin.

This Board has no cause for making an extended report. The health of the township has been generally good. No complaints have been made to the Board of sufficient consequence to require a formal meeting. A notice to the person or persons who occasioned complaints to be made, from the Chairman and Secretary of the Board, has been in each case sufficient to correct and remove all the causes of complaint.

WILLIAM P. SUTPHIN,
Secretary.

BERNARDS TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Freeman Stelle, Chairman, Millington; J. A. Layton, Treasurer, Liberty Corner; Calvin Thompson, Basking Ridge; A. F. Voorhees, M.D., Basking Ridge; J. A. Whitenack, Jr., Secretary, Mine Brook; A. F. Voorhees, M.D., Health Inspector.

The Board organized at the time ordered by the Town Committee, and at its second meeting, held at Bernardsville, June 24th, adopted sanitary code, and had it printed in book form and distributed to the inhabitants throughout the township.

Have no regular meetings to hear complaints, as a suggestion included in our code requests that all persons having cause for complaints make them in writing. By so doing, the nuisance can be more promptly attended to and with less expense than to hold regular meetings.

Have only had occasion to call but three (3) meetings of the Board to investigate nuisances, and where found to exist a notice from the Board, with reference to our code and the penalty for its violation, caused it to be promptly abated.

Reports of the five practicing physicians in township show that there has not been any prevalent or contagious disease during the year.

J. A. WHITENACK, JR.,
Secretary.

BRANCBURG TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John G. Sutphin, Chairman, North Branch Station; Geo. S. Corle, Neshanic Station; Wm. H. Dolliver, Neshanic Station; Adonis Nelson, M.D., Neshanic Station; E. Brokaw, Secretary, South Branch.

To the best of my knowledge, we have had no epidemics or complaints made to the Board. May 27th, 1893, the Board of Health met at Neshanic Station for the purpose of adopting a code of ordinances. The ordinances were introduced and brought to their second reading. A notice stating title of said ordinances was published in the way prescribed by law. Chap. LXVIII, sec. 12.

On motion, the Board adjourned to meet again June 10th, 1893, for the final passage of ordinances. We did so, and the ordinances were passed and published according to law. The Board also had handbills printed and distributed to each family and left at each post-office in the township by the Assessor.

E. BROKAW.

BRIDGEWATER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alexander H. Brokaw, Raritan; Dr. A. L. Stillwell, Somerville; C. L. Voorhees, Somerville; Peter Gulick, Raritan; James Ferry, Bound Brook. Dr. A. L. Stillwell, Health Inspector.

The condition of the general health throughout the township has been unusually good. During the months of March and April there were a number of cases of scarlet fever, several fatal. It is the custom of the Board to see that such cases are quarantined and that the premises are properly disinfected on the recovery of the patient.

Intermittent and remittent fever has been more prevalent than usual this fall.

Two cases of glanders (in horses) have been dealt with. They were disposed of according to the direction of the circular of the State Board on that subject.

The question of sewers is being agitated in Raritan.

There have not been as many complaints made to the Board as usual, and those complained of have, with few exceptions, followed the suggestions of the Board.

C. L. VOORHEES,
Secretary.

BOROUGH OF BOUND BROOK.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. Howard Perry, President; W. S. Negus, Secretary and Treasurer; Chas. McNabb, Inspector; C. R. P. Fisher, M.D., Medical Officer; J. N. Rowland, School Trustee. Post-office address of all, Bound Brook.

The water-supply is from a mountain stream dammed up in the gorge above Chimney Rock, about two miles from town, and reaches all parts of the borough by gravity. This has been in operation for several years. The water is clear, except immediately after a rain. The stream does not take any sewage, and no more pollution of any kind than any ordinary country creek, and most likely considerably less. A little over half the borough depend on cisterns and wells.

This Board has done all in its power to recommend sewers for the borough, and at the last Council meeting the sewage system was ordered begun.

As stated last year, we have no tenement houses, strictly speaking, but some that are occupied by more than one family, each having one floor. Some of the Italian and Polish families keep large boarding houses.

We have a yearly house-to-house inspection.

We have a public scavenger that empties the cesspools and privy vaults at a stated price per yard and the contents of both are hauled to a farmer that makes a compost out of them.

Cesspools are mostly built with open bottom, and our soil is a sandy and gravelly one and very open.

No cows or hogs allowed to be kept in the settled portions of the borough.

The woolen mills empty their dye-water into the river; the other factories have no nuisances.

The public school has had new steam heat put in.

Public health has been very good during the last year. Passed two additional ordinances during the year. One in regard to scavenger and one in regard to burying contents of privy-vaults close to streets.

Four scarlet fever cases and two diphtheria cases reported, and all precautions taken. No spread of the disease from any case occurred. Immigrant small-pox suspects found in one hour after receiving notification by mail from the State Board. House, furniture and clothing thoroughly disinfected, and vaccinated. No spread of the disease, and very little alarm created.

Have made all necessary arrangements for emergency hospitals in case of need, to be up on the outskirts of the borough and over 1,500 feet from the nearest dwelling. Have an ordinance in regard to compulsory vaccination under consideration.

Have on hand a sufficient amount of disinfectants for any emergency.

Have sewerage started. Forty-six privy-vaults cleaned by order of the Board. Gravel-pit nuisance abated by the borough and good drainage established there; no more complaints from that quarter.

CHAS. McNABB,
Inspector.
W. S. NEGUS,
Secretary and Treasurer.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theodore Hodge, Bound Brook; John Totten, Middlebush; John Stothoff, Middlebush; Dr. Jacob Voorhees, East Millstone; Dr. J. Howard Cooper, Health Inspector, Middlebush.

The Board of Health has had a very prosperous year as well as a very uneventful one. The Inspector hasn't been called out, and no complaints have been presented.

The water-supply is from wells and cisterns. All the stagnant water and refuse matter is carried away by the method in use generally in country places. Slaughter-houses, abattoirs and all public places are in perfect sanitary condition. Our cemeteries are well looked after, and all bodies are put under the surface five or six feet.

We have had no cases requiring quarantine restrictions during the year.

Very little advancement has been made during the last year by the local Board.

There has been no contagious disease among animals reported to the Board. No complaints of nuisances have been entered by any one in the village of Millstone; in fact, none in the township.

JOHN STOTHOFF,
Chairman.
J. W. VOORHEES,
Assessor.

HILLSBOROUGH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter J. Quick, South Branch; J. V. D. Smith, Weston; Mr. Wyckoff, Millstone; Abraham D. Baird, Assessor, Frankport; W. H. Merrell, M.D., Secretary.

Nearly all the houses have cellars; occasionally one has basement instead. Some cellars are used for storing vegetables.

There are few tenement houses of more than two families. No yearly house-to-house inspection.

Being a township having no village of 200 inhabitants, we have no sewers.

No epidemic.

There are very few cesspools; these are not cemented nor regularly emptied.

Slaughter-houses (there are only two) are kept so they are no nuisance.

No new factories.

The only nuisance reported is from a photographic concern at Neshanic. This, now, is in decent shape, but so far the Board has had to keep busy with it to keep it in good condition. It still may need to be brought before the grand jury, sometime.

Board has not passed ordinances.

W. H. MERRELL, M.D.,
Secretary.

MONTGOMERY TOWNSHIP.

Report not received in time for printing.

NORTH PLAINFIELD BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Rev. Wm. E. Honeyman, President; P. M. French, Andrew Lane, Frank Curtis, J. H. Carman, M.D., Secretary; Frank M. Whiteley, Health Inspector.

North Plainfield has enjoyed a very healthy year, there being no epidemics of any kind. A house-to-house inspection is made twice a year, and the borough is kept in a good sanitary condition. Have discovered several sewer connections with Green Brook during the year, and caused some to be cut off. We are anxiously looking forward to the time when the city of Plainfield will adopt some sewerage system with which we hope to connect. Have adopted an ordinance regulating the collection of kitchen garbage the past year, and now have that important sanitary feature under our control.

J. H. CARMAN, M.D.,
Secretary.

NORTH PLAINFIELD TOWNSHIP.

The township outside of the borough of North Plainfield is very small and the Board of Health has never organized.

J. H. COOLEY,
Assessor.

WARREN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Peter J. Zeglio, Warrenville; John D. Bornmann, Warrenville; Peter Bower, Warrenville; Diedric Ehlen, Warrenville; Joel Codington, Martinville.

Our report must be the same as the years passed. Our township is a hilly part of Somerset county and a farming district.

SUSSEX COUNTY.

ANDERSON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Levi H. Space, Chairman, Newton; Benjamin D. Totten, Andover; Charles Gardner, Andover; J. C. Clark, M.D., Andover; G. C. Cook, Assessor, Andover.

Situated in the southern part of Sussex county, with an area of about 14,000 acres; population about 1,100.

The township of Anderson will compare favorably with any township in the county with like area of territory, as to sanitary and healthful location.

What is now known as the Andover Cemetery, under the supervision of an incorporated body, known as the Andover Cemetery Association, was originally set apart as a place of burial of the dead, thirty-five years ago.

The average *annual* interments to the present time is but a fraction over eleven, or one in one hundred of present population.

No swamps. Cases of malaria not frequent.

No contagious diseases among domestic animals.

But one slaughter-house; no cause of complaint arising from it.

Number of milch cows in township present season, 856.

No ordinances passed by the Board.

Four school-houses, two of which are new.

G. C. COOK,
Assessor.

BYRAM TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John D. Lawrence, Stanhope; Robert Slaght, Stanhope; P. D. Smith, Waterloo; D. W. Goble, Assessor, Andover.

Water-supply from springs and wells. Water pure.

Drainage natural.

Houses mostly all have basements, used to store vegetables.

Refuse and excreta generally put in manure heaps.

Slaughter-houses kept clean.

Board holds regular meetings, but had nothing to do the past year.

FRANKFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Oscar Northrup, Augusta; Victor Compton, Branchville; Linus Clark, Branchville; E. S. Dalrymple, M.D., Health Inspector, Branchville; George Phillips, Assessor, Branchville.

There is nothing to add to former reports. The general health of the township has been very good. There has been no disease among animals.

GEORGE PHILLIPS,
Assessor.

GREEN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Vansyckle, Tranquillity; Job J. Decker, Assessor, Andover; W. S. Hibler, Huntsville; Wm. C. Gray, Huntsburg; Dr. S. B. Straley, Andover.

Water-supply from springs and wells, about an equal number of each, the water of both being, except in a few instances, hard. Very few use cistern water for drinking purposes.

Drainage is, except in a few instances, very good.

Very little malaria is present.

Houses generally have basements or cellars, and as a general rule vegetables are stored in them during the winter. Very few houses contain more than one family. Yearly house-to-house inspection is not made.

No sewers; cesspools are built with open bottoms or sides, generally the latter, and the contents are buried when emptied.

Ordinances were passed requiring vaccination, but all unvaccinated children have not yet complied, owing to shortness of time.

The Board passed ordinances requiring all nuisances abated and one requiring vaccination. These ordinances have been enforced as fully as is possible. Several nuisances (four) have been reported and three found, the fourth on investigation being found not detrimental to health. The three were promptly abated on notice.

HAMPTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Abram S. Morris, Newton; Jacob R. Stoll, Vale; Charles M. Williams, Baleville; Moses Ackerson, Halsey.

There has been no contagious diseases among animals. General health throughout the township has been very good. No slaughter-house nuisances. No ordinances passed.

MOSES ACKERSON,
Assessor.

HARDYSTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

President, Horace E. Rude, Hamburg; Secretary, John Linn, Hamburg; John A. Palisser, Stockholm; James Crome, Franklin Furnace; J. B. Pellet, M.D., Hamburg.

Water-supply, wells, cisterns and springs. Wells and springs, hard.

Drainage good. No swamps. Cellars dry.

Houses have cellars; are used in the ordinary way.

There is not a yearly house-to-house inspection.

No prevalent diseases this year.

Have no slaughter-houses.

JOHN LINN,
Secretary.

LAFAYETTE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Warbasse, Jacob Maines, John M. Hull. Post-office address of all, La Fayette.

No organized Board.

NEWTON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter S. Decker, Charles S. Steele, Lewis J. Martin. Post-office address of all, Newton.

No Board of Health here.

GEORGE HARDIN,
Assessor.

MONTAGUE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Santford Nearpass, Tristates, N.Y.; Timothy Shay, Montague; James A. Rundle, Montague; Wm. P. Hornbeck, Assessor, Montague.

There have been no special meetings of the Board the past year. There have been no complaints.

SPARTA.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. H. Sutton, Monroe; John Massaker, Sparta; E. Munson, Assessor, Sparta.

Ours is a rural town. We have no organized Board of Health, consequently no report to make.

E. MUNSON,
Assessor.

SANDYSTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George E. Hursh, Layton; James M. Stoll, Hainesville; Henry M. Ellette, Layton.

No regularly organized Board of Health.

STILLWATER TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph L. Hetzel, M.D., Stillwater; John S. Obdyke, Assessor, Stillwater; Jesse Sherred, Swartswood; Obadiah Vanhorn, Swartswood; David R. Swazey, Fredon.

The water-supply is mostly wells and springs. A very few use cisterns.

There has been only a few cases of malaria the past year.

Most of the houses have cellars; they are quite largely used for storage of vegetables.

There is only a few houses that have more than one family.

Pneumonia prevailed during the winter and spring months, and diarrhoea and dysentery during the summer months with ordinary severity. There was a dozen cases of scarlatina of a mild type during the fall of 1892.

I have inquired as to contagious diseases of animals and found none.

There has been three new school-houses built in the township the past year and one repaired.

Our Board has not passed ordinances.

The Board met in September to hear complaints; none were made.

The only complaint made the past year was the neglect of several parties in not burying dead animals, which was attended to by one of the Board sending them notice.

JOHN S. OBDYKE,
Assessor.

VERNON.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Carlos Allen, Vernon; A. S. Blanchard, Assessor, Vernon; A. P. Shaw, Vernon; Abram Vanwinkle, Glenwood; Stephen C. Wright, McAfee Valley.

There has not been any change from last year's report.

We have no Health Inspector.

Vernon township has not two thousand inhabitants in it.

A. S. BLANCHARD,
Assessor.

WALPACK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Martin Hull, Flatbrookville; Nathaniel Vanauken, Flatbrookville; Nicholas Tillman, Walpack Center.

We are a small and altogether a rural township. Population about four hundred and fifty.

The general contour of the township is such that it affords good natural drainage, and the absence of ponds and swamps makes the town remarkably free from any prevailing diseases.

We have three public school buildings, all in good condition.

The cemeteries are well taken care of.

There has been no contagious diseases, and the general health of the township has been good.

J. W. BUNNELL,
Assessor.

WANTAGE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hon. Jacob Swartwout, Deckertown; F. V. R. McCoy, Deckertown; Brice Roy, Deckertown; J. S. Wolfe, M.D., Coleville.

Since the incorporation of the village of Deckertown the township is left without any villages of over one hundred inhabitants.

The township being hilly the drainage is perfect, cellars being generally dry.

Swamps on the east. No malaria.

There has been no prevalent disease, and no loss of animals from contagious diseases.

The Board has had one meeting, but no complaints have come before them.

NEWMAN HALL,
Assessor.

UNION COUNTY.

CLARK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Marx Reifel, George Cordes, Isaac Terhune. F. P. Bullman, Assessor. Post-office address of all, Rahway.

We have no report to make this year. No complaints made, and no business came before the board.

F. P. BULLMAN,
Assessor.

CRANFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edmund B. Horton, President; Charles Leo Abey, Charles N. Drake, Edward S. Crane, Joseph H. Severaner, J. Mac Connell, M.D., Gideon E. Ludlow, Secretary. Names and post-office address of all, Cranford.

We have a good supply of water by a private company from wells at Netherwood, introduced January 1st, 1893.

Our Board passed a code of ordinances last year, and obtained judgment against one offender this year.

The health of the township during the past year has been good.

EDMUND B. HORTON,
President.

ELIZABETH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

I. W. Whelan, President; James S. Green, M.D., Wm. A. M. Mack, M.D., Victor Mravlag, M.D., John O. Donahue, J. O. Manning, Clerk; E. G. Putnam, Health Inspector. Post-office address of all, Elizabeth.

Have had four cases of small-pox, all brought here from Long Island City. Aside from these have had less cases of contagious diseases than usual.

There have been several sewers constructed, and more will soon be on recommendation of Board of Health, in localities where needed. The streets and gutters have been kept in much better condition than formerly, but there is still ample room for improvement.

E. G. PUTNAM.

FANWOOD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George C. Miller, Fanwood; A. D. Shepard, Scotch Plains; William Terry, Plainfield; John Robson, Scotch Plains; F. W. Westcott, M.D., Secretary and Health Inspector, Scotch Plains.

We have nothing new to report for the past year. Health of the township has been very good. No contagious disease. The Board have regular meetings to hear complaints, if any, and all cases reported receive prompt attention. We have no trouble with cases reported, as all seem anxious and willing to abate and remove whatever may tend to injure health.

F. W. WESTCOTT,
Secretary.

LINDEN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William H. Donalson, Chairman, Linden; Henry McCandless, Elizabeth; John F. Spinning, Elizabeth; Sandford Clark, Elizabeth; James W. Hope, Roselle; Milton B. Crane, Roselle; J. Hampton Eddy, Rahway; Robert A. Shotwell, Rahway; Daniel W. Reynolds, Roselle, Health Inspector; Henry C. Pierson, M.D., Roselle.

In making my annual report I have nothing new to add to former reports, with the exception that water has been introduced in the village of Roselle. The health of the township has been remarkably good; not one case of any contagious disease. No reports of disease among cattle. We have no slaughter-houses in the township.

JOHN A. ETHRRIDGE,
Assessor.

NEW PROVIDENCE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Badgley, Chairman, New Providence; George Wilcox, New Providence; Lewis Bergmiller, Berkley Heights; A. M. Cory, M.D., Inspector, New Providence.

The Board of Health was organized in June, and due notice was given for the rendering of complaints. No complaints were brought formally before the Board.

There have been no epidemics or contagious diseases among us. The health of the community has been good.

A. M. CORY, M.D.,
Inspector.

PLAINFIELD CITY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Rockfellow, President; Lemuel W. Serrell, Henry B. Newhall, Geo. W. Endicott, M. D.; Oliver B. Leonard, Secretary. M. Marvine Dunham, Health Inspector. Post-office address of all, Plainfield.

The sanitary work performed the past year under the authority of the Board of Health, has been similar to that of recent years. Precautionary measures have been persistently maintained by the Health Inspector, and vigilant attention given by him to the investigation of all unwholesome localities. During the twelve months from October 1st, 1892, to October 1st, 1893, he has made 656 inspections from house to house, and in cases of pressing emergency has served 68 peremptory notices for the abatement of detrimental nuisances.

In connection with this precautionary oversight of the sanitary condition of the city, there have been permits issued for emptying 594 cesspools, and cleaning out and disinfecting 376 privy vaults.

For the further care of the general health, this Board is considering the adoption of a plumbing ordinance, regulating and controlling ventilation and drainage of buildings as well.

The Muhlenberg Hospital is a valuable institution, greatly appreciated by the community, and sustained mostly by voluntary contributions. It is managed by a competent board of advisers, and supplied with experienced nurses. First-class medical attendance is rendered gratuitously by the physicians of the city. The last annual report showed 167 persons treated, only seven of whom died. No contagious cases are provided for.

The Common Council very generously made an appropriation the past year for the purchase of suitable grounds and the erection thereon of a quarantine hospital for use in extreme cases. But it has not been

possible, thus far, for our Board to secure a proper location within the city limits.

The doctors have promptly reported to us all contagious diseases. No epidemic has prevailed, and not an unusual amount of sickness has required their professional services. While there has been no special sickness that might be said to be prevalent, there has been a larger mortality among the children than usual, though not traceable to any local causes. In all contagious cases the premises are quarantined, and on the recovery or death of the patient, thorough fumigation is attended to.

The principal causes of death among adults were diseases of the lungs, heart and brain. With little children the mortality was chiefly attributable to cholera infantum, diphtheria and scarlet fever.

GEO. W. ROCKFELLOW,
President.

OLIVER B. LEONARD,
Secretary.

CITY OF RAHWAY.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chas. B. Holmes, M.D., President; H. Page Hough, M.D., John M. Randolph, M.D., Henry B. Rollinson, Daniel K. Ryno, S. R. Ryno, Health Inspector and Secretary. Post-office address of all, Rahway.

The city of Rahway is situated on the Pennsylvania Railroad, about nineteen miles from New York; with estimated population of 10,000, and a climate comparatively free from malarial and kindred tendencies.

The ground on which the city stands is of a generally level character; soil, sufficiently porous to dry quickly after storms and prevent the formation or existence of stagnant pools; dwellings, etc., so constructed that the city is not overcrowded in any part.

Water supplied through Holly system of water works owned by the city; water is taken from north branch of Rahway river.

Surface water is carried off by gutters which empty into underground sewers; sewage in all principal streets carried off through sewers as above, which empty into river below water-works.

Sidewalks, paved; road-beds, macadamized or paved with Belgian blocks, and are under the supervision of the Street Commissioner.

Houses generally without basements.

Houses and streets lit by gas and electricity.

Most all dwellings are connected with the sewer system of the city, but few cesspools being used, the contents of which, when cleaned, are taken out of the city.

Markets and slaughter-houses are so managed as to furnish little, if any, cause for complaint. Diseases of animals, if contagious, are reported to the Board of Health, and receive prompt attention.

Schools, almshouse, police station and other public buildings have all recently received attention and are in good sanitary condition.

There is but one cemetery within the city limits, which is managed so as to afford no cause for complaint.

The Board of Health has adopted a sanitary code and ordinances, which are enforced in a way to prevent the existence of any nuisances or other causes that might be a menace to the public health.

The collection of vital statistics is satisfactory, except as to returns of births, which some of our physicians give but scant attention.

It is required that contagious diseases be reported to the Board of Health, after which necessary precautions are taken.

There have been no diseases prevalent during the past year.

An Assistant Health Inspector was appointed at the May meeting of the Health Board, who held office until October 10th, 1893. He made a thorough house-to-house inspection, and wherever nuisances were found, steps were taken to compel their abatement. Under direction of the Assistant Inspector, streets, gutters and sewers were flushed from the fire hydrants during the summer and air-slacked lime was freely used wherever found necessary.

An open drain known as "the Main street ditch," long a cause of complaint, was removed as a further source of complaint by laying a 24-inch tile drain in said ditch for a distance of over 200 feet, after which the ditch was filled in with earth to the level of the surrounding land.

The total number of complaints reported to and by the Inspector was 343.

Number of complaints or nuisances abated, 271. Of the balance, some were trivial in character and others were laid over until cooler weather.

The past summer was one of the healthiest in the history of the city.

S. RUSLING RYNO,
Secretary and Inspector.

SPRINGFIELD.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

N. C. Cox, J. J. Hoff, A. P. Stiles, A. P. Carter, T. W. Harris, M.D., Health Inspector. Post-office address of all, Springfield.

The town has been very healthy during past season. No contagious disease except two mild cases of diphtheria. The Board has received but very few complaints, and these have been looked after and abated.

The Board has during the past year adopted a set of ordinances.

The Board has under consideration now plans for draining some swampy places in the town, and hope to soon carry them out. This, if done, will add considerable to the healthfulness of the town.

T. W. HARRIS, M.D.,
Inspector.

SUMMIT.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Parker W. Page, Chairman, Summit; Dr. Wm. H. Risk, Summit; James W. Reeves, Assessor, West Summit; James H. Kelly, Charles S. Day, J. J. Lane, Inspector, Summit.

Public water-supply by private company; about three hundred houses connected. Water analyzed is pure.

We have dry cellars and no swamps.

Sewers were introduced in 1892.

Ninety-five per cent. of houses on line of sewers are connected.

Cesspools are cemented if within one hundred feet of water-supply.

TOWNSHIP OF UNION.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alexander Cummings, Roselle; William Allen, Hilton, Essex Co.; John Leonard, Union; D. Hobart Sayre, Secretary, Union.

Since our last report but few complaints have reached us, the most of which were of a minor character, and have been promptly remedied, in accordance with directions of the Board, or of some member thereof, without a formal meeting. Have held one advertised meeting in accordance with the law. An outbreak of small-pox in one locality, emanating from some unknown source, was promptly quarantined, and the disease spread no further. We caused the premises to be disinfected. The general health of the township has been above the average. Scarlet fever was prevalent in one of the schools in a mild form in the spring, but was attended with no fatal results.

D. HOBART SAYRE,
Secretary.

WESTFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

N. V. Yardner, J. M. C. Marsh, Charles F. Connant, Martin Wells, Joseph B. Harrison, M.D. Post-office address of all, Westfield.

WARREN COUNTY.

ALLAMUCHY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel H. Drake, Charles M. Townsend, Mathias Hibbler, Edward J. Harden. Post-office address of all, Allamuchy.

There is no regular organized Board of Health in this township. Water-supply from wells and springs. Natural drainage. No slaughter-houses. The township is very healthy.

E. J. HARDEN,
Assessor.

BELVIDERE.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Arthur, President; George Weaver, Secretary; Wm. J. Burd, M.D., Treasurer; Robert J. Reimer. John H. Robeson, Health Inspector. Post-office address of all, Belvidere.

Since our last annual report the health of the people of Belvidere has been good. Scarlet fever in an exceedingly mild form was epidemic last winter and spring. During the summer months there was none, but this fall there have been a few cases. Pertussis in a mild form is now epidemic. Cases of contagious diseases are reported to the Board of Health. Vaccination is almost wholly neglected.

The Board of Health has decided to ask the Common Council next spring, when the appropriations are made, for an amount sufficient for the collection and disposal of garbage and refuse.

W. M. J. BURD, M.D.

BLAIRSTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. H. O. Carhart, Blairstown; Wm. C. Howell, President, Blairstown; Wm. B. Sigler, Secretary, Blairstown; J. J. Linaberry, Blairstown; E. C. Hoagland, Vail; Joshua Jones, Walnut Valley.

Population, 1,700.

One cemetery in the heart of the village of Blairstown. Wells filled with water from this; generally condemned.

Township unusually healthy during past year.

Board organized early in the spring and immediately condemned slaughter-houses and a few other obnoxious places and ordered them remedied, which was never done. Board has not met since nor done anything. Have had no complaints in writing, but a few verbal.

W. B. SIGLER,
Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Marshall Hoffman, Asbury; A. C. Metler, Broadway; J. K. Smith, New Village; Wm. Vliet, Asbury.

FRELINGHUYSEN TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Town Committee.—Reed Kerr, Johnsburg; Geo. Armstrong, Marksboro; G. W. Lundy, Johnsonburg; Assessor, W. H. Ackerson, Johnsonburg; Dr. Fredrick Rorback, M.D., Johnsonburg.

Springs and wells supply water.

Natural drainage. Cellars, dry. No malaria.

There has been no prevalent disease the past year.

Our township lies in the northern part of Warren county, and is very healthy.

We have no village of over 200 inhabitants.

We have no regular organized Board of Health.

GREENWICH TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Philip Hance, Stewartsville; Freeman H. Metler, Stewartsville; Robert I. Smith, Bloomsbury; P. F. Hulshizer, Stewartsville; William Sherrer, Secretary, Bloomsbury.

There have been two cases of diphtheria and one case of scarlet fever in the township this year. One case of diphtheria proved fatal.

WILLIAM SHERRER,
Secretary.

HARMONY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry Metz, Chairman, Harmony; James DeWitt, Harmony; Ralph Rush, Montana; C. Pittinger, Clerk, Harmony.

The health of the township has been remarkably good during the year. No epidemic has occurred. Vaccination is neglected. Nothing new to report.

J. D. DEWITT.

HARDWICK TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hiram France, Blairstown; David Newmans, Blairstown; James D. Lauterman, Blairstown; Philip Savercool, Hardwick.

The best of health has prevailed. No contagious disease. Our water-supply is pure.

We have had no special meetings, as they were not deemed necessary.

PHILIP SAVERCOOL,
Assessor.

HACKETTSTOWN.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. W. Smith, Mayor; A. W. Cutler, J. S. Cook, M.D., A. E. Martin, M.D., James Tamblin, Thomas Nolan, A. J. Martenis; J. M. Everitt, Health Inspector. Post-office address of all, Hackettstown.

Water supply from reservoir; owned by the town; about all the houses take it; it is not discolored; has no iron taste; is soft, and first-class the year round. Reservoirs and pipes are cleaned. The stream from which it is taken receives no sewerage above point of supply. Examination is made frequently. No wells; but few cisterns, if any.

Usual water level is such as to secure dry cellars; no swamps; malaria is not frequent.

Houses generally have cellars; quite a number of cellars are used for storing vegetables; no yearly house-to-house inspection.

Our record does not show how far sewers are used, and what proportion of houses connect with them. Cesspools are generally open bottom and sides.

No prevalent diseases this year.

Slaughter-houses are outside of borough limits.

No nuisances from factories.

Board has passed no ordinances.

The Board during the past year has built two cesspools, removed several nuisances, and have had a number of hog-pens inspected.

A. C. PROTZMAN,
Clerk.

HOPE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Isaiah B. Hildebrant, President, Hope; Edgar C. C. Howell, Hope; Henry Whitesell, Townsbury; Dr. John Miller, Hope; R. M. Van Horn, Assessor, Hope.

Board met and elected officers.

The Physician was directed to see that houses where scarlet fever had been were properly cleansed.

No other meetings or actions as a Board.

INDEPENDENCE TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. D. Simonton, Vienna; A. B. Leigh, Danville; John Titus, Hackettstown.

There is no Local Board of Health organized in this (Independence) township. This is a hilly country, sparsely settled. General health of inhabitants has been good for the past year. Our largest village, Vienna, has about 250 inhabitants.

C. H. ALBERTSON,
Assessor.

KNOWLTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Henry Albertson, Chairman, Delaware; Wesley Linaberry, Knowlton; Andrew N. Van Horn, Hainesburg; Ephraim Dietrich, Secretary, Columbia.

The condition of health in the township since last report has been good. There have been no diseases of a contagious or malignant

nature, and aside from la grippe, which prevailed somewhat, though in milder form than in other years, during the winter and early spring, no epidemics have occurred.

There have been no contagious diseases among domestic animals

But little or no attention is paid to the vaccination of school children, as reports show that but a very small percentage of those attending school have ever been vaccinated.

The Township Board of Health organized on the 18th of March last, and appointed July 29th, 1893, as the time for holding the annual meeting to hear reports, complaints, &c. The Board met at the appointed time, but there were no formal complaints made of any existing nuisances, nor of any other matters requiring attention.

There is no physician residing within the township, therefore there is no medical member on the Local Board of Health for the township, nor has the Board appointed a Health Inspector, as there appeared to be no necessity for the appointment.

Excepting five small villages, this is an agricultural township. There are no manufactories within the township which could in any way be deleterious to the general health. There are not even any slaughter-houses in the township.

The passage of health ordinances and their publication have, I think, had a good effect.

EPHRAIM DIETRICH,
Secretary.

LOPATCONG.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. H. Amey, John Hamlin, Ed. H. Paulus, Isaac Barber, M.D., Rowland Firth, Assessor. Post-office address of all, Phillipsburg.

Our township is in virtually the same healthful condition as last reported. Although it includes the environments of Phillipsburg there is seldom any complaints from dumping garbage, etc.

We have excellent natural drainage.

We have had no trace of epidemic disease for years.

Our water-supply is probably divided as follows: Cisterns, 75 per cent.; wells, 20 per cent.; running water, 3 per cent.; water-works, 2 per cent. The public water-supply is of the best quality.

ROWLAND FIRTH.

MANSFIELD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Nicholas Martenis, Port Murray; William H. Thompson, Beattystown; Edward S. Morlatt, Karrsville; James Beaty, Assessor, Stephensburg.

OXFORD TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Wiseburn, Chairman, Oxford; Geo. A. Wildrick, Oxford; John H. Hildebrant, Belvidere; Wm. K. Miller, Jr., Oxford; L. B. Hoagland, Secretary, Oxford.

We have nothing special to report. There have been no prevalent or epidemic diseases in our township since our last report. There has been little or nothing for the Board to do during the past year, and we report our township in good, healthy condition, and better sanitary condition than ever before.

CHARLES WISEBURN,
Assessor.

PAHAQUARRY TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elias L. Gariss, Millbrook; Moses M. Depue, Calno; Ambrose Van Campin, Millbrook.

There is no physician in the township. There has not been any prevalent diseases this year. The inhabitants are enjoying good health.

JASON K. HILL,
Health Inspector.

PHILLIPSBURG.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. C. Parker, President; Frank Kneedler, Secretary; Wilson Carey, John Warner, William Kline, Physician; W. G. Tomer, Health Inspector. Post-office address of all, Phillipsburg.

In all probability there is no town in the State of New Jersey that can boast of a purer or better quality of water, or where there is less complaint in this particular, than Phillipsburg.

It receives its supply from two large, inexhaustible wells, located along the Delaware river, about a mile northwest from the town, which is pumped into a reservoir at a height sufficient to force the water through town with great power. Special care is taken by the superintendent of the water company to keep the reservoir free from substances that would tend to pollute the water. As Phillipsburg is universally regarded as one of the healthiest towns in the State, we have no doubt that this, in a great measure, is due to the excellent quality of the water.

While the drainage in the northern or hill sections of the town is generally good, the other portions are not so fortunate. The want of good drainage is a matter that has given the Board of Health interminable trouble and annoyance, as it may be called a natural impediment to the proper disposition of all surface and other water. This is a question that has received more consideration and attention from the members of the Board and others interested in the sanitary condition of the town than any others. The topography of certain portions of the town is such that sewers, erected in such a manner as to be effectual, would cost an enormous amount of money, and would necessarily entail upon our citizens a heavy and burdensome tax. As it is, the Board is compelled to resort to every expediency possible to guard against the accumulation of such extraneous matter as may be deleterious to health.

Comparatively speaking, there are but few sewers and these fail to give general satisfaction, from the fact of these not being of sufficient capacity to carry off the water in times of heavy rains. Our observation and experience have taught us that sewers, if not properly constructed and carefully attended to, are more detrimental to health than if there were none at all.

Generally speaking, the dwelling-houses are erected with basements or cellars, and are usually dry and healthy, unless in times of heavy rains, when those located in the lower sections of the town are flooded. There are very few families that occupy their basements, unless it be during the hot summer months.

While many of the citizens residing on those streets on which sewers are constructed have made the necessary connections, there are others

who fail to do so. In view of this omission, the members of the Board are considering the expediency of compelling them to make such connections by the passage of an ordinance. This would obviate much of the labor and trouble that now confront them on those streets.

While a large number of cesspools or privies are walled up with stone or brick, the majority of them are lined with boards or planks. As the building of all cesspools is under the immediate jurisdiction or control of the Board, the members have not deemed it wise to prohibit the use of plank when, in their judgment, it is safe to do so. According to the health law of the town, the contents of all cesspools must be removed when they are within two feet of the surface of the ground, which work is generally performed by experienced scavengers, regularly equipped for that purpose, and the material is conveyed in air-tight casks or barrels to a point along the Delaware river, beyond the town limits, and used for fertilizing purposes. In some cases, where the surroundings will permit, a new cesspool is dug and the old one filled up. This method, however, is not often practiced. The contents of no cesspool can be removed without first obtaining a written permission from the Secretary of the Board, under a penalty of \$25.

For some time past the health authorities have been agitating the question looking to the appointment of a town garbage collector, who shall be paid in the same manner as all other town officials are paid, and who shall be under their immediate control. So far nothing definite has been done. At present the garbage is collected by self-appointed collectors, who make it a business in the spring, summer and fall. The garbage and all deleterious substances throughout the town are deposited at the general dumping-grounds provided for this purpose, which are located near the Delaware river. These grounds are closely watched by the health authorities and all matter of an objectionable character is securely covered over.

There has been no disease among the horses in this section during the past year.

There are only four slaughter-houses in this town, all of which are kept in good condition and are frequently visited by the Health Inspector. No person is allowed to keep a slaughter-house within the limits of the town unless permission is granted by the Board, and that with the distinct understanding that it is to be thoroughly cleansed every twenty-four hours. For a violation of this rule a penalty of \$50 is imposed.

Our public school buildings and the grounds surrounding them have frequently been visited by the Health Inspector during the past year, who found them, so far as he was able to judge, in an excellent sanitary condition. The superintendent is one of the most careful and watchful men in reference to the health of the schools. He has taken every possible precaution against the introduction of contagious diseases therein and has given strict orders to his respective teachers to report to him at once the appearance of any suspicious case.

At a recent meeting of the Board of Education a resolution was adopted requesting the Board of Health to inform the superintendent of schools of the existence of all contagious diseases, the names of all parties so afflicted, their locality, and such other facts as may assist the superintendent and teachers to guard against imposition. This is a wise request and is being complied with by the Board in every instance. Children belonging to any family in which contagion exists, or has existed, are not permitted to attend any of our public schools unless in possession of a certificate signed by the attending physician and countersigned by the President of the Board. A teacher knowingly admitting a pupil in violation of this rule is liable to a fine of \$50.

There are two cemeteries within the corporate limits of the town, Protestant and Catholic. These are under the jurisdiction of careful and experienced superintendents, and are therefore kept in excellent condition. They have received certain instructions from the Board of Health which they rigidly enforce whenever circumstances require it.

So far as was possible to ascertain, there have been but one or two cases of contagious diseases where the necessary reports were not made to the Secretary of the Board by the physicians. In view of this, a resolution was adopted by the Board and forwarded to the party charged with the neglect, with the statement that if the offence were repeated prosecution would certainly follow.

No sooner is a case of contagious disease reported to the Secretary of the Board than the Health Inspector visits the family and places them under strict quarantine by fastening at the main entrance to the residence a small yellow flag, upon which is conspicuously printed the name of the disease. It is not often that this warning is disregarded, unless by those who have no respect for themselves, their neighbors or anybody else. In two instances, however, this signal of danger was torn down. Although the Board offered a reward of

twenty dollars for information that would lead to the arrest and conviction of the offenders their names have never been made known.

During the past year, as is universally admitted, the Board has accomplished a great work in the way of enforcing the sanitary requirements inaugurated the previous year. The labor in this respect was much easier than last year, from the fact that a majority of our citizens began to appreciate the necessity of keeping their premises and the grounds surrounding them in a good sanitary condition. In other words, they began to realize the truth of the old proverb, that "cleanliness was next to godliness." Two years ago the Board resolved to rigidly enforce the health ordinances irrespective of opposition, let it come from whom it may. As soon as the members began to enforce these laws, many who had heretofore disregarded them looked upon all such attempts as an innovation of their rights and privileges as citizens. This feeling, however, has undergone such a wonderful change that very little opposition is now evinced. There are a few, however, as is the case in every community, who are unwilling to be—as they are pleased to term it—"dictated to in reference to anything of a sanitary character."

The funerals of those dying from any contagious disease have been strictly private. No one, except the undertaker, pall-bearers and the immediate members of the family, being allowed to enter the building. The time of burial is generally fixed by the Board, which in no case is to exceed forty-eight hours from the time of death. In addition to the usual services held by the officiating clergyman at the cemetery, sometimes a funeral sermon at some subsequent period agreed upon by the clergyman and family, is preached. Immediately after death from a contagious disease, the Health Inspector visits the family and gives the necessary instructions for the government of the funeral according to the rules and regulations of the Board, which have been complied with in every instance except one, with which you have already been made acquainted.

Phillipsburg was never in a better sanitary condition than now. The streets and alleys are comparatively clean, and every effort is made on the part of a large majority of our citizens to keep them so. The health of the town is excellent. The statistics prove that in no previous year in its history has its health been as good. Comparatively speaking, Phillipsburg has had but few cases of scarlet fever during the entire past year, two of which proved fatal. There has not

been a single case of diphtheria here since last March ; while the disease in Easton, "just across the river," is prevailing at an alarming extent, and has resulted in the death of some thirty or forty. The people of Phillipsburg have great reasons to be thankful.

FRANK KNEEDLER,
Secretary.

POHATCONG TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. Case, Shimers; John H. Hughes, Carpentersville; Joseph C. Weller, Shimers; A. A. Painter, Assessor, Shimers.

There is nothing to be added to former reports. The general health of our people has been excellent. No complaints have been made to the Board, and we have had no contagious diseases.

A. A. PAINTER.

WASHINGTON TOWNSHIP.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Miller, Assessor, New Hampton; Peter Weller, New Hampton; George Wyckoff, Washington; George Rush, Washington. C. B. Smith, M.D., Health Inspector.

Washington Borough is the only place having a separate Board of Health in our township. Our general health has been exceptionally good during the past year. Our water supply is from springs, creeks, wells and cisterns. Our drainage good; no malarial districts.

There has been but one complaint made to the Board this year, which was from Port Colden, caused by the water being drawn from the canal, leaving basin dry, from which came a very offensive odor; but before the Board could act, after complaint was made, the company filled the basin with water, which remedied the trouble.

We have had no prevalent or contagious diseases during the year, except a few cases of mild type of scarlet fever. Vaccination is sadly neglected all over the township.

DR. C. B. SMITH,
Inspector.

WASHINGTON BOROUGH.

NAMES AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. F. P. McKinstry, President; Dr. William Stites, Health Inspector; John Hornbaker, George Campble, Levi Bowbly, I. Rigler, Minor Beattie, Secretary. Post-office address of all, Washington.

The Washington Board of Health has nothing important to report for this year.

There has been no prevailing disease; in fact our town has been remarkably healthy.

The water-supply is the same as former years. The Board has examined the reservoir at different times and find the water of a dark color, from the soaking of fallen leaves. There is considerable mud in the bottom of the reservoir. It is cleaned about once a year. After heavy rains the water becomes very yellow in color.

The streets are being macadamized.

Everything pertaining to the Board of Health remains the same as last year.

WILLIAM STITES,
Inspector.

New Jersey Sanitary Association.

REPORT, WITH OUTLINE OF PAPERS AND DISCUSSIONS, SESSION OF
1893. BY D. C. ENGLISH, M.D.

The nineteenth annual meeting convened in the music hall of the Laurel House, Lakewood, at eleven o'clock A.M., Friday, December 8th, 1893.

The president, Carrol Phillips Bassett, C.E., Ph.D., called the meeting to order, and introduced John Miley, Esq., of Lakewood, who extended a hearty welcome to the members of the association, spoke of the healthfulness of Lakewood and referred briefly to its early history. President Bassett, in a few well-chosen remarks, responded with thanks.

State Geologist J. C. Smock, Ph.D., was then introduced and presented an able paper on "Forestry in its Relation to Health." He spoke of the influence of forests upon the healthfulness of a country as consisting in the effects which are produced by forestal agency directly and mainly through the climatic elements of temperature, of the air, humidity, rainfall, winds and sunshine or its opposite, cloudiness; and, indirectly, through their position as clothing the surface of the earth and affording a charm to the face of nature or giving a sombre coloring to the landscape. In this paper he used the term "forests" not in the broad English sense—*e. g.*, Epping Forest—but included the smaller areas which are generally known as copses or groves, as well as the more extensive tracts commonly designated as forests, but on the other hand he restricted it to tree-covered land and did not include open glades or brush land.

While the influence of forests upon temperature might be studied in that of the soil, in that of the air in the forest, under the trees and in the tree tops, in the air above the trees and in that of the adjacent open country, he should, since man is not

arboreal and not generally a denizen of the forests, consider the influence on the temperature of the adjacent open country as that which is of vital importance. He gave, however, a concise statement of the results of the more accurate and systematic observations upon the temperatures of soil and air in and near forests. In reference to the effect upon temperature of the soil he quoted Mr. B. Fernow's summary in a recent bulletin of the United States Department of Agriculture, based upon observations at the forest meteorological stations in Germany and France. The influence of the forests is shown by the range of temperature. Within the forest it was 21° to 29° C., = 38° to 52° F.; without the forest, 35° to 41° C., = 63° to 75° F.

The temperature of the air in the forest is not modified as that of the soil, inasmuch as it is more variable and has a wider range due to the more active circulation. He cites the general effect as summarized by Prof. Harrington, in the above-named bulletin. The heat is less intense than in the open field. The reduction of the temperature in July amounted to 6.5° ; the least, in April, $.65^{\circ}$; whereas in evergreen trees the maximum was reduced 4.21° in August and 1.2° in December. The forest is cooler than the open country in summer and about the same temperature in the winter.

Careful observations over the tree-crowns or above the forest show that the air temperatures there also are influenced by tree growth, and notably more by evergreen than by deciduous trees. The influence of the forest upon the temperature of the air in small open spaces or clearings in it, is heightened by the reflection of the heat in the day more than that of further distant open spaces, or the surrounding country. The appearance of frosts in the immediate vicinity of forests when there is none in the open country, is noted as an evidence of greater heat radiation and more rapid cooling, due to the influence of the trees.

Referring to the distant influence of the forests upon the temperature of the air as not so apparent or so readily explained, it could be said, however, to be due to the circulation of the air and the transference of moisture by these air currents.

Prof. Smock then refers to the effect of the clearing of land of its wood, replacing of the forests by farm lands, as softening the rigors of the winters, making the spring appear earlier and pro-

longing the autumnal season, and accounts for this amelioration of climate by the more open conditions of exposure to sunshine and wind and the consequent more rapid evaporation of the moisture as well as the more thorough drainage of the soil and the greatly increased rate at which the waters are discharged from the surface. The geographic argument is referred to of a comparative study of forested districts of country with treeless areas somewhat similarly situated, as favorable to the statement affirming an influence on the temperature from forests. He cited at some length Dr. Hann, of Vienna; M. Wocikoff, of Russia; Dr. Ebermeyer, of Bavaria, and Prof. Harrington, of Washington.

The influence of forests as windbreaks, in checking the force of the wind and sheltering the ground to the leeward of them is then dwelt upon as being analogous in a degree to the shielding influence of lofty mountain chains.

The snow fences of our railway lines and the protecting influence of a row of trees, especially evergreens, are referred to. In the valleys of the Bergamo, Italy, where maize could not be made to ripen until the restoration of forests had made the climate milder, the influence of trees as windbreaks tends to reduce the evaporation of moisture from the surface of the ground and to equalize the temperature.

The need of longer series of meteorological observations to give data for the elucidation of these points is referred to, as also the relative influence of forests as protection against wind on plains and in a flat country and in hilly and mountainous regions.

Prof. Smock then dwelt at some length on the influence of the forest upon the humidity of the air as a varying element, determined by the kind of trees as well as the general character of the climate. The bed of leafmould, litter and young growth or under-brush and the foliage of the trees all unite in intercepting some of the rainfall, particularly in slight falls, and also in checking evaporation from the ground. The moisture thus taken up is given off more slowly in evaporation and by percolation to the soil. On the other hand, there is the evaporating leaf surfaces, especially in a deciduous forest in the warmer or growing season, and a transpiration of a large volume of water into the atmosphere.

The relation of forests to rainfall as cause and effect, was then discussed from the scientific standpoint at considerable length.

Bulletin No. 7, U. S. Department of Agriculture, G. P. Marsh, in "The Earth as modified by human action," were cited. The geographical argument, *i. e.*, the comparison of the rainfall over forested and over treeless districts was then presented and data given in this and other countries, which go to prove that there is more rain over forested districts. Interesting statistics were given from Mr. H. F. Beauford's "Indian Meteorological Memoirs," which showed that in the Northern Provinces of India, which had been denuded of its forests by wild tribes prior to 1875, the growths had been protected since 1875 and a dense forest growth has appeared over an area of about 50,000 square miles, in the whole 61,000 square miles of territory, that the record of rainfall of the decade ending with 1875 was 48 inches in a year, and for the decade from 1876 to 1885 the rainfall was 58 inches in a year, showing an increase of over 20 per cent. Somewhat similar illustrations are cited from M. Wocikoff in the island of Java, and from Dr. Müttrich, of Germany.

To summarize the above generalizations, the influence of the forest is to reduce the extreme ranges of temperature and to make more equable climate; to check the wind movement and lessen its force and drying action; to increase the relative humidity of the air slightly and particularly in the summer and warmer part of the year; to increase the rainfall and to promote a more nearly uniform evaporation of the moisture. In a word, the tendency of their influence is toward the production of more even and milder climate. The removal of the forests or the deforestation of a region tends to heighten the extremes of temperature; to increase the force and destructiveness of the winds; to promote conditions of drought and flood. The forests represent the normal or natural state; their destruction means a modification and in its train there is the clash of conflicting forces resulting from the sudden derangement or disturbance of the equilibrium. To restore the forests is in part to restore the harmonious order of nature at least to some extent, and so make the earth more habitable for man. But man is not a savage and needs lands for the production of his crops. And it should be stated in this connection that the appropriation of the earth's surface to crops is not altogether so different from forestry in its effects upon evaporation of moisture and upon the humidity of the atmosphere.

A proper distribution of the forests seems to be consistent with the maintenance of those climatic factors which make the earth a more comfortable abode than would be in total disregard of them and the neglect of those tendencies which favor them. The distribution of forests may be an arbitrary matter, but that some forest is necessary is known. A safe rule is to keep all that can be kept.

Prof. Smock then discusses the chemical class of climatic influences—ozone, oxygen, volatile matters, the terebinthine odors of the pines, the volatile or aromatic principles given off by the eucalyptus tree; cites the groves of the latter-named tree on the Roman Campagna as affording protection against the miasma of the Pontine marshes, and the general immunity from malarial disorders in Australasia in marshy districts where the trees are all evergreens. He questions whether the exemption is due to the mechanical resistance to the winds carrying microbes or to the germicidal and antiseptic action of ozone, hydrogen dioxide and turpentine oil—the products of foliage in the liberation of oxygen.

Prof. Smock proceeded to the consideration of the relation of the above climatic factors to health and disease after calling attention to the great modification of the general principles involved in different latitudes and in the different climates of the earth. He limited the application to the north temperate zone, and to our country more particularly, because of its practical importance. Man alone, of all the higher life forms on the earth, is able to endure the extreme conditions of all of its varying climates, because he can create artificial climates in which to rest or recuperate after exposure to severe or enervating natural climatic surroundings. His environment is to some extent what he will have it. But the highest development is in the temperate zones, and where neither extreme heat or cold prevails, where the rainfall is not excessive nor too scanty, but is well distributed, and where the sweep of the wind is not so swift as to lick up all the moisture and parch the ground, nor, on the other hand, to drive the snow and frost particles with the blizzard's force. The general healthfulness of Western and Central Europe and of our Middle and Atlantic and Ohio Valley States, as contrasted with that of the countries and States to the north and south of them,

illustrates the superiority of the more equable climates. He then proceeded to demonstrate that forests were essential to the highest degree of public health, comparing the well-forested plains of Northern Germany with the denuded provinces of Central Russia, and the western prairies and treeless plains of our own country with the better wooded Ohio Valley, and said that in this State we might well question as to the advantages or injuries which the excessive clearing in some parts of the Raritan Valley has had upon its healthfulness.

The influence of forests in the protection against certain diseases was referred to, *e. g.* the eucalyptus and the pine woods. The more equable temperature and the less range which are observed in forested districts, as compared with similarly-situated open plains, are influential in the preservation of health by lessening the tendency to acute lung diseases as well as diarrhœal disorders.

The temperature is so closely related to the amount of moisture in the air that the influence of either one alone cannot be given in statistical terms. The careful mortality statistics of London appear to prove that the cold and damp weather of winter are favorable to inflammatory diseases of the throat and lungs, as compared with the warmer seasons. Extreme cold waves are dangerous to persons in feeble condition. As the tendency of the forest is to diminish the range of temperature, it would seem that forests tend to conserve life. Cases were, however, cited to show that it is not safe, in all cases, to characterize the influence of forests as beneficial or preservative, considering mean temperatures and the humidity of the air.

The question of the influence of rainfall was then presented at length—that it is increased slightly by forests. Its influence was unimportant. Professor Smock then presented as the climatic element of greatest importance to health, so far as forests are concerned, is the wind. He referred to the many health resorts that were shielded by their position behind or surrounded by mountains, or protected by forests. Whatever tends to arrest the blizzard or the hot and drying wind of a drought period, lessen the amount of dust in the air or shut out miasmatic emanations, is certainly protective and beneficial to both public health and to individuals liable to the prejudicial effects of cold waves, dust and

miasma. The effect of low temperature, as well as that of high ones, are, doubtless, bad or aggravated by wind. The air in rapid motion, if dry, causes an increased evaporation and exposes to dangers of "taking cold." The forest lessens the air movement. The intense cold of the quiet forest-glade or of the lumber-camp in a pine woods, or of the Sanitarium shut in by pine woods, is borne with some degree of comfort as compared with the piercing and heat-robbing blast on the prairie, or in a widely-cultivated farming country.

The value of forest belts and of trees in rows, particularly evergreens, as screens against the wind, cannot be too forcibly stated. Our country would be far more comfortable and healthier if there were more woods distributed so as to break the winds.

Prof. Smock then referred to observations upon the relation of forests to certain diseases. Of malaria in India prevalent in the low lands and river valleys; influence of the forests, and tall trees especially, hinders the formation and spread of the poison; thinning out of the trees increases it; clearing of the woods intensifies the ravages of the disease, the exposure of the decaying vegetation to sunshine and rain and imperfect drainage causing the increase and virulence of the poison.

In the southern part of this State swampy districts are generally free from it as long as the swamp is undisturbed.

The dust-arresting influence of trees is most remarkable. Tissandier found that the air of Paris in dry weather contained six times as much dust as that of the country, and after a rain twenty-four times as much.

There are less microbes in the woods than in crowded cities, or even in the open country. Ebermeyer has shown that there are no pathogenic microbes in forest soil, and that the conditions in it are altogether unfavorable to their development. Forests exercise a healthful effect upon the ground-water. The influence of the forest is to retain the high stage of ground-water, and there is not the same degree of oscillation in the water-level.

Prof. J. Madison Watson, of Elizabeth, opened the discussion. He spoke of the recognition of the great importance of forestry by the governments of Europe in establishing and maintaining schools and departments of forestry, and to the recent awakening of American interest, as illustrated in the establishment by the

United States of the Yellowstone National Park; the Algonquin National Park, in Canada; the creation of park commissioners by States and cities; the adoption and annual observance of Arbor Day, and the addition of forestry to the curriculums of schools and colleges. He referred to the fact that the noteworthy American works on forestry have been published during the past decade. He thought this dawn of promise, so intimately connected with the public health, should receive the ready recognition and enthusiastic support of this sanitary association. This awakening, he thought, had come none too soon to meet the changed and deplorable condition of many portions of the older States of the country, as experience has shown that where forests disappear the effect has been lamentable, the small streams drying up, followed by insalubrity of climate, and sometimes utter desolation. A writer in a recent German magazine says of Italy: "The improvidence of five generations has changed the climate, and compromised the salubrity of the country. The highlands have been denuded of trees; the flow of water has ceased to be regular. Extensive waste lands, formerly yielding abundant harvests, are now subject to alternating periods of inundation and drought, and consequently are poisoning the atmosphere with germs of malaria."

Prof. Watson believed that the application of this quotation is unfortunately too true to portions of New Jersey. Reforestization would again supply rivulets, streams would re-appear and salubrity return. This State easily ranks first in her facilities for instruction and practice in forestry. Almost insular, nearly nine-tenths of her boundary being ocean, bay and river; a surface diversified by mountains, hills and valleys, lakes and innumerable inland streams; her navigable rivers, creeks, bays and coves flushed daily by ocean tides; a mild climate; rich in agriculture; situated midway between and contiguous to the greatest American cities, and having unequalled communication with the whole country.

In its sanitary aspects forestry enters so intimately into all the progress and prospective interests of the people, in the reclamation of wastes and wilds, uplands and lowlands, of whatever nature, and in the improvement of parks and gardens, and the beautifying of homes, that he felt its neglect by the State becomes well nigh a crime.

He spoke of other questions of national importance as well as of local interest, as, for example, what trees and shrubs are of greatest sanitary value in connection with summer and health resorts on uplands; what ones are best adapted to miasmatic valleys and marsh lands? In the event of the destruction of pine woods connected with health resorts, may the American balsam poplar, the eucalyptus or any other trees not endangered by forest fires be substituted with like sanitary results? He thought New Jersey should follow New York in securing, by legal enactment, instruction in forestry in the public schools, academies and colleges. An arboretum should be established in connection with the Trenton Normal School, and some degree of elementary instruction should be imparted in all the schools of the State.

The discussion was further continued by Dr. I. H. Platt, of Lakewood; G. P. Olcott, C. E., of Orange; J. Owen, C. E., of Montclair; Dr. G. J. V. Schott, of Passaic; Mr. Stockley, of Lakewood. The last named presented at some length, tables of average temperature and moisture percentage during different winter months in different parts of this and of foreign countries.

At the afternoon session the President introduced Timothy M. Cheesman, M.D., Instructor in Bacteriology, College of Physicians and Surgeons, New York City, who presented a paper entitled,

A CONSIDERATION OF ARTESIAN WELL AND SURFACE WATERS FROM THE STANDPOINT OF BACTERIOLOGY AND PUBLIC HEALTH.

Dr. Cheesman opened his paper with a description of the surface-waters, ground-water or underground streams and underground reservoirs, and the sources and varieties of impurities contaminating these waters, and rendering them unpalatable or causing them to convey disease and in some cases widespread epidemics.

He dwelt at some length upon the following points: The danger of the pollution of water by human excrement; the common practice of emptying drains and sewers into water-courses as fraught with the greatest danger to public health; the reeking contents of privy vaults and cesspools used for hiding sewage and domestic waste leaking out into the soil and

polluting ground-water; the communication of infectious diseases thereby; the strong tendency fortunately for waters as they exist under natural conditions to purify themselves by the various physical and chemical actions, as by sedimentation, oxidation and other chemical changes, by the death of many of the living things contained in them, by disinfectant action of light, especially direct sunlight, extreme cold, etc.; and the process of purification by filtration.

“Sedimentation is one of the most active forces at work in the self-purification of water. It affects the suspended matter and under favorable conditions it would, no doubt, in time collect all substances of greater density than water at the bottom of the stream or lake. But we know that the conditions for sedimentation are not always favorable. Large bodies of still water offer great opportunity for sedimentation to occur; yet, the force of gravity which induces it, is in many instances overcome by currents, which may be caused by the winds, by the effects of heat and cold, or by the tributaries or outlets. In streams the larger of the suspended matters are often soon deposited on the bottom or on the banks, but many of the finer and lighter particles are sometimes carried for long distance; the distance to which they may be carried is dependent upon the force and flow, and other conditions present in the stream.

“Oxidation and other chemical changes occur in both the dissolved and suspended matters in water, and are active factors in self-purification, but these changes are greatly influenced by temperature, by light, and by the kinds and the number of bacteria and other living things which are present.

“Another means of purification of water is from the death of many of the living things contained in it.

“The disinfectant action of light, especially of direct sunlight, has been shown to exert a marked influence upon the bacteria, and many of these organisms are killed by extreme cold. Other causes are also actively at work in destroying the bacteria and other forms of life.

“Again, in the ground-waters a most active purification is affected through filtration. As the water percolates the soil, the grosser of the suspended matters are left upon the surface, and many of the finest ones are removed in different parts of the

filtering medium, and remain adherent, through various agencies, to the sand and gravel, while the water passes by.

“This purification by filtration is by no means purely a mechanical process, in which the bacteria are held back because the pores in the soil are so small as to retain them, for it has been shown that the soil alone will not filter out bacteria. It is not until after a slimy deposit has been formed upon the surface of the sand and gravel that filtration is effected and it is therefore this layer of slimy substance which effects the purification.”

We must not trust, however, to these methods of purification, but know either that a water has never been polluted, or, if polluted, that it has been properly purified before judging it suitable for drinking water.

To determine the degree of purification which a water has undergone, it is submitted to certain analyses. These analyses seldom give definite information as to whether infectious substances, such as disease-producing bacteria, are contained in the water or not, but, as has well been said, water analyses are a “series of experiments undertaken with a view to assist our judgment in determining the potability of a supply.” They determine certain important facts which must be considered in connection with all the conditions surrounding the water, and the value of any water analysis “rests upon its interpretation” in the light of this external evidence.

In some cases analyses are superfluous. There is no need of analyses to prove that a stream is being polluted when we see the contents of a sewer emptying into it, and much may be learned of other and less apparent pollutions by a systematic inspection of the sources of supply.

Our knowledge on the subject is sufficiently exact to state that many bacteria of disease are capable of living in water for considerable periods of time, and that water may carry them in suspension for great distances. In the process of purification some of these bacteria may die, some may be removed by sedimentation or filtration, but, under ordinary circumstances, we can have no positive assurance that all harmful bacteria have been removed or destroyed by the agencies which effect purification.

Among the minute vegetable organisms in water which are revealed by the microscope are the bacteria, a group of especial

significance, because among them are to be found the germs of certain serious infectious diseases.

Special methods are required for the study of these organisms, and are used in water analysis to determine the number and kinds of bacteria present, to decide upon the efficiency of purification by methods which aim to remove or destroy the bacteria, for the discovery of the bacteria of disease, and for the study of the vitality of known species of disease-producing bacteria, in waters of different compositions and under varied conditions.

All bacteria found in water, or their progenitors, have been derived from extraneous sources. The great majority of them are not in any way harmful to man, and their presence in water is important to induce and promote the chemical changes which dissolved and suspended matters undergo in the process of purification. Many of the harmless species are known to multiply in potable waters, and some of the disease-producing forms, although they rarely multiply to any great degree, have been found to remain alive in water for varying periods of time, in some instances for several months, while others are usually rapidly destroyed.

Numerous cases are on record in which bacteria of disease have been found in polluted streams. The difficulties usually met with in the search for these organisms in waters which contain a large number of other bacteria are very great, and the chances of discovering the disease-producing forms are small. Although a number of them may be present, and may infect persons using the water, yet by the time the disease they induce has developed, and suspicion that the water is infected has been aroused, it is quite as likely as not that the disease germs will have disappeared from the supply.

The discovery of disease-producing bacteria, however, is not the primary object of bacteriologic water analysis, as we know without any kind of analysis whatever that they may be present in polluted waters.

The number of bacteria a water may contain and yet be considered wholesome cannot be stated, as the conditions surrounding the sources of supply are so different. Contamination of a water from an uninhabited region is without significance from a bacteriologic standpoint, while pollution by sewage or excrement-

titious matter, be it ever so slight, is a menace to health, and yet the number of bacteria found might vary to any degree in favor of either of such waters. Arbitrary standards of purity have been set but they have little intrinsic value in determining the salubrity of natural water. An enumeration of the bacteria may aid materially in determining the amount of pollution or the degree of pollution of a water, but the number found gives no clue to the sources from which these bacteria are derived.

Dr. Cheesman refers to the fact that nearly all waters contain bacteria, as a rule surface-waters more than ground-waters, and running waters more than lakes and other bodies of still water. In rivers where cities and towns, located on the banks, empty their waste and sewage directly or indirectly into the stream, bacteria abound, and in much larger numbers at their outlets than at their sources. In the unpolluted bodies of still water fewer bacteria are usually found than in running water, because lakes and ponds are often largely fed from the naturally-filtered ground-water through springs, and because they offer better opportunities for self-purification by sedimentation. The number of bacteria in unpolluted ground-water is usually small, because of filtration in percolating the soil. Even polluted water thrown on surface may, by filtration, become purified, so that at a point usually about six feet below the surface but few bacteria are found, though it is possible this filtration may be very incomplete through some fissure or channel conveying pollution to the deeper layers of the soil.

Prof. Chas. B. Brush, C.E., of Hoboken, opened the discussion on this paper. He said that the public was liable to become too much alarmed. It is necessary to have discussions on these matters, but they must be clearly understood. There is a phase, aside from disease-producing germs, where the water becomes disagreeable to taste and yet is safe for use.

The general subject of rainfall and the source of surface supplies was discussed and especial attention drawn to the necessity of limiting the excessive use of water.

In the majority of cases we must depend upon surface supply except in a few notable cases, like Memphis, Savannah, etc.

We can guard against pollution of a surface supply but cannot trace all cesspools and drains contaminating a subterranean

supply, and as far as germs are concerned one supply may be as readily polluted as another. In reality the surface supply is in a degree subterranean, for as soon as the storm flow is over then the deeper sources are drawn upon.

The removal of forests decreases the flow from the drainage area, for grasses and grains use up more water than forests, and therefore there is less water to flow to the streams.

Water is at its worst in the winter and the extreme summer. In the winter the ice keeps the air from it, and in the summer there is an excess of vegetation.

These conditions are disagreeable but not dangerous.

These disagreeable features may be overcome by the introduction of oxygen. There should be regular inspection of streams and all sewer connections must be cut off.

He then spoke of the objectional features of subterranean supplies, such as hardness, etc.

We must do all we can to avoid contamination, and boiling will make any water safe for drinking purposes.

Mr. Owen then spoke as to the necessity of avoiding alarm, but on the other hand we must not promote a feeling of security. Deaths may be rare but impure water affects the general system. He then drew attention to the difficulties of obtaining a good supply, but that from an unpolluted surface was the best. There are two classes of supply, namely, that for cities and that for isolated communities.

Where cities get from beneath the ground there is liable to be pollution, and it is almost impossible to locate the source of contamination. He then drew attention to the dual system, using separate waters for drinking and manufacturing purposes.

He then spoke of cases of contamination in different localities and said that surface supplies could be purified while subterranean supplies cannot.

Mr. Bassett spoke of the germs that were at work and of the general action by nitrification.

Mr. Baldwin said he was disappointed that attention had not been drawn to the value of chemical examination to determine the character of water.

He drew attention to cases of contamination of deep wells that had come under his investigations.

Mr. Greene drew attention to the practical side of the question. He thought that many supplies are contaminated; that peopling up of lands along streams tended to change the purity of a supply.

Dr. Schott spoke of cholera and enteric fever being caused by contaminated water-supplies, and also drew attention to the contamination of deep wells that had been brought to his attention.

Dr. Chambers cited a case in New York where a filter was used, but owing to inattention it became fouled.

Mr. Olcott spoke of laws to regulate plumbing, but none as to water, and that great care should be used to secure tight joints.

Dr. Gauntt discussed the need of pure water and the diseases caused by bad water. He also drew attention to typhoid fever at Burlington, due to contamination at Philadelphia, and also to that taking place at Trenton, and expressed a feeling of alarm at the prospects.

Dr. Cheesman thought that all these points were interesting, but that contaminations must cease and supplies be kept pure.

Vice-President A. B. Poland, Superintendent of Public Instruction, presided at the evening session, which was opened with prayer by Rev. Dr. Swartz.

The annual address was delivered by the President, C. P. Bassett, C.E., Ph.D., of Newark, who chose for his subject "The Interest of the State to Conserve its Streams."

(This address will be found in this Report of the State Board of Health, page 31, *et. seq.*)

The thanks of the Association were, on motion, unanimously voted to President Bassett for his able and interesting address.

David Harvey, counselor-at-law, of Asbury Park, was then introduced and presented a paper on "The Enforcement of Health Laws."

He spoke of the importance of judicious sanitary legislation and of difficulty experienced in the past in securing satisfactory statute laws enforcing punishment for the infraction of sanitary codes, health authorities being obliged to resort to common law remedies. The public had not been awakened to the importance of such laws for their protection, and some physicians even insist that scarlet fever, diphtheria, &c., are not communicable, permitting their patients to go about and encouraging the belief

that the watchfulness of the Health Board is unnecessary and that quarantine is a barbarous imposition.

Recently, however, the Legislature has placed it within the power of Local Boards to deal in a very summary and efficacious manner with such people, and has empowered them to enact ordinances to protect communities from the spread of disease.

He cited the English law, which punished far more severely than our New Jersey laws.

He explained the Law of 1887, which gives Local Boards power to prevent everything prejudicial to health, to define and declare what shall constitute nuisances in lots, streets, docks, wharves, vessels and piers, and *all public or private* places, giving them co-ordinate jurisdiction with courts, enabling them to abate the nuisances without fear of interference by the court. They are also given power to impose penalties not to exceed one hundred dollars for the violation of any ordinance, section of code, or amendment thereof.

Local Boards may pass ordinances and rules covering everything that in their judgment is detrimental to health, and such ordinances can be enforced.

Mr. Harvey cited a case in which the Board of Health of a certain township ordered the destruction of a building which medical experts and others pronounced dangerous to the lives and health of the inhabitants of said township; the dwelling, then unoccupied, but in which five persons had recently died of scarlet fever of the most malignant type, and in the immediate vicinity of which building there prevailed several cases of scarlet fever, caused by or traceable to germs of scarlet fever coming from or imparted by said building.

The notice was served on the owner, who was notified when the Board would meet to consider the matter, &c. A few days later another notice was served on him, in which, after stating as the result of the investigation, that they had decided that the building was a nuisance, hazardous to the public health, they ordered him to destroy the said building at his own expense within two days. The Board passed a resolution authorizing and directing the destruction by fire of the building by the Board if this notice was not complied with. A bill was filed in the Court of Chancery by the owner of the building to restrain

the action of the Board. The court refused to enjoin the Board of Health, and stated that the court had no right to interfere with the Board, as they were the sole judges in the matter. The resolution of the Board was carried out and the building burned.

He called the attention of the Association to the urgent need of legislation that will authorize the State Board of Health to apply to the Court of Chancery to enjoin nuisances in cases where Local Boards fail or neglect to do so. He hoped the Association would bring about the passage of such a law.

In closing, Mr. Harvey urged upon Local Boards the importance of enforcing health laws that conduce to the good of their respective localities.

This paper was then discussed by G. P. Olcott, C.E., and Dr. T. R. Chambers, of Orange, and Dr. G. J. V. Schott, of Passaic, the latter stating that he had brought fourteen suits under their code and had lost only one, and that one by his own error.

On motion of L. B. Ward, C.E., of Jersey City, the question of additional legislation recommended by Mr. Harvey in his paper was referred to the Legislative Committee for action after conference with the State Board of Health.

Prof. H. B. Cornwall, Ph.D., of Princeton College, presented a paper on "Food Preservatives." See fuller notes *seq.* in this Report.

The Association regretted the absence, on account of sickness, of Prof. A. R. Leeds, Ph.D., of Stevens Institute of Technology, who was to have opened the discussion on Prof. Cornwall's paper. Shippen Wallace, Ph.D., of Burlington, expressed himself in agreement with the views of the paper, gave the results of some examinations made by himself, and argued against the use of these food preservatives as deleterious and as unnecessary.

SATURDAY, December 9th.

The session began at 9 o'clock, A. M., President Bassett in the chair. He introduced J. H. Duren Ward, A.M., Ph.D., of New York City, who presented a very interesting and instructive paper on "Some Ideals for Hygienic Workers." We give an outline of his address as follows:

Health is one of the oldest topics in literature. Although so much has been said upon it, there is hardly a feature in which the community is doing as well as present knowledge would make possible, while of many facts that should be easily understood they are absurdly ignorant. This should lead the public teachers of health to suspect something radically wrong in the method of teaching. Hygiene has done wonders; but these are only a tithe of what may be expected when it has learned to realize human conditions and the real mode by which such things are learned. Man is an animal. His frame was developed by running and climbing. His nature is not met by this city concentration and centralization of populations. In it there is restriction. A few generations of such caging, results in serious deterioration. This evil must be met by definite artificial methods. The yet feeble movement toward Physical Culture is in the direction of remedy. During our century in several countries there has been an effort on the part of certain more earnest and intelligent workers. In Sweden, under the Ling system, it tends to definite individual development on anatomical and physiological lines. In Germany, the emphasis is on drills in numbers working together. In France, the æsthetic predominates. Expression is the end aimed at in Delsarteism. In England, the interest centers in sports and general out-of-door exercises. In inventive America, mechanical appliances and curious resisting apparatus characterize. These all have great excellencies, and our public can not be too earnestly incited to take them up. An ideal and a yearning for the physically perfect must prevail. Again, in our methods of teaching all things hygienic there must be a radical change.

We are too *bookish and unsystematic*. For want of illustrations our most needful principles do not become well known. Nor can they be by mere teachers' say-so's. The simplest things are not understood. The mass are defective in imagination, and yet our teaching is of such a character as to require the most extensive drain on the representative faculty. It is not enough to tell children or grown people that air that has not been changed in a room is bad, that it injures, &c. They do not see it or smell it. It looks the same. They must be shown how it is bad, what it is composed of, why hot air rises and cold sinks, what impurities

are in the top of the room and what in the bottom, what is the defect in steam radiator-heating, &c. The fact is that in almost every room in the land there are from one to three feet of vitiated air near the ceiling and some inches on the floor with no possible means of escape, and that houses with such defects are being built by thousands and have been for generations. These are sufficient proof of the gross lack of understanding on the part of the community and of the architects who plan for them.

This fault of teaching applies to the dissemination of the facts about mass phenomena (Physics), molecular phenomena (Chemistry, including foods), and life and death phenomena (Physiology, emergencies, disposal of the dead, sexology and covering).

The subject has become so vital and so comprehensive that a new profession is likely to be the outcome. All new ideals rear their new supports. Medicine is tending to specialism. A class having hygienic conditions and advice, as its object is coming into demand. It is probable that ere many years there will be a new degree. *D. H.*, Doctor of Hygiene—with hundreds studying toward it. Then shall we have an army of workers whose special business it will be to make clear to the community the important truths without the understanding and practice of which men, women and children are the creatures of circumstances, surviving so long as and only because circumstances are favorable.

Prof. A. B. Poland, State Superintendent of Public Instruction opened the discussion on this paper. He highly commended the paper, was glad that the pessimistic views of its beginning changed to a more optimistic closing, and spoke of the advance in physical culture and of the present tendency to increased length of life which he believed was due to the attention this subject is receiving.

The president introduced J. A. Exton, M.D., of Arlington, N. J., who read a paper on,

THE NECESSITY OF REVACCINATION, AND FACTS IN EVIDENCE OF ITS UTILITY.

He restricted the use of the term "revaccination" to cases in which vaccination had been successfully performed. While its necessity had long been recognized as a universal practice it

has only been recognized in recent years. Jenner claimed for his discovery that, "duly and effectually performed, it could protect the constitution from subsequent attacks of small-pox as much as the disease itself." The protection is complete and lasting in a majority of cases, but only partly so in a minority. We urge to-day the interest of the minority and would protect those who are susceptible to this loathsome disease. The protective power of vaccination is rendered less certain by the lapse of time and decidedly influenced by systemic changes.

He quoted from Trousseau, "the conclusions drawn from all facts is that we should prescribe revaccination, and a repetition of revaccination, according to circumstances, particularly in an epidemic of small-pox. We should promote the general adoption of revaccination with as much zeal as we bestow on propagating the practice of vaccination, because revaccination undoubtedly augments the chance of resisting variolous contagion."

Dr. Exton urged the utmost precaution to guard against failures in all revaccinations, observing complete antisepsis, using perfectly fresh and entirely healthy virus, repeating in case of failure, and seeing that the part is thoroughly dried after the operation. When a primary vaccination has been only partially successful with but one or two vesicles, revaccination should always and immediately be performed upon exposure to small-pox. He quoted Dr. Collie, "as the best primary vaccination does not confer complete protection up to the varying time of puberty, he would be disposed to advise revaccination before that period, even in cases of persons well vaccinated," and suggested that the age of ten years would be the most suitable time. He quoted a case reported by Dr. J. C. Holmes, of Cranbury, as strongly favoring frequent revaccination. A family of eleven had all been vaccinated but one, a servant, who took small-pox and died; all were revaccinated at the first visit, except a German farm hand, who refused, on the ground that he had been vaccinated in childhood, and had also had small-pox in the old country seven years before (his face bearing evidence); all the revaccinations were successful; all escaped but the German, and he had the disease severely.

When the primary vaccination cicatrix does not show the true vaccine character, revaccination should always be resorted to, as the best vaccinated subjects sometimes respond to revaccination.

As to the time it should be done, he believed that about puberty is the most suitable, because it is after this period that cases of postvaccinal small-pox are usually met with; small-pox, as a rule, after vaccination in childhood, being attended with little danger.

In one of the largest English hospitals there were one hundred and ten persons acting as nurses, all of them in attendance upon small-pox cases, all but two were revaccinated and all but these two escaped the disease.

In the epidemic of 1881, on the Atlas Ship Hospital, the only nurse among the ninety employed who contracted small-pox was a maid who had not been revaccinated.

Dr. Mason, during his forty-two years of duty at the Southern Small-pox Hospital, had never observed a case of the disease among the officers and employes who had been revaccinated when they entered the service, although all had been constantly exposed to the infection.

Dr. Exton quoted other authorities in favor of revaccination every five or six years, and especially in times of epidemics. Dr. Buck has successfully revaccinated persons whom he had vaccinated with equal success only a year previously.

He called attention to the following points: Revaccinations are much less successful in the adults than in the young; some diseases seem to favor satisfactory revaccination, especially those of a typhoid tendency and of the zymotic type; those vaccinated at birth and not revaccinated have a susceptibility which reaches its height about the age of twenty; bovine lymph is always to be preferred; under no circumstances should the lymph from a revaccination be used; when no epidemic prevails, the spring months are the most suitable for revaccination of school children; revaccination should not be deferred until the appearance of a small-pox epidemic.

The following statistics were then cited by Dr. Exton: In epidemics in Copenhagen and London, the greatest number of cases which occurred after vaccination were among those who had not been vaccinated within fifteen years.

During an epidemic in Sweden, out of 560 deaths from small-pox, 103 were of those who had been vaccinated in childhood, and all of the fatal cases were above fifteen years of age. (Hein, of Wurtemberg, and others, are quoted that entire variolous

power of vaccination is only temporary, and that it decreases in proportion to the length of time that has expired since its performance.)

The London Board of Health reported 361 deaths in 1731 cases of small-pox in the unvaccinated, or 20.85 per cent.; 22 deaths in 58 cases of small-pox after small-pox, or 37.92 per cent.; 32 deaths in 929 cases of small-pox after vaccination, or only 3.44 per cent. During an epidemic of small-pox in Marseilles, out of a population of 40,000, 30,000 had been vaccinated. 2,000 of these were attacked with small-pox and only 20 died. In Boston, during the epidemic of 1860, out of above 4,000 cases among the vaccinated, only 105 died. These cases show conclusively that there are individuals in every community who will take small-pox if they rely upon the protection of a single vaccination. The percentage of the successful results of revaccination is from 50 to 70 per cent. It is certain that small-pox, even of the most modified form, is rarely seen after revaccination. Hein found among 14,334 revaccinated soldiers only one instance of varioloid, and among 30,000 citizens but a single case of small-pox. Dr. Gerstacher says: "It appears the mortality from small-pox in Prussia, which does not differ from other countries, has fallen to a minimum under the operation of the vaccination law, so that this disease may now be considered as effectually controlled, except in some of the remote border districts. On the other hand, Austria, the adjacent country, on account of her carelessness and defective laws as to revaccination, is a terrible sufferer from the dread disease."

The following comparative table was then given from the London and Berlin reports of the mortality of small-pox. Berlin enforces the revaccination law, London does not:

DEATHS FROM SMALL-POX PER 1,000.

	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.
London.....	20.8	70	38.08	21.1	12.5	61.9	11.5	3.4
Berlin.....	1.8	.04	08	.07	.08	4.7	.04	.03

Gertstacher advises the revaccination of all school children towards the close of their school days as essential to a complete immunity.

The purpose of revaccination would be to insure against whatever may have been spurious in the first operation; in cases in which the course of the diseases may have been irregular it supplies the necessary amount of protective power and destroys the susceptibility to small-pox in those where primary vaccination may have been complete.

A paper on this subject, prepared by A. H. Doty, M.D., Chief Inspector of Contagious Diseases, New York city, was then read, with a letter of regret that his duties rendered his presence impossible.

He began by expressing his regret that this subject had not received the attention that its importance demanded, and he believed that this neglect is largely due to the belief in the Jennerian theory that one successful vaccination affords the necessary protection against small-pox throughout life, and to the uncertainty as to the time when revaccination should be performed.

The importance of revaccination became known during the latter part of Jenner's life, when he had, however, discontinued his active investigations, and he apparently still held to his original belief that one vaccination was sufficient, looking upon the cases of small-pox occurring in those previously vaccinated as an evidence that the vaccination had been imperfectly performed.

About 1823, the year of Jenner's death, the necessity of revaccination became very evident, and considerable legislation ensued which resulted in compulsory revaccination in several of the continental countries. Considerable opposition was met with, as the protective power of primary vaccinations had been so great in reducing the mortality it was deemed unnecessary. Statistics, however, soon proved the greatly reduced percentage of mortality by revaccination. The tables of Gerstacher showing in the unvaccinated the mortality was 40 per cent.; in those protected by one successful vaccination 12 per cent.; while in those who had been successfully revaccinated the rate of mortality was only 6 per cent.

Between the years 1874 and 1884 the average annual number of deaths from small-pox in London was 26 per 100,000 inhabitants, while in Berlin during the same period the average was

only $1\frac{1}{2}$ per 100,000 inhabitants. He believed the reasonable explanation for this difference is found in the fact that in England primary vaccination and not revaccination is compulsory, while in Germany both are compulsory.

During 1892, and thus far in 1893, the Health Department of New York city has removed to Riverside Hospital 814 cases of small-pox, of which 516 were over 15 years of age; with few exceptions the latter had been successfully vaccinated in childhood, but in the great majority of cases they had not been successfully revaccinated. It is a significant fact that a case of small-pox among the 175,000 children attending the public schools in that city is almost an unknown occurrence. These children are required either to be revaccinated by the Health Department, or furnish a satisfactory certificate of revaccination from a physician.

He could not positively say when a revaccination should be performed.

In Germany vaccination is compulsory between the ages of ten and twelve years. This regulation is also in force in other countries as the result of careful observation, and there seems to be little doubt that in the majority of cases a successful vaccination in infancy and a successful revaccination between ten and fifteen years of age is sufficient protection from small-pox during life.

Those who do not have this subject under constant observation would be surprised to know how large is the number of children and adults who fail to receive the protection of vaccination and revaccination from the carelessness of the operator. Some are not seen after the operation. Mothers are told that if the arm becomes sore the child need not be brought back, as the operation is then successful, whereas it should be known that a sore arm following vaccination does not by any means indicate a successful result. The patients, however, feel assured of protection, are exposed to and contract the loathsome disease, and the value of a genuine vaccination is then brought into question.

The importance of care is urged in the selection of the vaccine virus, in the details of the operation and of the phenomena in a vaccination or revaccination.

If it is a primary vaccination, the pearly-colored vesicle which becomes perfectly formed at the expiration of 168 hours, and the

characteristic areola which appears at the ninth day, should be seen and examined before a successful result is announced or a certificate given. Although, as a rule, the typical pearly-colored vesicle is not seen in revaccination, we do recognize, by the well-marked local and constitutional symptoms which occur, that the operation is successful.

He suggested, in closing, that this course be followed, and that each physician would give as a matter of record a certificate after successful vaccination, and so simplify the matter, and do away with a great deal of unnecessary vaccination.

Talbot R. Chambers, M.D., of East Orange, was then introduced, and read a paper on "Garbage Disposal." (See this paper as following this outline of proceedings.)

The President appointed the following members as the Committee on Forestry:

I. H. Platt, M.D.....	Lakewood.
Prof. J. C. Smock, Ph.D.....	Trenton.
Prof. J. M. Watson.....	Elizabeth.
George W. Howell, C.E.....	Morristown.
James Owen, C.E.....	Montclair.

COMMITTEE ON LEGISLATION.

James Owen, C.E.....	Montclair.
Judge W. M. Lanning.....	Trenton.
David Harvey, Counselor.....	Asbury Park.
E. S. Atwater, Counselor.....	Elizabeth.
C. P. Bassett, C.E., Ph.D.....	Newark.

The Nominating Committee reported the following nominations for officers for the ensuing year, and they were unanimously elected, as follows:

President—Hon. Addison B. Poland, State Superintendent of Public Instruction, Trenton.

First Vice-President—David C. English, M.D., New Brunswick.

Second Vice-President—Shippen Wallace, Ph.D., Burlington.

Recording Secretary—A. Clark Hunt, M.D., Metuchen.

Corresponding Secretary—Prof. J. M. Watson, Elizabeth.

Treasurer—George W. Howell, C.E., Morristown.

EXECUTIVE COUNCIL.

(With the above-named officers.)

James Owen, C.E., <i>Chairman</i>	Montclair.
Isaac Hull Platt, M.D.....	Lakewood.
Charles B. Brush, C.E.....	Hoboken.
J. C. Smock, Ph.D., State Geologist.....	Trenton.
Judge J. A. McGrath.....	Jersey City.
Prof. C. H. Raymond, Ph.D.....	Lawrenceville.
Supt. Vernon L. Davey.....	East Orange.
Rev. Samuel Lockwood, Ph.D.....	Freehold.
Judge W. M. Lanning.....	Trenton.
Henry R. Baldwin, M.D., LL.D.....	New Brunswick.
H. B. Francis, Esq.....	Camden.
Prof. H. B. Cornwall, Ph.D.....	Princeton.
Prof. A. R. Leeds, Ph.D.....	Hoboken.
William Elmer, M.D.....	Trenton.
H. B. Baldwin, Chemist.....	Newark.
David Harvey, Counselor.....	Asbury Park.
H. C. Green, Esq.....	Arlington.
G. J. V. Schott, M.D.....	Passaic.
W. H. Hall, M.D.....	Lakewood.
E. S. Atwater, Counselor.....	Elizabeth.
Prof. C. M. Davis.....	Bayonne.
William Pierson, M.D.....	Orange.
Joseph H. Powell, Esq.....	Bridgeton.
James A. Exton, M.D.....	Arlington.
Daniel Strock, M.D.....	Camden.
Talbot R Chambers, M.D.....	East Orange.
John L. Leal, M.D.....	Paterson.
H. B. Willis, Counselor.....	New Brunswick.
G. W. Rockfellow, Esq.....	Plainfield.

HONORARY MEMBERS OF THE COUNCIL.

Prof. C. F. Brackett, M.D., LL.D.....	Princeton.
L. B. Ward, C.E.....	Jersey City.
McRee Swift, C.E.....	New Brunswick.
W. K. Newton, M.D.....	Paterson.
Ezra M. Hunt, M.D., LL.D., Secretary State Board of Health.....	Trenton.
James C. Bayles, C.E.....	Orange.
F. Gauntt, M.D.....	Burlington.
Prof. James M. Green, Ph.D., Principal State Schools.....	Trenton.
Henry Mitchell, M.D.....	Asbury Park.
D. Benjamin, M.D.....	Camden.
George P. Olcott, C.E.....	East Orange.
E. L. B. Godfrey, M.D.....	Camden.
C. Phillips Bassett, C.E, Ph D.....	Newark.

The thanks of the Association were unanimously tendered to the proprietors of the Laurel House for the favors shown by them ; also to the Local Committee, Dr. I. H. Platt, G. P. Olcott, C.E., and W. J. Harrison, Esq., for their faithful services in preparing for this meeting.

The Disposal of Garbage.

BY T. R. CHAMBERS, M. D.

This is a subject which sooner or later must concern all cities and towns, and the ingenuity of man evidenced in the various disposal systems is itself most interesting.

The immediate removal of all impurities from within and about our homes is one of the most important of sanitary essentials to health. The word "garbage" comes from the old English, meaning to purge or cleanse, to make clean.

Garbage not only refers to the kitchen animal and vegetable refuse, but to the sweepings from rooms, which at times contain most dangerous elements. It has happened that the sweepings from a room, contaminated by some contagious disease, have found their way to the muck heap on a back lot, where ordinarily no one goes. But the children in their romping play have exposed themselves to contagion on this heap. The house dog or domestic cat has conveyed the germs from this heap to innocent, unsuspecting households. Such garbage should be destroyed, just as all woolen or other goods which cannot for any reason be sterilized by heat, dry or moist. In the Seventeenth Annual Report of the New Jersey State Board of Health, attention is called to the apparatus for burning garbage on the kitchen range. From personal experience I can state the fire in the range itself is preferable. For this cremation it is necessary first to dry out the garbage in the oven, or it would, if not fed slowly, put out the fire and slag up the bricks of the range. A few householders never employ a private or public scavenger. The East Orange Board of Health last summer requested the people of the town to consume, as far as possible, their garbage in the kitchen range. The people complied for about a week, and then gradually fell back upon the scavenger. It seems impossible to convince the

people at large that it is more economical to town and individuals of a town, besides being more cleanly, to consume the refuse of the house in the house. It is a fact that the American people as a class have not been taught to save in little things, and while it is really no easier, yet, having been imbued with the idea that a public scavenger is a necessity, they prefer to keep on the same way. The public scavenger is here and has come to stay. Since he is part of the machinery of a town, he should be compelled to use sanitary carts and have regular, systematic collections. He should collect only garbage, and be expected and compelled to go to the rear of each house for his collections. Thus would be avoided one unpleasant feature of some of our most beautiful towns—the so-called ash barrels on the sidewalk. If the coal ashes were kept in the individual houses in a place by itself it would never produce any disease, and it could be removed at the pleasure of the householder. People owning low, depressed ground would be glad to collect it and remove it for filling purposes. The Board of Health could stimulate the demand for ashes by ordering the filling of sunken lots. In our State, from November to March, garbage will not be likely to do harm if mingled with coal ashes when used for filling purposes. But during the rest of the year (nine months) it would ferment, send out vile odors, attract myriads of flies, and must be destroyed. While it is eminently proper to feed potato parings and rinds to the horse and cow, it is a fact proven by the experience of a number of cities that swill gathered by house-to-house collection is not proper food for cows or pigs. The milk from the cows fed with such stuff sickens the infant fed upon it, and the meat of the pig so fed is unfit for domestic use.

During the summer, the sight and smell of the garbage brought in by the tide to the Coney Island beach, where thousands of people were bathing, would be sufficient to convince anyone that the best thing to do with the garbage of New York City would be to destroy it in the city. But the patronage of the voters employed on these scows is too tempting to the politicians, hence this crude and outrageous manner of New York's garbage disposal.

It is improbable that fresh swill or garbage causes disease, but if kept a few days in a warm temperature, foul odors are given

off and it becomes a fertile soil for disease germs. And, as a successful surgical operation is one where absolute cleanliness has prevailed, so may we be sure the highest and most healthful hygiene is where there is perfect absence of filth.

Since the garbage may not be stored up, nor used as food for cattle; cannot be dumped on the neighbor's land; may not be thrown into rivers, nor cast into the sea to be thrown back upon the shores; may not be used as filling for sunken lots in populous districts—there is only one alternative. It must be destroyed within the city or town producing it. Its carriage for any distance by sea or land having proved grievously expensive, and always unsatisfactory, it may be cared for in the heart of a city without offense to anyone, except by reason of the number of scavenger wagons bringing their loads. There are two methods of disposal, the Utilization and the Cremation.

In the Utilization method there are three systems. The Simonin has been in use at Providence, R. I., for about six years, and is used in Cincinnati. The garbage is placed in latticed iron crates about seven feet square, three of which are rolled into a large iron cylinder, which is then hermetically sealed. The cylinder is now filled with naphtha and steam is then passed into a number of pipes surrounding the crates. The naphtha penetrates to the very center of the mass in the crates. Infected clothes may thus be exposed to hot naphtha. The naphtha has great affinity for grease and fat, and when drawn off carries with it all the grease and fat, and the moisture is at the same time taken away in the form of vapor, leaving the contents of the crate perfectly dry and minus the grease and fats, and perfectly free from odor. The most delicate fabrics may be treated by this process and come out perfectly safe from contagion and uninjured. A condenser and steam press free the naphtha from the grease and fat, which is sold. The water from the garbage is free of all offense and is thrown into a brook, while the naphtha, with only about three per cent. loss, is ready to be used again. The dry resultant found in the crates is powdered, and after having some phosphates added to it is said to be an admirable fertilizer.

The Simonin people ask a town to build the plant for them (the plant costs from \$30,000 up), and they will give bonds and

operate it free of expense, provided they may have a twenty-year lease. The author believes they can do it, and testifies from a personal examination of the Providence plant that it is free from all offensive odor.

The Merz system was in use and abandoned in Buffalo. It is in use in St. Louis, but costs the city \$1.80 for every ton disposed of. By this process the garbage is first dried and then the grease is extracted by benzine.

The National Garbage Reduction Company, of Washington, has a system just as satisfactory as the Simonin, and less expensive. The plant consists of a number of tanks or digestors. The garbage is dumped into the upper end of a digester, and the end is closed. When the garbage is thoroughly cooked with steam, the bottom of the tank is opened, and the tankage is dropped into presses by which all the liquid matter, including the grease, is expressed. The solid matter is dried and powdered, and, with the addition of phosphates, finds sale as a fertilizer.

This system has been in use in Washington for over a year, is indorsed by the District Board of Health, and also by the District Commissioners. The company offered to build a plant for Worcester costing \$50,000, the city to furnish the capital. The company agrees to pay an annual rental of \$3,000, and all charges for repairs, taxes, insurance, &c. The \$3,000 per year paid by them as rental to be used as a sinking fund to liquidate its debt, and the plant to revert to the company when it amounts to the capital invested. The company offers to give a bond, and guarantees to dispose of forty tons per day.

If I understand this contract the city is relieved of its garbage in a most satisfactory manner for about eighteen years free of expense. It only has to advance the price of the plant.

Cremation, the second method, is more popular, because the first cost is less, and the plant is owned and worked by the cities themselves. Lowell, Philadelphia, Pittsburgh, Alleghany City, Wilmington, Del., Troy, N. Y., and a number of Southern and Western cities have this system in operation.

The Engle is one of the oldest and best known of these furnaces. The author was one of a committee to visit the Engle furnace at Lowell, Mass., and can testify that, with some matters of detail to be corrected, it is nearly perfect. An improved Engle

furnace was in use at the Chicago World's Fair, where not only the garbage and sweepings but sewage sludge were daily promptly destroyed without annoying odors of any kind. W. S. MacHarg, the sewage engineer of the fair, states: "The work was done perfectly without creating the slightest nuisance, and we are perfectly satisfied with the working of the furnace."

The system consists of a covered building inclosing a fire-brick furnace, with a brick chimney about fifty feet high. The furnace has two fires. The first fire attacks the garbage directly, and the smoke and gases pass through the second fire, and thence through a superheated flue under both to the stack. The method is a sanitary one, and the committee at Worcester reported: "It gives no reasonable cause for complaint." Its working, however, is expensive. At Lowell, where coal costs \$5, the reduction of garbage costs \$1 per ton. In Chicago, where oil was the fuel, on one day (the largest day's work) it disposed of twenty-one tons of sludge and thirty-eight tons of garbage in eighteen hours, at a cost for fuel and labor of sixty cents per ton. Ordinarily the cost is really in the neighborhood of eighty or ninety cents. This company offered to build a plant for Worcester for \$9,000, and guaranteed the cost for consumption of garbage would not exceed sixty-five cents.

The Vivartas System is in use in Scranton, Pa. In this furnace the garbage is dumped into the furnace, and slides down a series of steps into the flames. The steps are surrounded by hot-air chambers, and the garbage is supposed to be dry when it reaches the fire, and is intended to serve as fuel, and so diminish the amount of coal needed.

The Worcester committee found the combustion was incomplete, as very black smoke came from the chimney. The company claims that one ton of coal will consume thirty tons of garbage, and that only two men are needed to run it at a cost for fuel and labor of \$8 for thirty tons.

The Dowling System in use at Washington avenue and Fifteenth street, Philadelphia, is located in a brick building situated about thirty feet from a row of good-class tenement-houses. I am told this system is not entirely free of offense. The garbage is dumped on a grating connected with the sewer, allowing a portion of the liquid to drain off. The garbage is then fed into

buckets on an endless chain similar to those in use in a grain elevator; is lifted ten or twelve feet, dumped into a hopper, passing from there to a corrugated roll, which crushes it and eliminates from it a portion of the moisture. From this roll it is carried by two archimedian screws, and fed slowly to the furnaces, complete incineration being thereby secured. Oil is sprayed by means of steam over the garbage, and when ignited creates great heat. The furnace is of brick, and the stack of brick and iron, sixty-five feet high. The company offers Philadelphia to build a plant for \$15,000 to dispose of garbage from a district of 250,000 people. The method is certainly effective, but the company refuses to guarantee the cost of burning, not because it would be excessive, but because they are unwilling to allow various other competing companies to learn the cost of reduction by their process.

The Brown Furnace in Boston is constructed with thick walls of fire brick, the inner surface of the brick being glazed with boracic acid, which protects against excessive heat. Surrounding the furnace on the outside is a water jacket, in which water is kept constantly running. The fuel used is crude petroleum. At one end of the furnace near the top is situated a combustion chamber, into which enters the burner. This burner not only conveys the fuel, but as a matter of fact forms the fuel, being not only a burner, but also a gas generator. It consists of three concentric pipes, the interior one carrying live steam, the next one petroleum and the exterior one gaseous products of combustion thrown back from the furnace itself. The steam gasifies the oil, and this gas in turn mingles with the gases of the outer pipe, forming a new gas of the highest combustibility. It is driven by a blast over the garbage, when it turns and passes back again under the grate, attacking the garbage on its under surface. The claims made for this system are the high degree of heat, quick and complete combustion and a furnace so constructed that it is capable of sustaining extreme heat without any increased cost for renewal or repairs. They offer to build a plant for Worcester for \$14,000, and guarantee the cost of burning not to exceed forty-five cents.

The Chemical Garbage Reduction Company, of Chicago, Ill., have a crematory whose furnace consists of one or more retorts,

each independent of the other, and each capable of burning twenty tons of garbage per day. Each retort is 8 feet wide, 10 feet high and 16 feet long, and it encloses a circular furnace retort 6x7, and 13 feet long, under which is an ash-pit 20 inches wide, 30 inches high and 16 feet long, opened at each end, the retort being separated from the ash-pit by grate bars of fire brick. From the top of the retort rises an iron hopper 6 feet square through which the garbage is dumped into the retort directly from the wagon without handling. An iron pipe ten inches in diameter also arises from out of the top of the retort and is connected with a suction and pressure blower from which it passes into a iron tank 8 feet high by 8 feet in diameter. This tank is half full of water, and the 10-inch pipe extends 3 feet into the water. After the retort has been filled with garbage the hopper is closed tightly and a small wood fire is built in the ash pit under the grate bars. The blower is then set in operation, and by suction draws the fire in the ash-pit up through the grate bars against the garbage, drying, igniting the same, freeing and separating from the garbage by heat volatilization all moisture and chemical elements, such as animal and vegetable gases, oils, salts, &c., and carries all smoke and chemical elements through the blower, forcing them under 3 feet of water in the tank, they being there precipitated, while the gases rise to the top of the tank and are carried through an 8-foot pipe back under the retort where they are utilized as fuel. The company claims the garbage is thoroughly dried and consumed. Second, it requires no fuel after starting because the gases of the garbage are utilized as the fuel. Third, it is smokeless and stenchless. Fourth, that a large plant being divided into several retorts, each of which can be operated separately, affords opportunity for repair without interfering with the work of the others. Fifth, that it will consume garbage and refuse of all kinds.

This furnace is one of the latest, and was running in Chicago for only three weeks during the past summer. Dr. T. Z. Bergeron, who represented the Health Department of Chicago, said it did its work thoroughly and scientifically. In the conclusion of his report to the Health Department he stated: "I have seen all kinds of garbage and refuse matter thoroughly cremated and consumed by this plant. Some of the garbage was so wet that

it contained 50 to 70 per cent. moisture. I am satisfied by this process, so long as the suction blower is in operation so steadily will the fire beneath the garbage consume it regardless of the moisture it contains. No fuel is needed except to start the fire, the plant furnishing its own fuel. I perceived no stench from the plant nor from any place about it, and no smoke, only steam. It stopped twice in two weeks, once because the engine got out of order, and again because clinkers caused by excessive amount of ashes, tin and glass formed on the grate bars and had to be removed, but the delay was short and the expense nominal." He says, "I believe this crematory will substantially fulfill the claims of its inventor. The test plant having been built to consume 20 tons per day, which is less than one ton per hour, has readily consumed more than one ton per hour." This plant is simple in its construction, is easily operated, and seems to accomplish the purpose in an economical way.

This company offered to erect a plant all complete for Worcester and covered with a building of corrugated iron for \$10,000, and to operate the same for 60 days. They guarantee that its operation shall be free from all offensive odors and the cost of consumption shall not exceed 25 cents per ton.

The Worcester Committee, after an exhaustive study of these various modes of disposal, recommended the Chemical Garbage Reduction Company, of Chicago, as the most economical and because it did not fetter the city with burdensome conditions. They stated the system is scientific and sanitary, and from all standpoints it is in our opinion the most desirable.

I have drawn liberally from the report of this Worcester commission because I know them personally, having accompanied them on their trip to see the Simonin process at Providence, R. I. I know them to be thinking and inquiring men, honest and well versed in sanitary science. After a year's investigation they came to a conclusion. Their conclusion is certainly worthy of respect.

It will always be an unanswerable question to me why cities and towns wait almost until appeal to the courts makes it necessary for them to substitute sanitary methods for crude and shiftless disposal of garbage. The little cluster of towns known as the Oranges, in this State, are becoming so thickly settled that

they are investigating the disposal system with some interest in a half-hearted fashion, but the courts will compel them, if they wait too long, to a more lively interest.

The burden of preventable diseases may be greatly relieved by sanitary measures, garbage disposal included. Cremation of garbage has only been employed for about six years, but testimony as to its worth is accumulating. Experiments are being continually tried. The heat of the furnace is being utilized in the production of power. More convenient and suitable means are in use for handling garbage. Ways and means for cheapening the operation are constantly improving. Above all, the good health of a town is becoming to be recognized as of more value than the money outlay for these most necessary improvements. To the author it would seem that if utilization companies are willing to make a contract, the town paying for the plant, and the company to run it afterwards, free of expense to the town, they do it because they expect to make money out of it. Now, why can't the cities make this for themselves? In France the people can live on what the Americans waste. It does seem shortsighted to burn up what has value. There are many details to be considered besides the question of the ultimate disposal of the garbage. Ordinances must be passed requiring separate collections of garbage and ashes. In Worcester and Lowell there is a public scavenger for the garbage, the people remove their own ashes, or rather private parties are glad to remove it for filling purposes. The experience of a number of cities is that it is more satisfactory for the city to own its own stable and carts. In a place where the roads are good and the hills not too steep, the one or two-horse iron car is clean and convenient.

Now to sum up, as compared with each other, the first expense of the utilization method is greater than by the cremation system as two or three to one, and after a number of years the plant passes out of the possession of the town, but in the meanwhile there has been no extra expense. The ash left from the furnaces is very valuable but is comparatively small in amount. If the author had a vote on the question he would unhesitatingly vote in favor of the utilization method as against cremation because, first, it cannot be right to burn up what has value; secondly, it is cheaper in the long run. As to which of the utilization plants

should be selected, I have seen the Simonin process and am delighted with it. The National Garbage Reduction Company has a feature which I look at suspiciously, *i. e.*, the squeezing out of the liquid swill into the sewers. As to the cremation systems, I agree with the conclusions of the Worcester people, that the Chemical Garbage Reduction Company is scientific and effective, while the blower works, and why shouldn't the blower be under perfect control? If we are to have cremation in East Orange I shall vote for the Chemical Garbage Reduction Company.

Notes on Food and Drink Preservatives.

BY PROF. H. B. CORNWALL, E.M., PH.D., PRINCETON, N. J.

[PREFATORY NOTE BY THE SECRETARY.—The following notes on various adulterants used as food and drink preservatives were parts of a lecture by Prof. H. B. Cornwall, of Princeton, before the New Jersey Sanitary Association, December 10th, 1893. They so fully present the facts as to the chief preservatives used that we have asked and received his consent to put them on record in this Report.]

Process of canning food dates back to patent by Augilbert, 1823, who placed the food with water in a tin can, the lid of which had a small aperture.* When the liquid in the can boiled briskly, and all air was expelled, the hole was closed with a drop of solder. Even earlier, in 1807, Saddington had described a method for preserving fruits without sugar, by filling bottles with the fruit, putting them in cold water, cooking loosely and heating gradually to between 70° and 77° (Cent.), and keeping at this heat for half an hour. The bottles were then filled to within an inch of the neck with boiling water, corked immediately and laid on their sides, that the water might swell the corks. The operation was completed by covering the corks with cement. Appert, 1810, received a prize from the French Government for practically the same method, except that he raised the temperature higher and continued it longer.

The principle in these cases was the same as that now at the basis of sterilizing processes in bacteriological investigations. Especially in weakly acid liquids are bacteria most easily killed by heat. It is not the expulsion of the air, with consequent

* See Bulletin 13, Part VIII, "Foods, and Food Adulterants." K. P. McElroy and W. D. Bigelow.

removal of oxygen, that prevents the putrefaction of foods thus preserved, since some of the putrefactive bacteria are anaërobic, and the presence of air hinders their development when it does not kill them. Prof. Wiley himself says (page 1016), with reference to the employment of preservatives, that opinions are divided in regard to their wholesomeness or unwholesomeness, the great weight of testimony being to the effect that while these bodies in small quantities are not injurious to health, yet the continual use of them, even in such small quantities, may finally become prejudicial. It is also shown that the same qualities which enable these preservatives to prevent the action of micro-organisms, and thus preserve the food from decay, are also active in the digestive organs, and hinder the normal functions of the digestive ferments. His conclusion is that, without doubt, the use of added preservatives in canned vegetables is objectionable. This conviction is not strong enough to warrant the absolute inhibition of these bodies, but the consumer would be sufficiently protected if the law should require that on each can of preserved vegetables the character and amount of the preservative used should be stated. The consumer and his medical adviser would thus be properly forewarned of the danger they may encounter in the way of such foods, and if in the face of this announcement they see fit to continue their use, it is a matter which rests solely with them, and they cannot hold the guardians of the public health responsible for any ill effects that may follow.

The reason canners have adopted the use of preservatives is stated to be that a temperature high enough and prolonged enough to kill the putrefactive organisms tends to disintegrate many of the vegetables and render them less attractive to the eye. Salicylic acid and sulphurous acid, usually in the form of sulphites, are most largely used.

The bulletin is very interesting in its showing of the great disproportion between the price paid and the nutrient matter generally present in canned foods, especially such vegetables as string beans and asparagus. For instance, in one sample of American string beans it was found that the digestible matter (dry matter) cost \$6.50 a pound.

A general view of the digestive experiments performed on these goods leads to the conviction that the process of canning,

especially when preservatives are used, such as salicylic acid and sulphites, tends to diminish the digestibility of the albuminoid and other bodies.

The development of the canning industry is of late enormous. In 1892, 84,700,000 cans of corn were packed in the United States, yet very little has been done towards controlling the producers in the direction of adulterations or improper use of preservatives. The canners are ignorant of the effects of the preservatives on the human system, and apparently use them without much effort to secure definite proportions, but use them to facilitate their work or to make sure that their products will not visibly spoil before reaching the consumer.

Much smaller quantities of salicylic acid will suffice to prevent the development of germs in a food which has already been heated high enough to kill growing bacteria than would be needed to affect bacterial life in an already-decomposing solution. According to the investigators the bacteria themselves will not, commonly, resist a temperature of 65° to 70° C. (150° to 160° F.) when in the active state in a fermenting liquid, but these bacteria, in the shape of spores or dust, will resist that degree of heat pretty well. But in such a case a minimum amount of salicylic acid or other disinfectant will prevent development into vegetating form. Now, it is much easier to put in a disinfectant than to heat a can of food, especially if somewhat solid, so long as to ensure heating even the interior parts high enough to destroy the spores. Of course, the canner saves expense when he economizes in time and heat, but he does not, apparently, give the consumer the benefit, or, at least, the retail dealer does not; for there seems, according to Bulletin 13, to be little difference in cost between the brands containing antiseptics and those free from them.

Salicylic acid was found in 47 per cent. of the canned goods examined. Sulphurous acid was also very common. It is especially used by corn canners, since it helps to keep the product white, but it also tends to attack the tin and bring it into solution.

Otto Hehner, Society of Public Analysts (*Analyst*, 1890)—“ We should, as a matter of policy, arrive at some sort of an agreement and an expression of opinion whether we, as a body, approve of or condemn the use of preservatives; and we owe it, as public

officers, to the public and venders of food to let them plainly know what attitude we occupy in reference to a practice which has for years past been allowed without the least objection on our part, and which has become almost universal. It is well known that in summer many milk dealers add some preparation of boracic acid in order to retard coagulation of milk. Such preparations are and have been openly advertised in numerous forms, and have been recommended by scientific men. Less well known is the fact that boracic acid and its soda-salt is most frequently to be met with in butter, especially Normandy and Belgian butters. Norwegian and other foreign fish are cured with salt and boracic acid; meat is preserved with it, and it is even found in preparations intended for invalids, such as in so-called sterilized peptones.

J. Mattern (Ber. der VII. Vers. d. Ver. Baqu. Chem. 36), finds that one gram boracic acid per liter retards coagulation of milk at 15°C. for from 24 to 36 hours; one-half gram only 21 hours; while at 35°C., one-half gram is without effect, and one gram retards the coagulation for 10 hours. In summer, therefore when the addition of boracic acid is practiced, not much less than one gram per liter of milk would probably be employed.

Salicylic acid, Hebner thinks, has not been largely used in England as a food preserver. It answers badly in case of milk and butter, and its use is chiefly confined to foreign fermented beverage. As much as one gram per liter was used when Salicylic acid had reached its height of popularity. Objections made against it resulted in prohibitive legislation in many countries, and its advocates then declared that five grams were enough to preserve 100 liters Bavarian beer for home use, and 20 grams for export. About three grains to twelve grains per gallon.

If we enter into the question of the physiological effect of preservatives (says Hebner) we meet diametrically expressed opinions. While inventors introduce every antiseptic as absolutely harmless and quote experiments by which it is shown that large and continued doses of antiseptic were administered without evil effects, other inquirers come to absolutely different conclusions. Literature teems with arguments in favor of and against some of these substances, and it must, he thinks,

be conceded that direct and palpably injurious effects on healthy individuals have not been traced to any of the antiseptics mentioned. But when so much is conceded, a wide field for discussion remains. While it is a meritorious achievement to prevent waste of good food by preventing its decomposition, yet it must be allowed that the indiscriminate addition of chemical substances which exert a poisonous action on bacterial and other organisms cannot be safely left in the hands of more or less ignorant venders of articles of food, even if no directly poisonous or injurious action can be traced upon a healthy adult by their use. It is evident that substances which interfere with the growth of fungoid organisms, like bacteria or yeast cells, must have some action upon the complicated human animal; and even if exuberant health and abundant gastric secretions may be capable, many times, of overwhelming the effect of the antiseptic, the effect itself must remain and detract from the efficiency of the human organism. It is inconceivable that the protoplasm of bacteria should be vitally affected by a substance which at the same time remains utterly inert on human protoplasm. The effect is evidently one of quantity. The absolute quantity may not be sufficient to show itself palpably, upon a body weighing, say, 1½ cwt., but it must be there all the same. Well does the *Comité Consultatif d'Hygiène Publique*, of France, report in reference to the use of benzoic acid in articles of food, that all antiseptics are injurious to natural digestion, because the addition of antiseptics of any kind is irrational as far as assimilation is concerned, and may be injurious to the normal action of the organs of digestion.

Since, continues Hebner, we now understand the causes of decomposition of food and can prevent it indefinitely by exclusion of germs or by cold, without the addition of any kind of foreign material, we should at least attempt to discriminate between processes of preservation. Since the preservation of any article of food is possible without addition of chemicals, the time has come for public analysts generally to set their faces against the present practice of allowing the addition of any antiseptic which the dealer in food may choose to make.

The Paris Court of Appeal decided that the addition of salicylic acid was to be considered as an adulteration of beer, to

the prejudice of the purchaser; not harmless, because salicylic acid was a drug the use of which must be ordered by a medical man, and could not be left to the trader.

The Commission of the Academie de Medicine of Paris on the Action of Salicylic Acid on Food reported on numerous cases in which the preservation of articles of food by salicylic acid has produced serious results, and is of opinion that small but continued doses of it may produce serious gastric disturbances in certain cases. Various States passed laws restricting or prohibiting the use of antiseptics. Buenos Ayres prohibited the sale of beer containing salicylic acid after March 31st, 1888, and meanwhile allowed only 0.05 gr. per liter. Other South American States followed. Also, Milan prohibited the use of salicylic acid in foods, wine and beer. Berlin prohibited the addition of any kind of preservative to milk.

Holland forbade the use of salicylic acid in foods. The Italian Ministry declared the addition to wine of any substance not natural to it an adulteration. Spain prohibited the use of any antiseptics in wine; Austria forbade the addition of salicylic acid. In Germany a distinction was made between salicylic acid added during mashing, to check the growth of acid-forming organisms, which was allowed on the ground that at most only traces of the acid would remain in the beer, and the subsequent addition of salicylic acid to the fully-fermented beer, which was prohibited. In consequence the use of benzoates, as in France, and sulphites and borates in Germany was largely practiced. Long discussions arose in regard to these substances. Some authorities contended that boracic acid was harmless; others were able to trace distinct physiological effects to its administration, and in 1889 the Soc. Bav. Analyt. Chemists came to the conclusion that it was objectionable from a sanitary point of view.

The British Sale of Food and Drug act allows to be added to food any matter or ingredient not injurious to health, if the same is required for the production or preparation thereof as an article of commerce in a state fit for carriage or consumption. Hebner very justly remarks that preservatives are not necessary for production or preparation, in a fit state for carriage or consumption of beer, milk, butter, wine, &c., because the majority of samples

analyzed are free from antiseptics. In his very emphatic words, "Good milk, fresh butter, sound beer, can be made and sold without antiseptics. As a matter of fact they have been so sold for centuries until sham science came in and taught the careless and dirty producer how to evade the natural punishment of dirt and mismanagement. Antiseptics are convenient to such producers, but they are not *required*. Hence we have no option but to consider them as adulterations." To agree upon limits within which the preservatives may be used is to concede the whole principle that a dealer in food has no right to add anything whatever to any article of food without due notice. Nor is notice given at time of sale of much real value. Hebner's article closes with the following sentences, which I heartily endorse:

"Our duty seems plain; we should work for entire prohibition of all sorts of preservatives. It is time we went back to natural food. I object to be physicked indiscriminately by persons not qualified to administer medicine whilst I am in health; I object still more when I am ill. I object still more strongly to have my children physicked in their milk, or their bread and butter. It is no consolation to me to know that the physic is not immediately fatal, or not even violently injurious. The practice is utterly unjustifiable from the point of view of a dealer, who wants to make extra profit, who wants to palm off a stale or ill-prepared article upon the public.

"We owe our very existence as public analysts to the desire of the public to have a guarantee of the absolute purity of their food-supply, and we would only be doing our duty if we did suppress the large and growing use of these objectionable chemicals called food preservatives."

At the same meeting of the Society of Public Analysts, Chas. E. Cassal read a paper "On the Adulteration of Food with Boracic Acid." To milk, he states that boracic acid, partly anhydrous and partly hydrated, with borate of soda are added (in solution) in the proportion of at least 7 grains of the solid substance to the pint of milk, and double this quantity to cream. There is also a chance that both the farmer and the city dairyman may use the preparations sold for this purpose. The medicinal dose of boracic acid for an adult, according to the British Phar-

macopœia, ranges from 5 to 30 grains; and one-twelfth this quantity, say $2\frac{1}{2}$ grains, would be the maximum suitable dose for an infant under one year old. Cassal says that one eminent authority refers to the tendency of boracic acid to set up diarrhœa, a disease very prevalent in hot weather, when the preservatives are most used to prevent the change which milk and cream are apt to undergo rapidly at a high atmospheric temperature.

Cassal found boracic acid in large amounts in meat extracts and fluids, intended especially for the use of invalids and children.

Boracic acid and common salt cannot be put on a par, because the salt is a food, and a natural constituent of milk.

It is not, says Cassal, easy to prove injury to health to the satisfaction of a court; it is not easy to state the exact percentage of antiseptic present. Cassal points out that under the Sale of Food and Drugs act it would certainly be an offense to add boracic acid to milk, because:

1. It alters the *quality* of the milk.
2. This defect is independent of the *quantity* added.
3. The boracic acid is not required for the proper preservation of the milk.
4. It does serve to conceal the inferior quality of stale milk.

While holding the ground that the only safe and proper course is absolute prohibition of the use of preservatives, Cassal is of opinion that much benefit would result from even the compulsory labeling of preserved goods with the name of the substance used. The producers take pains to conceal the fact that any preservatives have been used.

In the discussion that followed, Mr. Allen said that while he fully agreed that it was the duty of public analysts to insist that articles of food should be as represented, yet he was not fully satisfied that some of these preservatives were as objectionable as the governments of certain countries would seem to think. He distinctly objected to the use of boracic acid in milk, as its addition was a direct encouragement to milkmen to separate a portion of the cream, and sell the partially-skimmed milk next day as new milk.

Mr. Adams was of opinion that if preservatives were used the fact should be made known. Drugs that acted favorably on most

people seriously disagreed with others, just as there was great variety of opinions among various people with regard to the wholesomeness and digestibility of various food substances. Certain persons might be affected by preservatives, while others were not.

Dr. W. K. Newton, in a paper on Sanitary Control of Food-supply, read before the American Public Health Association, 1884, stated that he had examined preservatives consisting of salicylic acid, alone or with carbonate of soda, saltpetre, borax or boric acid. In his opinion their use should be discountenanced by sanitarians, because the mere fact that a certain chemical combination will check fermentation or putrefaction outside of the body leads us to believe that digestion will be impaired or impeded. This he had sought to prove in an imperfect way by treating milk with a preservative, and then attempting artificial digestion. Digestion was proved to be interfered with, or checked altogether.

Serafini (Archiv für Hygiene, 13, S. 173, abst. in Wagner, 1891, p. 1091,) says common salt in the proportion of 5 to 8 per cent. retards the development of bacteria, and gives meat time to dry sufficiently. Boracic and salicylic acids are unnecessary.

SULPHUROUS ACID.

Dr. Ludwig Pfeiffer (Munich, Seventh Convention of Delegates of Applied Chem., Pharm. Cth. 1889, p. 431), stated results of his studies relating to the injurious action of sulphurous acid on the human body:

1. The gaseous acid and concentrated solutions are deadly and rapid poisons.
2. In less concentrated form the acid causes death quickly to cold-blooded animals; warm-blooded ones can endure it better, but soon show symptoms of active poisoning.
3. In more dilute form and doses less than 0.1 grm. the results are less important, but doses of 80 mg. or more, even if divided during the twenty-four hours, induce disturbances of the digestive tract, while the whole body is more or less affected.
4. Salts of sulphurous and "hyposulphurous" acid, even in very large doses (40 grm.) are not deadly poisons for men or dogs.

5. In moderate doses they strongly irritate the intestinal canal, and in long continuance anæmia and weakness result.

6. In smaller doses, one-tenth of a gramme, cause disturbances of the digestive tract. Even in the smallest quantities they are destructive to frogs.

7. The most active salt is sulphite of magnesia; the normal alkali salts and sulphite of lime are less active. The bisulphites are least effective.

The use of sulphurous acid should be limited as much as possible; in some cases it cannot be entirely dispensed with. Malt and hops, as well as vessels and apparatus used in making wine and beer, should, after being treated with sulphurous acid, be thoroughly aired or rinsed. Wine should not be sold in freshly sulphured casks, but should be kept until the sulphurous acid has oxidized to sulphuric acid. The use of sulphurous acid should never be allowed to take the place of cleanliness and care, and then there is no need or danger of excess of sulphurous acid. For beer or wine 0.01 gm. per litre ($\frac{1}{100000}$) is usually sufficient, but he found sometimes as much as 0.089. His experiments indicated that a day's consumption of wine containing in all 80 mg. sulphurous acid could induce marked effects.

The convention recommended the determination of the sulphurous acid in analyzing wines, and regarded sulphurous acid in other articles of consumption than beer and wine as of less importance.

J. Brand (Ph. Cth. 1889, p. 741,) found in canned asparagus 0.157 per cent. S. O.², in the liquid part 0.195 per cent. sulphuric acid; even moderate use of such food would introduce into the system much larger quantities of sulphurous acid than, according to present experience, can be disregarded from a sanitary point of view.

Crampton failed to find sulphurous acid in American beers.

SALICYLIC ACID.

Physiological Action. Nat. Dispens., H. & M. Plants watered with a solution of it speedily die. It prevents various reactions in organic bodies, hindering the development of prussic acid in a mixture of amygdalin and almond emulsion; of the acrid prin-

ciple of mustard on the addition of water; the souring of beer, milk, &c. Taken into the human system, it passes through very rapidly, although its excretion, when taken in considerable doses, does not cease for several days after the medicine has been suspended. It appears to undergo, however, some change in the system before elimination, since the urine containing it does not check the fermentation of yeast. Its local action is that of an irritant, due in part to its insolubility. In very large doses of a drachm or so it produces varying effects—delirium, vomiting, prostration, acute nephritis. Useful in acute articular rheumatism. Dose, 10 to 40 grains.

From Crampton's report, already quoted, I cite the following passages:

"In 1881 the use of salicylic acid was prohibited as a preservative for food or drink; in Germany it was only allowed to be used in beers intended for export. The experiments by Kolbe, who took doses of 0.5 to 1 gramme daily for several days without appreciable ill effects, still leaves open the question as to its harmlessness without regard to age, sex or idiosyncrasy.

"In 1885, with but one dissenting voice, the Independent Union of Bar. Represent. of Applied Chemistry refused to sanction its use in beer in the proportion of 0.05 gm. per liter. In the present prevalence of kidney disease (the most common form known as Bright's disease), it is matter of grave consideration whether it would not be prudent to forbid its use altogether. The physician, at all events, prescribing beer as a tonic for a weak, convalescent patient, would certainly like to know whether he was giving at the same time not inconsiderable doses of a strong therapeutic agent. In one case a wine was tested in the Paris Municipal Laboratory which contained in one liter the full medicinal dose for twenty-four hours."

Crampton quotes Dr. Edson as follows:

"Within the past few months I have been confronted with a subject the importance of which to the community is very great. It is the use of salicylic acid, a food preservative. Many, if not all, the manufacturers of preserved foods are adding small amounts of this substance to their goods to prevent loss by decomposition. The French authorities believe that the use of salicylic and boric acids tends to irritate delicate digestive

organs, and also to irritate the kidneys, through which they are eliminated under their own forms. Though I have talked with a number of scientific gentlemen in this country, few are willing to go into court and swear that this is also their opinion. It must not be lost sight of, however, that a person might at a meal take several articles of diet, each containing that which if taken alone would be a harmless dose, but taken together, and possibly for a considerable time, would prove highly injurious. The only safe way is to discard all additions to food which may possibly become a source of danger."

Dr. Edson had found in a so-called wine, made from various dried fruits by maceration with water and addition of sugar, followed by fermentation which was checked with salicylic acid, about $4\frac{1}{2}$ grains of the acid to the pint. A number of chemists had expressed the opinion that the wine should be condemned, holding that depressing effects in the nervous system would follow the daily use of the acid in small doses. He himself, with Drs. Isham and Linchan, was of opinion that the adulteration was a dangerous one and likely to cause sickness. Some 5,000 gallons of this wine were seized and condemned.

Dr. Bartley, chemist of the Brooklyn Board of Health, reported in 1887, in regard to bottled beer, which, unless thoroughly cured and well cleaned, was liable to spoil by fermentation or putrefaction. To avoid the necessary care in making and keeping the beer for a long time, brewers had adopted the practice of adding salicylic acid to prevent the fermentation. Dr. Bartley says, in view of the increasing use of the acid in canned foods, drinks, fruits and milk, that it is becoming an important sanitary question as to its effects on health when used in small quantities for a long time. There can be no doubt that in large quantities it acts very injuriously both upon the digestive processes and the kidneys.

In its elimination the kidneys not rarely become acutely congested or even inflamed, giving rise to acute Bright's disease.

Although a potent remedy in acute rheumatism, it is not suitable for long administration on account of the above injurious action. It requires the addition of from eight to ten grains of free salicylic acid to one gallon of beer in order to prevent the growth of ferments. Much more is needed if bicarbonate soda

has been also added. Three grains have been found in a pint of wine.

Dr. Bartley quotes a committee of the French Academie of Medicine as saying (in 1886), that while in persons of good health the prolonged use of such small quantities of salicylic acid as would be contained in articles of food or drink treated with this substance probably not injurious to health, it may, nevertheless, produce very decided disorders of health in certain persons, and especially in the aged and those who have a tendency to diseased kidneys or dyspepsia. Salicylic acid and its salts are eliminated by the kidneys. They tend somewhat to check the action of the digestive ferments contained in the saliva, enteric juice and pancreatic fluid, and hence to delay digestion; hence it is easy to understand that they may aggravate digestive or renal troubles.

The report closes with the recommendation that the addition of salicylic acid, or its compounds, even in small amounts, to foods or beverages shall be forbidden. The committee find that as much as 12 to 15 grains were used in one gallon of beer.

Dr. Bartley himself states his opinion that it is time the addition of salicylic acid to articles of food received a check at the hands of sanitary authorities, and recommends that the Health Department take action toward the prohibition of this injurious adulteration.

Crampton reports finding salicylic acid in seven of thirty-two bottled beers, one being an imported beer. None was found in the draft beers. Of American bottled beers, six out of nineteen contained salicylic acid, and these included the product of some of the largest breweries in the country. He was not able to state whether it was put in by the local bottlers or added at the breweries. In one case he found it in the beer from a large Western brewery, but failed to find it in another sample sent direct from the same brewery. There was doubt whether the firm did not know of the purpose for which the second sample was obtained.

In Bulletin 13, 1893, it is stated that probably few canners do not at least occasionally use salicylic acid. The opinion is expressed that its use should be unhesitatingly condemned in cases where the fact is not stated on the label of the goods. It may be harmless in very small doses to ninety-nine out of a hundred consumers, but the one hundredth man should be pro-

tected. Moreover, there is no safeguard against the use of inordinate quantities, for while the qualitative detection of salicylic acid is very easy, the quantitative estimation is a matter of very considerable difficulty. For this reason the canner who uses any may use almost any quantity he pleases with perfect impunity. Moderately large doses of salicylic acid are quite likely to prove detrimental to many people.

Abst. from *Archiv. für Hygiene*, '86, 483: "Lehman (*Archiv. d' Pharmacie*, 1887, p. 973) caused two healthy Munich laborers to take daily 0.5 gramme of salicylic acid in half a liter of beer for three weeks. They showed no symptoms of indigestion, no headache, and were in excellent health during the whole time. Kolbe, taking daily doses of 0.5 gm. long continued, found it harmless (he was discoverer of cheap way for making it)."

From a hygienic point of view, Lehman considers that there is no objection to the moderate addition of salicylic acid to foods, &c.; nevertheless he would, in particular, not allow it to be added to beer—rather because there would be no certainty as to the quantity added and because it would be used to preserve badly-made beer, than on account of any danger that too much salicylic acid would be taken if added to various foods. His objection would be less a sanitary measure than a matter of national economy. In Bavaria, at all events, a perfect beer, free from salicylic acid, is made strictly from barley malt, hops and water, in all breweries, large and small, conducted in a cleanly and rational way. The addition of salicylic acid is shown by experience to be unnecessary for the preservation of export beer, and these facts have secured for Bavarian beer a reputation that ought not to be sacrificed for the advantage of a few small brewers.

Breslau (*Archi. d. Pharm.*, '85, 275,) concludes with regard to addition of salicylic acid to beer:

1. It is proper and commendable.
2. Within certain limits (5–10 grammes per hectoliter = $\frac{1}{200}$ to $\frac{1}{100}$), it is entirely harmless to health.
3. The addition of salicylic acid to beer is neither an adulteration, by the addition of foreign bodies, nor an apparent improvement of bad wares, since by its aid a spoiled beer is not again made

drinkable; the object is only to keep the beer in its original condition and to protect it against spoiling. There is no violation of the laws on foods, which punish adulterations made for the purpose of deception and in opposition to the just customs of trade and use, since the use of necessary preservatives is admitted in such laws. [But Bavaria punishes the use of salicylic acid. Ref.]

4. According to his construction of it, the Prussian law allows the use of salicylic acid within certain limits.

BORAX—PHYSIOLOGICAL ACTION.

Continued large doses produce the same consequences as the prolonged use of other salts of sodium—liquefaction of the blood, scorbutic symptoms and, sometimes, eruption of the skin. Borax is hostile to the lower forms of animal life. In a solution of even less than 1 per cent. of this salt, bacteria cannot be developed. Boracic acid has been stated (Polli., 1887,) to possess remarkable anti-fermentative powers. He mixed beer, milk, urine, eggs, blood and meat with this acid, which kept them fresh for thirty days in the summer, while the substances used for comparison putrefied in half the time. In chronic cystitis its mucopurulent deposit disappeared from the urine after a few days' administration of this acid, in the daily quantity of 75 grains (5 grms.) He found that borax possesses similar qualities, and recommended it as well as the acid to prevent fermentation and putrefaction. The dose of borax in case of uric acid gravel is from 5 to 30 grains (0.33 to 2 grms.) in watery solution largely diluted.

Crampton failed to find borax in beers. *Ph. Cth.*, 1888, p. 218. The increasing use of boracic acid for preserving sea fish has caused doubt whether its continued use may not be hurtful to the human system. Fish preserved by action of a dilute boracic acid solution, under a pressure of six atmospheres, contains about 2 grms. of the acid per kilo flesh, and of this two-thirds is extracted by boiling, so that at one meal about $\frac{1}{2}$ gm. of the acid might be introduced into the system. Against its use is raised the argument that even small amounts of boracic acid have an injurious effect on the human system, by hindering the assimilation of albuminoids.

Emmerich (*Chem. Zeit.*), quoted in *Analyst*, 1888, says: "Boric acid only acts when present in large quantity. It prevents the growth and multiplication of germs, but does not kill them even in a 1 per cent. solution. Experiments with milk gave very unsatisfactory results, as an addition of 4 per cent. of the acid only preserved the milk for four days. Hare flesh may be preserved for six weeks by the use of 3 per cent. of the acid. Boric acid is supposed to be harmless, but recent investigators prove it to be dangerous, as it strongly acts upon the mucous membrane of the large intestine. A dose of four grams killed a large rabbit; two grams made a dog very sick. The acid is much used in Sweden for preserving fish and milk, but cases of poisoning have already occurred in that country. Long continued use of the acid is not favorable to good health and, at all events, its addition to milk should be prohibited."

E. Hötter is quoted by Cassal (*Analyst*, Dec., 1890,) as having published a series of experiments on the action of boron compounds on plants. The absorption of such compounds was found by him to destroy the chlorophyll, and hence to arrest the process of assimilation. The roots are affected and soon die. Free boric acid was more prejudicial than the alkali salts.

Hebner (*Analyst*, July, 1891,) has stated results of experiments as to the influence of boric acid on peptic digestion. He said that Leffman and Beam (*Analyst*, XIII, 103,) had found boric acid to be without influence, practically, on the diastatic action of malt extract, and *presumably* on that of saliva; but Gönief-Besanez (*Lehrbuch der Physiologischen Chemie*, p. 45,) states that boric solution, while without influence on organized ferments, renders non-organized ones inactive. Hebner rubbed 50 grammes of hard-boiled white of egg through a very fine sieve, added 250 grms. water and 0.15 per cent. hydrochloric acid with 0.04 grms. pepsin, previously proved capable of dissolving 2500 times its weight of albumen in five hours at 40° C. The 0.034 grms. pepsin could accordingly dissolve 82.5 grms. albumen. He put each lot of 50 grms. egg white, etc., in one of eleven bottles, adding to ten of them successively increasing proportions of boric acid—0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.8, 1, 1.5, 2, 2.5 and 3 grms.—and kept them in a water bath at 40° C., with frequent shaking. The albumen dissolved equally well in

all the bottles, and in about five hours was completely dissolved in all, so that there appears to be no retarding action of boric acid on peptic digestion. At the same time, as we have already seen, Hebner objected to the indiscriminate use of chemical food preservatives as being certain to have some physiological action, and his experiments with boric acid, above detailed, did not in any way prove that it was a desirable ingredient in food. He had lately had to analyze some hams, alleged to have had injurious effects, and had found them strongly impregnated with boric acid. Bacon he had found to be also very largely boric.

Artimini (*L'Orosi*, Vol. 8,) recommends boric acid in times of epidemics, especially of cholera, on account of its antiseptic qualities and destructive action on micro-organisms, and because in small doses it is harmless to the human organism.

J. Foster (Berlin, *Berichte*, 1883, p. 1754, quoted in Wagner, 1883,) says the use of boric acid and other preservatives depends not only on how far such substances can be used without bringing about the effects due to medicinal doses, but also in the question whether foods so preserved are assimilated to the same extent as without them. Two series of experiments were undertaken on the effects of boric acid added in small doses to daily fare. In one case a mixed diet; in the other, a diet of milk and eggs exclusively. The result showed that the boric acid exerted an influence on the digestive organs, even when not producing medicinal effects. The amount of dry substance and of nitrogen in the feces was increased, although to a slight extent only, as little as 0.5 gram of boric acid per day caused such results. This result was obtained even with highly nitrogenous diet of milk and eggs. The cause may have been either an increased flow of secretions in the intestinal canal, or diminished absorption of foods, or increase of epithelial admixtures. In the last two cases there would undoubtedly be an ill effect. The proportion of fat and of fatty acids in the feces after the use of the boric acid was scarcely abnormal, but in case of boric acid acidified alcohol extracted decidedly more than from normal feces, the extractive matter being such as results from the action of digestive fluids (gall) in fats. From this it results that the boric acid causes increased separation of gall and increased secretion of albuminoids—the latter effect being certainly not

desirable. Hence boracic acid is not so good a preservative as many think.

De Cyou (Arch. Pharm., 82, 270, from Journ. de Pharm. et de Chrimè; Sériè 4, Tom. 29 p. 417,) from a series of experiments concluded that meat preserved with *borax* retained the appearance and taste of fresh meat and kept all its nourishing qualities. Dogs gained in weight while consuming daily 4 grammes of borax for 14 days. Le Bou, on the other hand, while succeeding in preserving flesh for a long time by means of borax in powder or in solution, observed that the use of such meat disturbed digestion to such an extent, after a few weeks, that he had to abandon its use. Borax taken repeatedly, even in small doses, works as a poison and its use as a food preservative should be discontinued. On the other hand, several authorities, English, Danish and Italian, are quoted in favor of borax as a harmless preservative (although the grounds for these conclusions are not given).

J. Mattern (Zett. Aryew. Chemie, Seventh Convention of the Bavarian Union of Technical Chemists, p. 36,) concludes that the use of boracic acid as a food preservative is, according to present experience, not without suspicion from a sanitary point of view.

BEER.

Crampton, in Government Report on Malt Liquors, speaking of beer, says: ["We come now to what I consider the most important sophistication of beer at the present day, and the most reprehensible and most deserving of repressive legislation.] The use of artificial preserving agents not only introduces foreign matters into the beer which are more or less injurious, according to the nature of the material used, but also serves to cover up and hide the results of unskillful brewing or unfit materials; giving to the public for consumption a liquor that, if left to itself under natural conditions, would have become offensive to the senses and putrid with corruption long before it was offered for sale."

In the report on wines Crampton quotes Prof. Heilgard (Report of Viticultural Work, 1883-84, and '84-85, p. 32), with regard to the use of antiseptics for the preservation of wines, as follows: "The fermentations above referred to may be stopped by the

action of the substances known as disinfectants, antiseptics or poisons. It should be unnecessary to argue respecting the admissibility of additions coming properly under the latter designation, yet it is true that in Europe such additions have not unfrequently been discovered in wines that, if left to themselves, would soon have become unsalable. It is not easy to draw the exact line between poisons proper and those substances of which the use to a certain degree, and in a certain way, may be considered admissible for the purpose of stopping undesirable fermentations in wines. There is, however, one point of view which covers the whole ground in connection with the use of wines for hygienic purposes, namely, that whatever impedes fermentations also impedes digestion, which is itself in a great degree a process of fermentation. The habitual use of wines containing antiseptics will, therefore, inevitably result in functional derangements, and this is so well understood that in Europe the extreme amounts of those allowed at all is strictly limited by law. Salicylic acid is effectual in much smaller quantities ("than sulphuric acid"), and at one time it was thought that it would be admissible to use it freely. But while its effects upon the human system are not apparent at first in most cases, yet the decided and unpleasant effects often produced in persons of weak digestion have but served to emphasize the general axiom, that we cannot with impunity continue to introduce into the human body substances foreign to the vegetable and animal products that have from time immemorial constituted the nutriment of mankind. If some persons are able to bear for a time doses of salicylic acid that will completely stop digestion for some hours in the case of others, it is altogether unlikely that even the strongest person could continue its use indefinitely without injury. After some years of toleration the legal prohibition of its use in articles of food or drink seems, in Europe, to be only a question of time.

Finally, when wines are not entirely sound—and with the methods of fermentation now in vogue this is a very prevalent condition—the remedy to be applied should not lie in the use of antiseptics, sulphuric, salicylic or boracic acids and the like, but in the simple and rational process devised by Pasteur and named for him. The "Pasteurizer" should be an indispensable appliance in every wine-house; and its use, if properly under-

stood and practiced, would at once do away with nine-tenths of all doctoring for unsoundness.

Dr. Otto Schweissinger (Jahresbericht aus dem öffaett chemisch, Laboratorium zu Dresden), Ph. Cth., 1888, p. 61, says with regard to preservatives in general that, especially those sold in liquid form, cost a great deal too much. He instances one sold at a rather high price as a fruit preservative, which consisted of 2 parts each of common salt, 25 parts glycerine, and 70 parts water. With regard to salicylic acid itself, he considers the agitation against it in certain quarters as not altogether well founded, and thinks the complete prohibition of it as a preservative would be greatly to be deplored, although PERHAPS it might be very useful to put a limit to the amount to be used.

Wagner, 1889, p. 1091. The Imperial Sanitary Bureau at Berlin issued the following regulations of the beer trade:

Benzoic acid is not to be used, as it causes catarrh of the stomach and injuriously affects the assimilation of albumen. Boracic acid is entirely unnecessary, and diminishes the digestibility of albumen. Salicylic acid works effectively in from 15 to 25 grm. per hectoliter, but there is reason to believe that much more is often used.

With regard to the regulation of the milk trade in Prussia, Wagner states (1884, p. 1055,) that the addition of preservatives, including salicylic and boracic acids, is of doubtful nature, because they may exert an injurious effect on digestion, especially among children, and may easily be abused.

Institutional Sanitary Inquiries.

BY E. M. HUNT, M. D., AND A. CLARK HUNT, M. D.

During the past year the Board has continued its examination into the sanitary condition of institutions. As a special examination and report was made thereupon last year, we this year only print a general statement and details as to the very few not reported on before.

Our plan is to have in small book form (see Circular 78) a system of sanitary inquiry, by which a record is on hand in this office as to facts relating to the construction, sanitary condition and occupancy of each State institution, and of all the county, city and township institutions of the State. A duplicate record is also arranged to be kept at every institution, so that Superintendent and managers may have ready at hand an outline of facts. We now have on file this series of reports for nearly all localities. Some of them are very full and accurate, and others more or less imperfect. We seek in the yearly inspection visits to test their correctness, to supply their deficiencies, to see how well institutions take care of the duplicate, and to add on the blank pages any new facts that may appear. The number of these returns, the comparisons made and the very large interest represented in a social, sanitary and monetary way, give to this entire oversight a great importance.

During the past year the Secretary was called upon to furnish a brief outline as to twenty years of institutional history in the State of New Jersey, for the meeting of the National and International Conference of Charities and Correction, held at Chicago in June last. As this is important to the State, and as a guide to inquiries, it is here appended.

NOTES ON TWENTY YEARS OF INSTITUTIONAL HISTORY IN THE STATE
OF NEW JERSEY, BY EZRA M. HUNT, M. D., SEC'Y STATE
BOARD OF HEALTH OF NEW JERSEY.

The first systematic effort made in New Jersey to secure facts as to the condition of almshouses and some other charitable institutions was that of 1866, when a Sanitary Commission, of which the writer was president, sought to gather facts which would bear on the prevention of pauperism and which would show our full duty as to the insane and idiotic who were not yet cared for in the one asylum which had been provided. As this investigation was a little previous to the twenty years as to which information is sought, we simply refer to it as therein given. This and other circulars and inquiries, not published in this report of the Commission, served to awaken public attention. It resulted in no formal legislation. Although this Commission was temporary, it kept alive some interest in the subject until another Commission in 1874 drew still fuller attention, especially to the sanitary needs of all charitable and penal institutions. It was with this moderate, but yet valuable, introduction that the State Board of Health, which was formed in 1877, had embodied in its law provision for the sanitary care and oversight of all public institutions.

In 1873 the provision for penal and charitable care was as follows: one State prison, inmates about 554; one penitentiary in Hudson county; one jail in each of the 21 counties; one reform school, organized July, 1867, inmates about 244; The New Jersey State Lunatic Asylum, organized 1848, inmates about 653. Before this, for the dependent classes, we had almshouses in over half the counties, known as county houses; in other counties, township houses; in some townships no buildings, but the poor "farmed out"; in two or three larger cities, city almshouses.

The date of the establishment of important State and local institutions is as follows:

Burlington County Almshouse.....	1800
New Jersey State Asylum, Trenton.....	1848
Salem County Asylum.....	1867
Cumberland County Asylum.....	1870
Girls' Industrial School, Trenton.....	1872

Morris Plains State Asylum.....	1876
Camden County Asylum.....	1879
Essex County Asylum.....	1881
School for Deaf-Mutes.....	1883
Home for Disabled Soldiers, Kearney.....	1888
Home for Feeble-Minded Women, Vineland.....	1888
Home for Feeble-Minded Children, Vineland.....	1888

One of the first changes to take place was the partial separation of the insane in almshouses into small asylums, or separate buildings just adjacent to the almshouse. These, as a rule, did not embrace the harmless idiotic or epileptic, but such as had been returned from the State asylum as incurable and because of its crowded condition. The State made some allowance for the keeping of these in a home asylum. Three of these asylums, namely, those of Hudson county, Essex county and Camden county, are large enough to secure orderly methods and attendance, and will compare favorably in some respects with the State institutions. Passaic county might also be included. Even these, however, are too subject to the fluctuations of politics; a criticism from which our State institutions are not wholly exempt.

The smaller county insane asylums are carefully watched, and, as a rule, fairly well kept. They are only five in number, and the system is not to be commended.

There have been from time to time exceptional cases of abuse in these asylums, and the almshouse system has been very defective and serious conditions have been found in many counties and townships. The State Board of Health, while not having powers of a board of charities and correction, has been able to correct many abuses and to exercise a wise restraint.

Feeling its powers inadequate, and regarding its direct care of the health of the State and of sanitary conditions as a sufficient duty, it advocated the formation of a council of charities and correction.

This council was formed in 1882 with some excellent provisions. It had only \$1,000 at its command, and among its members not any who had devoted themselves to this interest. It has made only formal reports and has never done much efficient service.

In 1881 a State voluntary association was started in Morris county, New Jersey, but it was not until 1886 that it attempted

or secured recognition in a legislative or State capacity. This was chiefly in the direction of authority to visit institutions, to make report to Legislature and, by more recent act, to receive \$600 a year as a State appropriation. It has since been limited as to its right to visit State institutions, and so far as pecuniary assistance is concerned would probably have done better to have retained its voluntary features. There are branch societies more or less efficient in nine counties and some valuable work has been done.

During the past ten years there has been a steady increase of attention to our charitable and penal institutions. The asylums are built according to improved methods. Many new jails and almshouses have been constructed, and others reconstructed. As the State Board of Health compares its visitations of 1892 and '93 with those of 1877-78, when it began its work, most notable sanitary improvements are apparent. With it there has been a general attention to improvements in charitable and correctional care. The sexes are more fully separated; children are comparatively rare in our almshouses; the reform schools relieve our jails and prisons of the younger class of criminals. A parole system has been adopted by the State Prison, but it has only been in operation a little over a year, and the law is imperfect.

There is still much lack of a careful study of the causes and conditions of insanity, pauperism and crime, and of power and provision for disposing of individual cases so that inmates shall have the benefit of industrial training and reformatory methods. There is not a sufficient effort to select out cases which are at present consigned to chronic detention, and to rid our almshouses of those who should be self-supporting or supported by their friends.

There is, however, such improvement in general as is in the highest degree encouraging. Yet very much more might be done by legal enactment, by pecuniary provision and by the wise work of voluntary associations. Our chief embarrassment arises from the degraded populations of our larger cities, much supplemented by an influx from New York and Philadelphia. The looseness of our laws as to liquor license and gambling furnish a constant supply of lewd fellows of the baser sort. We are still guilty of the strange blunder of manufacturing insanity, pauperism and crime by adequate and well-defined measures for sustaining drunkenness, betting, immorality and vice.

We must continue to do what we can to minimize the results of loose education in ethics and morals. We must continue to offset and alleviate the results of our methods of vicious production until we learn that prevention is better and more feasible than an attempt to overcome results. Yet we must ever seek to neutralize these results as we meet them in society, in tramp life and in the various institutions of charity, punishment and reform.

We append hereto a list of the various institutions of the State, together with their approximate number of inmates, as given by recent returns.

ALMSHOUSES.

INSTITUTION.	P. O. ADDRESS.	Total number of inmates.	Men.	Women.	Children—under fourteen.
Atlantic County,	Smith's Landing,	16	7	9	0
Bergen County,	Oradell,	34	15	13	6
Tri-Township,	Englewood,	5	4	1	0
Burlington County,	Pemberton,	238	130	82	26
Camden County,	Blackwood,	173	112	45	16
Cape May County,	Cape May C. House,	18	9	9	0
Cumberland County,	Bridgeton,	78	46	29	3
Newark City,	Newark,	175	91	80	4
Orange City,	Orange,	20	0	0	0
Gloucester County,	Clarksboro,	57	31	15	11
Trenton City,	Trenton,	68	44	24	0
Hudson County,	Snake Hill, Jersey City,	620	220	175	143 males, 82 females.
New Brunswick City,	New Brunswick,	30	13	17	0
Monmouth County,	Perth Amboy,	29	0	0	0
Perth Amboy City,	Perth Amboy,	6	1	3	2
Morris County,	Boonton,	86	51	34	1
Paterson City,	Paterson,	192	69	83	40
Passaic City,	Passaic,	20	0	0	0
Salem County,	Woodstown,	55	27	24	4
Sussex County,	Branchville,	85	27	38	20
Rahway City,	Rahway,	9	0	0	0
Elizabeth City,	Elizabeth,	28	18	7	3
Warren County,	Townsbury,	83	47	33	3
		2,116			

ASYLUMS.

INSTITUTION.	P. O. ADDRESS.	Total number of inmates.	Men.	Women.	Children—under fourteen.
State Asylum for the Insane,	Morristown,	904	462	441	1
New Jersey State Lunatic Asylum,	Trenton,	753	381	372	0
Institution for Feeble-Minded Women,	Vineland,	9	0	0	0
New Jersey Home for the Education and Care of Feeble-Minded Children,	Vineland,	31	9	5	11 males, 6 females.
Burlington County Insane Asylum,	Pemberton,	54	11	43	0
Camden County Insane Asylum,	Blackwood,	118	50	68	0
Cumberland County Insane Asylum,	Bridgeton,	12	5	7	0
Essex County Asylum for Insane,	Newark,	413	164	249	1
Gloucester County Insane Asylum,	Clarksboro,	5	5	0	0
Hudson County Lunatic Asylum,	Snake Hill, Jersey City,	258	102	156	0
Passaic County Insane Asylum,	Paterson,	49	17	32	0
Salem County Insane Asylum,	Woodstown,	46	23	19	4
		2,652			

PENAL INSTITUTIONS.

INSTITUTION.	P. O. ADDRESS	Total number of inmates.	Men.	Women.	Children—under fourteen.
New Jersey State Prison,	Trenton,	921	888	33	1
Atlantic County Jail,	Mays Landing,	8	7	1	1
Bergen County Jail,	Hackensack,	21	20	1	1
Burlington County Jail,	Mount Holly,	111	97	13	1
Camden County Jail,	Camden,	65	55	10	
Cape May County Jail,	Cape May C. H.,	6	5	1	
Cumberland County Jail,	Bridgeton,	19	17	2	
Essex County Jail,	Newark,	184	150	32	2
Gloucester County Jail,	Woodbury,	8	8		
Hudson County Jail,	Jersey City,	199	154	39	6
Hunterdon County Jail,	Flemington,	4	4		
Mercer County Jail,	Trenton,	59	54	5	
Middlesex County Jail,	New Brunswick,	44	39	5	
Monmouth County Jail,	Freehold,	25	22	3	
Morris County Jail,	Morristown,	15	13	2	
Ocean County Jail,	Toms River,	2	2		
Passaic County Jail,	Paterson,	72	55	10	
Salem County Jail,	Salem,	10	10		
Somerset County Jail,	Somerville,	12	12		
Sussex County Jail,	Newton,	2	2		
Union County Jail,	Elizabeth,	50	41	9	
Warren County Jail,	Belvidere,	26	25	1	
State Reform School,	Jamesburg,	135			135
Hudson County Penitentiary,	Snake Hill, Jersey City,	223	193	20	1
Essex County Penitentiary,	Caldwell,	189	183	6	
†Newark City Home,	Verona,	175			{ *148 boys. *27 girls.
State Industrial School for Girls,	Trenton,	46			14
		2,631			

* From nine to eighteen years of age.

† The Newark City Home is for truant and wayward children, and is an auxiliary to the public school system of the city.

The following is a list of the very small township almshouses, with locations:

- Essex county—Belleville township, Belleville.
- “ “ Bloomfield township, near Bloomfield.
- “ “ Millburn township, in western part of township.
- “ “ Montclair township, Montclair.
- “ “ South Orange, Vailsburg.
- Hunterdon county—Raritan township, Clover Hill.
- Mercer county—Hamilton township, Hamilton Square.
- “ “ Hopewell township, Hopewell.
- “ “ Princeton township, Princeton.
- Middlesex county—Piscataway township, Stelton.
- “ “ Woodbridge township, Menlo Park.
- Somerset county—Bridgewater township, Somerville.
- “ “ Hillsboro township, Neshanic.
- “ “ Franklin township, Middlebush.
- “ “ Montgomery township, near Harlingen.

We reckon the whole of almshouse relief in almshouses at 2,600 persons.

The almshouse list does not include outdoor relief from poor fund or voluntary help of hospitals, orphan asylums and private charities.

Besides the various private charities it is worthy of note that the Newark City Home, or Industrial School, at Verona, Essex county, and the Children's Home in Parsippany, Morris county, have semi-official relations, the one taking charge of truant or vagrant children of Newark and the other receiving from the almshouse of Morris county. We have included in our list the Home for Feeble-Minded Children in Vineland, for although it has private relations, it is chiefly sustained by inmates assigned to it by the State. The blind of the State are provided for at institutions in other States. The School for Deaf-Mutes is not included in our list, as it is a part of the educational system of the State and connected with the State Normal School. It averages about 130 inmates.

We have also on file a sanitary record as to the construction and sanitary arrangements of the State Normal School.

It is all important that the various institutions keep their books of sanitary record accessible, so that all concerned can readily see the facts as to construction, air-space, heating, ventilation, sewage disposal, etc.

The institutions not noted in the last Report are as follows:

- New Jersey State Normal School.
- Millburn township almshouse, Essex county.
- Montclair “ “ “ “
- Hamilton “ “ Mercer “
- Hopewell “ “ “ “
- Mercer county workhouse.
- Princeton township almshouse, Mercer county.
- Woodbridge “ “ Middlesex county.
- Passaic city “ “ Passaic “
- Franklin township “ “ Somerset “
- Hillsborough “ “ “ “
- Montgomery “ “ “ “

We add these brief statements as to them:

STATE NORMAL AND MODEL SCHOOLS.

Located at Trenton. (A full description of the rooms, &c., is given in the report of this institution. It is omitted here, but can be referred to at any time.) There are four buildings. The cellars are three feet below ground. There is a bakery in one of them, but others are unused. Waste fluids run to the sewer. Pipes are properly trapped. Wash-out closets are used. Water used is from the city supply. Heating is by steam. Ventilation is by windows and ventilators to the roof. The students number three hundred and thirty-seven. Vaccination only partially attended to. There are nineteen bath-tubs. No special regulations as to bathing. There are separate rooms for use in sickness. There are fire-escapes in the girls' dormitory. Disinfectants are kept and used when required.

MILLBURN TOWNSHIP ALMSHOUSE, ESSEX COUNTY.

Located 3 miles from Millburn. Consists of farm buildings and farm. Has 5 inmates, all old. Three of these have been in the institution for years, and two came within 4 years. Each inmate has a separate bed, and the females have separate rooms. There are two female inmates. Rooms heated by drum and stoves. Rooms small but comfortable. Water from well 75 feet deep. Closets emptied in spring. No inside closet arrangements. House-cleaning spring and fall. Inmates fed at separate table. Farm contains 80 acres, and partially supports the institution. Rooms for males large and comfortable. No special sickness during past year and no deaths. The rooms were well kept.

MONTCLAIR TOWNSHIP ALMSHOUSE, ESSEX COUNTY.

Situated at Montclair. Built 1870. Large wooden building. Number of inmates, twelve. Five females, six males and one infant. Each inmate has a separate room. Water is obtained from a well 60 feet in depth. Building heated by a furnace; no bath-tub; no hot-water arrangements. No inside closet; only one outside closet, which is used by both sexes. All eat in a

common kitchen, fed at a common table. The Superintendent died September 17th, of this year. Clothing changed when necessary; under-clothing changed each week. Sink-water runs by a drain into a valley near by; slop-water is emptied into the closet. The institution is well managed. No special sickness during the year. There should be separate closets for each sex, a separate sitting-room for the males and bathing facilities should be furnished.

HAMILTON TOWNSHIP ALMSHOUSE, MERCER COUNTY.

Has six inmates; three men, one woman and two children. There is room for 12 inmates by putting two in a room. The sanitary condition is good.

HOPEWELL TOWNSHIP ALMSHOUSE, MERCER COUNTY.

Located near Hopewell. Has but five inmates, three men, one woman, and a colored boy nine years of age. Fourteen can be accommodated. The examination as to sanitary condition was satisfactory.

MERCER COUNTY WORKHOUSE.

Situated near Moore's Station. Built during the past year. The grounds include 104 acres. Water is obtained from a driven-well 583 feet in depth; it is good but quite hard; a spring near the quarry is also used as a source of supply during work; the water is pumped to three tanks, which hold a two-days' supply; the supply is probably not sufficient for future needs. The buildings are of brick; they are owned by the county; no cellar under the wings; under main building it reaches two feet above ground and is dry; it is used for heating apparatus and storage. Drains lead to a cesspool far down the hill and the overflow enters into a small stream; pipes are six-inch terra cotta. Fall is ample. Each cell has a closet and washbowl; the closets are so arranged as to stand filled with water and are flushed out once each day if prisoners are at work. If they are in, the flushing is repeated at night. The arrangement is not satisfactory. The roof of the building is of slate. There are open ventilators in each

corridor, opening to the roof. Heating is by steam. Number of inmates, fifty-six—forty-eight males, eight females. Inmates are bathed on entering, and thereafter once each week. There is a separate hospital room on the second floor. Inmates are fed in the corridor. A regular diet list is followed. Each inmate has a new straw mattress on entering. Fire apparatus is provided. Disinfectants are kept for use in closets and sinks. Men are employed in the quarry and women in the laundry and sewing-room. Cells, seven feet six inches by five feet and seven-foot ceilings. Doors are two feet by six feet. No sickness.

The institution will need great watchfulness to keep it in good condition. The closet system is unsatisfactory, and an increased water-supply will soon be required.

PRINCETON TOWNSHIP ALMSHOUSE, MERCER COUNTY.

Located at Mount Lucas, one and one-half miles from Princeton. The main building is built of stone and the location is on an elevation. The soil is stony. The farm connected with the institution contains eighty acres. Water is obtained from a well thirty feet in depth. The cellar is dry and is used for kitchen and laundry purposes. Sink-water runs to a meadow well away from the house. No inside closets. No bathing facilities. Heating by stoves. Wood and iron bedsteads are used. There is an outside building with four rooms, which is used for inmates. It is one story, without cellar. Clothing is changed when necessary. There are four inmates—two males and two females. The Superintendent died recently. The institution is well managed and all portions were cleanly.

WOODBIDGE TOWNSHIP ALMSHOUSE, MIDDLESEX COUNTY.

Located one mile from Iselin. Consists of farm buildings and farm. Number of inmates, seven—two females. Inmates use separate kitchen and dining-room. There are four rooms available for each sex. Heating by stoves and open fire-place. Water from well thirty feet deep. Clothing changed frequently. No bathing facilities. Medical attendance from Woodbridge. Rooms

vary in size, but are mostly small. Farm nearly self-supporting. Several deaths last year of old people. No deaths this year and no special sickness. The institution was cleanly at the time of visit.

PASSAIC CITY ALMSHOUSE, PASSAIC COUNTY.

Situated two miles from Passaic City. It is a two-story brick building; built this past year; cost \$5,000. The farm contains 40 acres. The location is on high ground. Mr. Van Winkle is the Superintendent. There are seven inmates. Water-supply is from a well; water is pure. There is every facility for separation of the sexes. The city physician visits the institution three times a week. There are all the modern improvements as to bathing, etc. There has been no special sickness during the year.

FRANKLIN TOWNSHIP ALMSHOUSE, SOMERSET COUNTY.

Located one and one-half miles from Middlebush. Built over 60 years ago; Mr. Henry Vroom is Superintendent; consists of farm buildings and farm of 130 acres. The institution is self-supporting. There are nine males and two females as inmates. Stoves are used for heating and lamps for lighting. Sexes are separated. No bath-tubs, but soon hot and cold water and bath will be introduced. There is a wind-mill and a tank holding 2,000 gallons. In winter two meals are served a day. Underclothing changed every two weeks. Seven rooms are used by inmates, varying in size from 8x10 to 10x12. All use a common dining-room. The out-building is situated over the brook. No inside closets. House drain empties in brook. House-cleaning once a year; walls whitewashed. Tobacco is regularly furnished, and clothes when needed. No special sickness. The institution is well kept.

HILLSBOROUGH TOWNSHIP ALMSHOUSE, SOMERSET COUNTY.

Located near Neshanic on high, rolling ground. The farm contains 110 acres. The building is an old farm-house. The

well is 40 feet from the house, 20 feet deep; water good. Each inmate has separate room. There are ten rooms in all available. Kitchen drain leads to a brook. Building is heated by stoves. There are nine inmates, five of these are children. No bathing facilities. Inmates fed in a separate dining-room. No special sickness during the year. The farm about supports the institution. The different portions of the building were cleanly and well kept, but there is need for better methods of separating the sexes, and bathing facilities should be furnished.

MONTGOMERY TOWNSHIP ALMSHOUSE, SOMERSET COUNTY.

Located one and a half miles from Harlingen. Built sixty years ago. Consists of farm-house and farm of one hundred and eighteen acres. Last year a part was built for the inmates having four rooms for males and same number for females. Rooms are small, but well lighted. Water from well twenty-five feet deep; also use cistern water for drinking purposes in winter. Roof of tin. Heating by stoves. Rooms ventilated by windows only. Number of inmates, three. All males. Inmates work on farm, if able. No bathing facilities. No special sickness during the year and no deaths. The institution was cleanly throughout. There is need of better facilities for bathing. Aside from this the building is well arranged. A separate building is used for tramps, having wooden benches and heating arrangements only.

We thus furnish these details in regard to all these institutions falling under State or local official care. It should be added as to the county asylums that, with the exception of those large enough to command all the details of organized asylum care, it would be better if they were discontinued. Their sanitary condition is examined into at the time of our almshouse examinations, and reveal, in the smaller ones, such defects as must arise in so imperfect a system. There are eight in all, of which at least four, namely, those of Burlington, Cumberland, Gloucester and Salem are of this character.

It can be said of our penal and charitable institutions in general that the last ten years witnesses great improvements in sanitary conditions as well as in other respects. The new jails

for Atlantic and Sussex counties are well worthy of attention. A new jail at Cape May C. H. is arranged for. There is large room for improvement, especially in Burlington, Camden, Hudson and Warren counties. Experience shows that as to all institutions thorough sanitary administration is most important for success as well as for cleanliness, and that continuous vigilance and skilled oversight are indispensable.

Circulars and Laws.

We add to our former circulars, Circular 81, relating to various matters for the guidance of Health Boards, and Circular 82 as to Hospitals and Hospital Plans. Copies of these will be sent on request, and all local Health Boards should append them to the Book of Circulars already furnished. We also print in full the more important health laws passed by the last Legislature, which should be appended to Circular 60. We print, as valuable for reference, the new national quarantine law, which so greatly concerns the State in its relation to the transportation of emigrants. All these circulars and laws should be familiar to the Local Boards and to the various health officers and inspectors of these Boards.

We add a circular letter marked "H," which was sent to railroad companies for 1892-'93. The following slips were also printed, with special reference to cholera.

CIRCULAR 81.

NEW JERSEY STATE BOARD OF HEALTH.

(Occasional Bulletin No. 2.)

LOCAL HEALTH BOARDS AND INSPECTORS.

Great and important are the powers given to these Boards. Often their action decides whether one case of communicable disease shall be followed by another, or by an epidemic. The failure of one man at a block signal is often no more serious in its consequences than is the failure of a Health Board or Health Inspector to block off disease.

PRESENT PROSPECTS—CHOLERA, TYPHUS FEVER, SMALL-POX,
DIPHTHERIA.

Cholera and Typhus Fever are at present threatening. Diphtheria, Scarlatina and Small-pox are not infrequent. It is a time for faithful diligence and special work. Let all governing bodies make proper financial provision, and then Health Boards see to it there is wise use of public funds.

Do not be negligent on the suggestion that Cholera may not come. Remember the words of our highest living authority, Sir John Simon, of England:

“It is important for the public very distinctly to remember that pains taken and cost incurred for the purposes of preventing cholera cannot in any event be regarded as wasted. The local conditions which would enable cholera, if imported, to spread its infections in this country, are conditions which, day by day, in the absence of cholera, create and spread other diseases; diseases which, as being never absent from the country, are, in the long run, far more destructive than cholera; and the sanitary improvements which would justify a sense of security against any apprehended importation of cholera would, to their extent, though cholera should never re-appear, give ample remunerative results in the prevention of those other diseases. * * * The peril and the wrong of neglect is therefore not to be reduced by any consideration of a possible, although highly improbable, exemption.”

Send for Circular 45 and Annex on Cholera, and Circulars 39, 44, 77.

We claim that in our State laws, in our Reports, our Circulars, our Guide Books, there is full information for each Board, and that negligence or lack of knowledge is inexcusable.

Let there be thorough inspection work this Spring. Remove all refuse that may become harmful. Perfect plans for dealing with first cases.

Deaths from preventable diseases are on the increase, and our Boards must do more radical and continuous work.

HOW TO PREVENT EPIDEMICS.

The only protection against epidemics is to place your city or district on a perfect sanitary basis, and keep it there. In diseases which probably have micro-organisms as their cause, we must guard against their entrance.

This is not all, nor is such prevention always possible. If it is not, we may still prevent seizure. We must look after *persons* and *places*.

All persons are not equally susceptible. Of those that are susceptible, we know that by securing cleanliness of person and of clothes, and enforcing personal cleanliness, we are always limiting disease. So we inspect and compel cleanliness as much to keep persons clean, as we do to detect or neutralize any one particular *contagium* or particle.

All places are not equally susceptible. This is true as to houses, as to rooms, as to their contents, as to soil and all surroundings.

It is so especially true as to houses, that our only safety is understanding and applying the best rules and habits as to general cleanliness, in order to avoid invasion or too much additional labor when some very specific *infection* has manifested itself. It is so especially true of the ground under and around dwellings that localities sometimes become so saturated with filth and with the materials of disease that our only defence is to get away until cleaning of the surface, drainage, air, sunlight, and a lowering of the level of the ground-water in it give the ground its necessary healthy space between the surface and the proper water-level down in the ground, and thus secures its purity. This, of course, includes the removal of such pockets or holes in the ground as cesspools or privy vaults, or such cementing, emptying or keeping of them as will permit those ordinary changes by which nature, up to a certain degree will take care of harmful particles and gases and dispose of them.

It is now known that many epidemics arise out of the ground; so much so that it is in evidence that the causes of many diseases cling to it, so that those nearest the ground contract them, while those who are in upper rooms or who are not brought so closely in contact with the ground, are not so liable to get the disease.

A Health Board, always on duty, with vigilance in preventing wrong conditions of persons and places, such as invite disease, is the best safeguard for the health of the people.

SUGGESTIONS TO HEALTH INSPECTORS.

(a) Do not call at a house, spend a few minutes and make return of that as an inspection. It should be returned as "A Sanitary Call" or "Sickness Inquiry."

An inspection is a definite thing and means a thorough sanitary survey of house and premises.

The man who returns a sanitary inspection as made and cannot answer, as to the premises inspected, most of the questions in section first of Inspectors' Guide, pages 11-13, has not really made an inspection.

If he has inspected a room fully, state that.

(b) Inspection is worth but little that does not have a record.

In all well-managed Health Boards one can go to the Health Office and find a record of the inspection in detail.

Here is a notice which regularly appears in one of our shore journals. Examination at the Health Office shows that you can there find the real sanitary condition of dwellings:

"SANITARY INFORMATION.—We offer to furnish free to any physician in the United States, upon written request, definite information concerning the sanitary conditions in the borough, and upon any specified premises.

"Application should be made to the clerk of the Board of Health, Park Hall."

An inspection which does not state what was done, or ordered to be done, and afterward, with date, state what was done, is imperfect.

Health Boards must cease slipshod methods, if they have them. There is no service in which method and accuracy are more important.

INSPECTION OF PUBLIC CONVENIENCES.

There is full evidence that some diseases, such as enteric or typhoid fever, cholera, etc., are especially spread by public closets or places of frequent and general resort.

The Health Inspector should each year, and oftener if epidemics threaten, inspect and put on file at Health Office a description of the public closet of each railroad station, court-house, school-house or other public assembly place, stating all defects, and be sure to see that they are remedied by the proper authorities or by the Board. This is very important in the interests of public health.

INSPECTION OF WATER-HOLDERS AND SUPPLIES IN PUBLIC PLACES.

The tanks, water-holders and source of water-supply of railroad stations and other public assembly places need also careful inquiry. Sometimes the water comes from an improper source, at other times it is stale or polluted by the vessel which contains it, or lead or other pipe gives it metallic particles.

This, too, must come under the care of Health Boards.

DISINFECTION.

It is too common, after a room or house has been cleared of the sick person, for an inspector to go and fumigate the house with sulphur, and then it is said that the house has been *thoroughly* disinfected.

Never call that, alone, disinfection.

What was done with all apparel and bed-clothing that the patient had in use? What opening and airing of all closets has there been? What scrubbing of floors, walls and furniture? What use of whitewash or chloride of lime or of slacked lime about the premises?

State the disinfectant used, and let it never be some patent powder or wash. State how much was used. Often the walls may still need to be gone over with a paint or whitewash brush wet with corrosive sublimate (2 drams to a gallon of water), and the floor and woodwork to be wiped with the same.

Rely most on air, sunlight, washing, scrubbing, hot air and steam.

"In order to prevent accident from corrosive sublimate, the following is a good admixture:

"Dissolve half an ounce of corrosive sublimate and five grains of commercial aniline blue in three gallons of water, and add thereto one fluid ounce of hydrochloric acid. Preserve in earthenware jars or wooden tubs."

For disinfecting by steam where there is no public disinfector:

"Take a cask, with one end perforated and the other knocked out. Place the clothing inside on a kind of frame-work fastened near the perforated end of the barrel. Then set the barrel over a large vessel of boiling water, and prevent the escape of steam around the base by wrapping cloths around it."

LOCAL CAUSES OF DISEASE.

However important it may be to prevent the arrival of the contagium of any disease, facts more and more prove that epidemics for their extent and virulence depend mostly on local causes. There are localities and individuals that by their conditions almost seem to stand asking to be infected. It is a partnership of causes that gives terror to most diseases.

Watch strangers and baggage, use quarantine, and in every way prevent invasion. Give advice to persons and watch the most careless and abject of the people.

But most of all, inspect houses, yards, alleys, streets, and clean up *in advance*. This is the most hopeful method of preventing disease.

Perfect your garbage and surface cleaning service. In cities and villages *refuse* soon becomes ground filth or air filth and breeds disease.

AS TO SMALL-POX.

The first question with many is what to do with the patient.

It should be, Who has been exposed? in order that in less than six hours every such one may be vaccinated.

The next point is to vaccinate all in the same house or who are likely to be exposed, and to urge general vaccination.

The question of removal of patient is always a relative one, to be decided by the Health Inspector or Health Board.

We were called to the first case in a large town in the middle business-block of a city. There was a restaurant in the basement. The post office was on the first floor. A family with children unvaccinated occupied the second floor. The patient was on the third floor and very sick. The Health Board had secured a place for removal. After consulting with the city physician, we ordered all persons vaccinated; sent a messenger, within one hour, to New York City for lymph, and directed that the patient be not removed. We gave notice next morning in the papers that there had been no exposure of any person who had not been vaccinated, and that there was no likelihood of other cases. The people believed us, and business was but little disturbed. In six weeks the patient recovered and was allowed to return to his home in another city. No other case occurred.

If circumstances had been different, it might have been necessary to remove the patient.

Small-pox is the one disease for which we always have a prevention.

Even if now and then a case occurs it ought never to spread, because vaccination is a sure method of stamping out the disease in the start.

Every city should own a plot of ground on which it can at any time place a tent or one-story hospital. On it should be a small house, for a single case or for administration purposes.

A case of small-pox ought to be as much of a curiosity as leprosy, for it is the one disease which we can almost completely prevent.

VACCINATION.

There are no new facts as to vaccination. If all children were properly vaccinated, say in the first year of life, and then again at about twelve years of age, not one person in ten thousand would have either small-pox or varioloid.

We now have bovine lymph, which can be had fresh and pure, and no case of any disease being transmitted by it has ever been shown.

Health Boards, physicians, school trustees, parents and teachers should see to it that all are vaccinated.

The enumerators of the school census now take account of the unvaccinated children of school age in every school district and in every city.

So the Board of Health should find out once a year, or oftener, who have been vaccinated and notify as to the neglect.

Provision should also be made to vaccinate all as provided for in Laws of 1887, Chap. 68, Sections 22 and 23.

MEASLES.

The bacillus of measles is again announced from Berlin, but is much in doubt.

At a recent meeting of the Epidemiological Society in London, Dr. Whitelegge spoke of Measles as follows:

“The type of the disease rarely changed during an epidemic and higher mortalities were mostly due to the state of the weather, the supervention of pneumonia or the co-existence of other specific diseases. The keynote of the epidemiology of measles was its *stability* of type, as instability was characteristic of diphtheria; and this might serve to explain the little variation in its clinical characters, its little tendency to live out of the body or in artificial culture fluids, in water, milk, &c., and the want of success attending all attempts to communicate the disease to the lower animals.”

SCARLATINA.

Most authorities prefer this name to Scarlet Fever. It is not a fever any more than Measles or Diphtheria, and should have a name not indicating a theory or the degree of severity.

We have no new facts as to it.

To prevent contagion it is urged that inunction with some essential oils or fats should begin early, as good for the disease and as protecting others from the falling cuticle. Thus the patient, so far as the outer body is concerned, is kept disinfected.

DIPHTHERIA.

We cannot urge too strongly careful attention to Circular 77 on this disease. All the more because it is on the increase.

Facts still more recent confirm the view that is favored by surface and upper soil-filth with dampness; that it seldom, if ever, attacks a perfectly healthy mouth and throat, and that it is local before it is constitutional.

Early treatment, isolation and disinfection are most important. A clean mouth is a great protection.

Besides special *local treatment*, the use of some spray, such as the Albolene spray, medicated, is of service and good also to prevent contagion. We use the following in McKesson & Robbins' small atomizer as a vaporizing mixture:

Albolene,	1 ounce.
Menthol,	} aa 1 grain.
Eucalyptol,	

We think the physician should inquire as to the throat conditions of the rest of the family before seeing his patient. We urge the closest attention to all details, not only for the welfare of the patient, but to save others from attack.

PERSONAL PROTECTION IN A SICK ROOM.

This divides itself into two kinds, first, that you may not take a disease yourself; second, that you may not convey it to others. To avoid either, strict personal cleanliness as to body and clothing is the first requisite.

Next, avoid sitting down in the room, and wash the hands if brought in contact with person or clothing.

My preceptor, in Small-pox, for instance, objected to putting on or off any clothing. Turning up the collar of his coat and removing no handkerchief or other article while in the room, he attended carefully to his patient. If wearing a hat into the room he kept it on; if not, he left it outside and did not replace it until in the open air. He believed in short hair on the head

and no hair about the face. He washed the hands on leaving the room and did not go to another patient until he had spent five minutes in the open air.

In very foul rooms the shoes might convey contagion. A paper bag fastened on each foot by a rubber band, and left in the room for destruction will obviate this risk.

It is well to have eaten not very long before any serious exposure.

A medical friend just now has Typhus Fever, probably because he examined a case in a cell before his breakfast.

Always have a clean mouth and a clean breath, with the use of the tooth-brush and rinsing with warm water or a disinfectant will generally secure even when we are not in perfect health.

Breathe through the nose and not through the mouth.

We mention precautions which would be excessive in many cases, but in severe cases or in times of fearful epidemic it is well to think of details and be on the safe side.

SPUTUM OR SPITTLE CONTAGIOUS.

It is claimed that the following diseases are chiefly conveyed by sputa or spittle from the mouth :

Pertussis (Whooping Cough),
Pneumonia,
Tuberculosis,
Diphtheria
Parotitis (Mumps).

In some eruptive diseases, as Scarlatina, the mouth secretions are also sources of contagion.

All spitting as a habit should be discouraged. Even common sore throats are believed by many to be communicable in this way. At the best the habit is not a cleanly one. But in the diseases named the secretions from the mouth and from the nose are to be regarded as unsafe. They are to be received so as to be easily removed to fire or covered with boiling water, or a disinfectant. As water in a cup or bowl is liable to be spilled and a cover to become soiled, we have found most convenient a flat-bottomed open bowl, size of the usual finger bowl, but not so

high; about two and one-half inches in depth. Then place in it a folded paper so as to come up a little around its sides and remove it for burning as needed. If it cannot be frequently removed, add to it from time to time a teaspoonful of chloride of lime, but never retain it for over twelve hours or suffer it to become dry.

There are also pasteboard spit cups to be had, but we have found the former, a pair of which can be procured at china stores, entirely satisfactory.

INTESTINAL CONTAGIONS.

Enteric or Typhoid Fever, Dysentery, Cholera and probably some other forms of bowel flux need to be disinfected. For this purpose common fresh lime, chloride of lime, carbolic acid and other disinfectants (see Circulars), are available. The disinfectant should always stand with the material for a few minutes before being emptied.

SPECIFIC DISEASES, ETC.

It is more and more apparent that many diseases, once considered dependent on a general cause, must be regarded as specific in their character. Thus under the general name of diarrhoea we have associated many different forms of intestinal flux.

The researches of Dr. Ballard in England seem plainly to show an outbreak of diarrhoea as of a specific character. There is much reason to believe that this is always true of cholera infantum as it occurs in the United States and which, as yet, has not its parallel in England, or in some hot countries.

"One of the notable monographs of the year (1892), was that on Amœbic Dysentery, by Drs. Councilman and Lafleur, of the Johns Hopkins Hospital, Baltimore—a paper conclusive in its results as to the etiological connection between these protozoic organisms and dysentery, and as important in its way as the demonstration of the plasmodium malarie of Professor Laveran." See *London Lancet*, December 31, 1892.

See in full Circulars 44, 45 and 77, as to communicable diseases.

SCHOOLS AS RELATED TO CONTAGIOUS DISEASES.

There can be no doubt that diseases are sometimes spread by children as brought together in schools. It is sometimes hard to decide whether to suspend a school because one or more pupils have, while at school, been taken with a contagious disease. If the children come from separated homes the disease is not so apt to spread if the school is suspended. If they come from one village, or from one ward of a city, it is claimed by some that with nothing to do they play together in the streets and are as much or more exposed than they would be in orderly attendance at school. It is a matter which in each case must be decided by the facts in evidence. If it is small-pox and every teacher and child could be vaccinated the first two or three days, it would generally be better for the school to go on. If it were scarlatina, to which several have been exposed and which often has a very short time of catching, or incubation, it would often be better to suspend. (See in full, Circular 76 of this Board.)

Teachers should be informed of cases of contagious disease in families and should have authority from boards of education or trustees to stop the attendance of children from such families unless they have a physician's certificate.

NOTIFICATION OF INFECTIOUS DISEASES.

Experience is more and more the necessity of notification of contagious or infectious diseases, especially in cities, towns and villages. Before 1890 the English Permissive Act showed such good effects in fifty-six sanitary districts, that a new act was adopted and its benefits are now extended to over four-fifths of the total population of England and Wales. Its effects are the early suppression of local outbreaks of disease, the prompt detection of insanitary conditions and the earlier provision of adequate hospital accommodation.

Our own statistics, as, for instance, those of Michigan, show the value of such a method of limiting disease. If almost every case of contagious disease is owing to a previous case, it follows that if you prevent exposure to the previous case you prevent the

extension of the disease. This means the isolation of cases from the public, from schools, and, so far as possible, from others of the same house or family.

It is found that this cannot be done on a system, unless some one board or officer is informed of the fact. Our State law on this point is most reasonable and proper. Chap. 68, Laws of 1887, Section 26. (See, also, Circular 60.)

In accord with this a Health Board generally passes an ordinance, stating what diseases shall thus be notified. A copy of the ordinance, with reference to the law, is then sent to each physician, and at the end of six months payment is duly made as the law requires.

While it is the duty, under general police regulation, for reports of marriages, births and deaths as special social happenings, to be returned without pay, the notification of sickness falls into the line of general business, and as such the physician must be paid for his service in notifying. Our cities that have followed the law long enough have succeeded well. Our complaints have come chiefly from Health Boards which overlook the terms of the law.

When a report of a case is returned it is often the duty of the Health Inspector first to see the physician and ask of him what needs to be done in regard to the patient, such as disinfection, removal, etc. He should carefully inform himself as to condition of premises and surrounding, and remedy any existing evils. Generally the teacher of the school at which the child, or anyone from the building, attends should be informed.

Our law looks upon the notification thus far as not of a public nature. Whether further notice of any kind is to be given depends on the case, on the disease, and on various items which must be left to the judgment of the Health Board.

Where a system is fully carried out with prudence and with good faith, and where physicians and Health Boards co-operate, families and schools gladly aid, and what would otherwise be an epidemic is limited to one or a few cases.

WATER-SUPPLY.

It is wise for a Board of Health, in the spring of each year, to examine as to its water-supply.

The Board should have a record, by name, of each house or family that depends on a cistern, of each one that depends on a well or spring, and of each one that depends on a public water-supply.

The cistern should be examined to see if it is properly constructed and cleaned.

The depth of each well should be known. If not over twenty feet, it depends directly on surface supply. Even if deeper it may be affected by soil filth.

Where there is a public water-supply, the water in the river just at the intake, the water in the reservoir or stand-pipe and the water of a faucet, in the foulest part of the city or near dead-ends, should be compared. (See Circular 53, on Drinking Water.)

Some capable inspector should visit the river on each side, for ten or fifteen miles above the intake, and be able to show on a map every cesspool or outhouse, every cow-yard, or foul spot or any other nuisance within fifty yards of its banks.

Owners should be shown the evil, and, if need be, the Board of Health of the district, or the State Board, informed.

Such sanitary patrol is of great advantage in securing the purity of drinking water.

It often not only corrects present nuisances, but prevents others.

Where water is suspected it should be boiled until its purity can be secured. In times of epidemic, *boiled drinks* are the only substitutes for suspected water-supply.

A pure water-supply and a pure milk-supply are most essential in order to prevent or check communicable disease or bowel disorders.

“The most valuable of philanthropies is that which is preventive.”

SPONTANEOUS POLLUTION OF WATER IN STORAGE RESERVOIRS.

Those who have noted the experiments of Dr. Farrow, of Harvard (see Mass. Health Reports), and the paper by Mr. Ruffner in our Fourteenth Report, and notes by the Secretary in former reports, will be interested in this brief account of a paper by Dr. Garrett, of London, December 21st, 1892:

“Dr. Garrett then read a paper on the ‘Spontaneous Pollution of Water originally Pure in Storage Reservoirs.’ The water-supply of Cheltenham was, he said, drawn from two sources: the river Chelt, and from openings in the oolite of the Cotteswold hills. The latter was moderately hard (12° — 16°), but of extraordinary purity, yielding only 0.04 per million of albuminoid ammonia and absorbing no more oxygen than ordinary distilled water. *One of the reservoirs was covered and the other two were open.* Complaints having been made that the town water had a ‘fishy taste’ suspicion fell on the Chelt as the less pure, but it was soon ascertained that the fault lay with the open reservoirs on Hewlett’s Hill and that the cause was the growth of Chara, which was not found in the covered reservoir, since like all plants forming chlorophyll it need light. Dr. Garrett exhibited specimens of the Chara. It grew luxuriantly in the early summer, but in autumn broke up to a great extent, rendering the water turbid with its disintegrated and decomposing tissues, which swarmed with organisms of every kind and emitted odors, *æcal* and other. Dr. Farrow, of Harvard, had referred these odors to *Lynglya Beggiatoa* and *Nostoe* respectively, and Dr. Adams, of Bolton, ascribed the stale-fish smell to *Converva Combycina*; but this last was not found at Cheltenham, where the *Lynglya* abounded. The Chara softened the water remarkably. Peaty waters containing vegetable matter were acid, but this was slightly alkaline. Attempts to exterminate the plants were unsuccessful, and Dr. Garrett had advised the use of the covered reservoir only, and that when it was necessary to have recourse to the others, that the water should not be allowed to remain in them any length of time.”

MICRO-ORGANISMS AND IMMUNITY.

Dr. W. R. Smith in the preliminary report on the “Differentiation and Identification of micro-organisms found in water-supplies” (Med. Off. Report 1887) 17th Report. “Did not detect in the water supplied by two of the London Water Companies any disease-producing organism, but colonies of microphytes of multifarious character such as the *Bacillus fluorescens*, *liquescens*, *Sto-*

plycoccus flavus liquescens bacillus erythrosporus and others whose identity with known organisms was not established. But whatever method he adopted the information afforded is at present of very limited value, for (1) All the organism introduced into the culture medium may not be capable of propagation in the latter. (2) Each colony may possibly be the product of one or more individual organisms, but this is not likely. (3) Accidental contamination of a water after collection may readily occur. See *Hygiene and Public Health*, vol. 1st, Stevenson & Murphy; article, Water. G. T. Stevenson, M.D., London, F. R. C. P. Lecture on Chemistry, Guy's Hospital. Official analyst to the Home Office; page, 298.

Bacteriological Examination.—"Many, if not most waters contain Bacteria, and there are several methods used for the Bacteria examination of water. These methods have not, however, come into general use, because no means are known which enable the microscopist and analyst to discriminate between pathogenic, zymogenic and presumably inert bacterium by mere inspection. The Bacteria of unwholesome water liquefy whatever cultivates media more readily than those from wholesome waters; but this summary embraces most that is known of the subject of the significance of Bacteria in drinking water. Some chemists attach importance to the number of colonies of organisms which may be developed in a cultivation and by inoculation with the water, but it cannot be said that it is definitely known that there is any definite relation between the number of organisms and the unwholeness of the water."—See cit., p. 296.

Sternberg recently found as follows as to the spirilla of Cholera: "The spirilla lived in unsterilized milk only twenty-four hours; in sterilized, they were living at the end of nine days. This was because the antagonistic bacteria in sterilized milk had been killed."

IMMUNITY FROM DISEASE.

There have been many doctrines as to why some persons escape when exposed to a contagious disease. It is well known that a second attack of some diseases, such as small-pox, scarlet fever, measles, etc., is very rare. Other diseases like malaria seem to

recur all the more because of a previous attack. Some even claim this as to diphtheria. Dr. Watson and others have held that where a disease has once been had and does not recur, it is owing to the fact that it has exhausted the pabulum of the disease in that system. Others hold that a particular impression has been made upon cells. These are but mere hypotheses.

Of late the doctrine of immunity and its causes has taken a more definite form. A recent writer says: "In bacteriology the question which is at present most engaging attention is the difficult, but highly important, one of the nature of the changes which produce immunity from the results of microbic viruses. Of the fact of such immunity—whether spontaneous or acquired—there is no dispute. It is one of the proven facts of science. But opinion is sharply divided as to the manner in which it is brought about—a division well shown in the interesting debate at the Pathological Society, of London, in the spring. A great deal turns upon the topic of phagocytosis, upon which Professor Metchnikoff has thrown so much light; but whether this remarkable process, quite as much physiological as pathological, is solely, if indeed mainly, concerned in the production of immunity from infective diseases, or whether it is in this respect supplemented or supplanted by the chemical action of the fluids of the body, are indeed moot points."

The discovery of Metchnikoff, of Paris, was that the white or colorless corpuscles, amœboid cells or leucocytes, as they are variously called, inclose, digest and destroy bacteria, thus becoming phagocytes. This, therefore, is often called the phagocyte doctrine.

Another view is that the prophylactic or destructive substance resides in the animal tissue juices. This theory is that the "immunity depends upon substances formed by the metabolism of the animal, rather than that of the microbe, and which are able to destroy either the microbe against which immunity is possessed, or the products upon which pathogenic action depends."

Prof. Haukin, of Cambridge, was among the first to present this view, and it is sometimes called by his name. It is also spoken of as the blood serum doctrine or the doctrine of defensive proteids, the view being that there is in the serum a ferment-like proteid which secures this protection. "This defensive pro-

teid is spoken of as of two kinds, namely, one that occurs naturally in a normal animal, and another only found in an animal artificially made immune and which, so far as known, only acts on one kind of microbe or its products."

To this latter belongs the Pasteur method of preventive inoculation or vaccination by attenuated virus in which, another animal having been inoculated, its blood serum is introduced into the person sought to be protected.

"All agree as to the importance of the study of the toxenes produced by bacterial life as the chief thing in the production of the phenomena of infective diseases. No one can doubt that it is not so much in its biological aspect as in its chemical, that the future development of the theory of transmissible diseases will be made." (See *London Lancet*, Dec. 31st, 1892.)

Professor Burdon Sanderson, in his lectures on the Origin and Nature of Infectious Diseases, says the dictum commonly attributed to Weigert, "no suppuration without bacteria," cannot now be accepted. So far from this Professor Sanderson shows "the proximate cause of inflammation is always chemical."

It is important to bear in mind that the word "attenuation" relates to a variable quality of the *virus*. The word "immunity" to a variable quality of the infected organism.

If we can give to the organism diminished susceptibility, or if the individual has it by some such process as that of phagocytosis, or by defensive proteids, that is immunity.

When we deprive the microphyte of some of its virulence, that is called attenuation. In 1880 Pasteur not only discovered artificial means for mitigating the virulence of the *virus*, but that the mitigated or attenuated *virus* could, by being inoculated into animals, render them immune to that particular microphytic disease. (See Sanderson, lecture third.)

"This illustrates what was known before, that virulence is one of the most variable attributes of a microphyte."

We have also come to know that "it is the one which is most affected by its environment."

SODA FOUNTAINS.

From experiments of the *Lancet* Special Analytical Commission on Mineral-Water Machinery and Metallic Contamination

(Dec. 31st, 1892), it would seem that ordinary water containing an excess of carbonic acid gas is capable of taking into solution distinct quantities of lead, copper and zinc, but not tin. The mineral acids produce similar action. In soda-water fountains traces of copper are often found. Copper lined with tin has been used with success, but it is difficult to insure perfect holders thus made. This is a most important matter, as the examination of soda-water fountains in Brooklyn and other places has shown. Soda-water machinery has much improved, but it is very important that the water used should be pure, and that it shall not become contaminated by injurious metals or any organic matter. Close attention needs also to be given to the various syrups and flavors used, many of which are unwholesome.

MILK-SUPPLY.

As milk is much used as a drink and in other forms, its purity should be secured.

All the more because it so readily takes up particles of contagion.

It is known to do this as to typhoid fever, cholera, scarlatina, etc., and is believed to do it as to other diseases.

Most of our cities should enforce the law of Chapter 74, 1882.

INSPECTION OF DAIRIES.

A recent English act (1890) "empowers the sanitary authority, through their medical officer, to enter and inspect dairies suspected of having been centers of infection, to demand lists of the customers, and with, if he desired, the assistance of a veterinary surgeon to examine and report on the health of the cows, not only in his own district, but, if the dairy farm were beyond its boundaries, to do the same in any part of the kingdom, having obtained an order from a magistrate of the county in which the farm is situated."

Our laws give similar authority, which should be exercised by city and township Boards in their own districts. Chapter 207, Laws of 1893.

FLOOR BEAM CEILINGS AND WHITEWASHED SIDE WALLS

vs.

HARD-FINISHED, PAINTED OR PAPERED CEILINGS, AND PAINTED OR PAPERED SIDE WALLS.

It cannot be denied that the former have some advantages for health over the latter.

The beams and the side of the floor which formed the ceiling could easily be brushed, washed or painted. Now, between the upper floor and the plaster ceiling there is a closed space into which dampness or liquids from the upper floor can go, as also any amount of house dust between the cracks, crevices and joinings of the upper floor. It is sometimes this which gives to almshouses, tenement-houses and others a peculiar odor which no general house cleansing removes.

Now, that parts of floors are often taken up for putting in gas or oil pipes, this filth is all the more likely to get through the house.

It is well known that fevers and other contagions have from time to time broken out after the removal of shanties or old buildings without cellars that have stood for long on ground thus polluted. So the space between the first floor and the ceiling can also become a risk. The remedy is to have floors so joined and oiled that no dust or liquid can enter. Where, as in old almshouses, we have found those conditions, the only relief has been to destroy and rebuild.

WALLS.

A healthy house or room needs to have at its sides or for its ceiling a porous inclosure. The value of bricks and of mortar or plaster walls is chiefly in the fact that they admit of the interchange of air without draft. The occasional coat of whitewash does not interfere with this, and in other respects aids in cleanliness. Paper and paint and varnish interfere much with this interchange of air. Experiments which show the contrast always surprise those who have regarded the difference as inconsiderable. It is still worse where old paper has been left and sizing or paste

used, which in itself is objectionable. More heed needs to be given to this evil, and it must be compensated for by proper cleansing of walls before papering, by choice of not too heavy papers, and by additional ventilation.

The danger from arsenic in papers is often shown, but this more rarely. The use of proper papering is compatible with health if only these facts are regarded, although wainscoting and whitewashed walls are better for assembly rooms, institutions and crowded living rooms.

ANIMAL EDUCATION.

The first duty that a parent owes to a child is to make him a good animal—a good animal in order that he may be the better fitted to have good mentality and true morality.

This simply means that the parent should help him to such health as is favorable to useful industry, to the acquirement of knowledge and to that character which health and industry are likely to promote.

The teacher must educate in all these directions. It is no more natural to have the best health and the best habits to promote health without training than it is to have the best knowledge and the best character without training.

Thus hygiene is not an incidental or supplementary part of instruction, but fundamental, radical, essential.

1893. Copies of this and other circulars may be had by postal addressed,

E. M. HUNT, *Secretary*,
Trenton, N. J.

CIRCULAR 82.

NEW JERSEY STATE BOARD OF HEALTH.

HEALTH BOARD HOSPITALS—ISOLATION OF COMMUNICABLE DISEASES.

Every town or city of any considerable size should have its distinct or isolation hospital for the separation and treatment of

cases of contagious disease. One can not know the time when, by the prompt removal of a case from the street, from a railroad station, from a tenement house, or from a more separate home, a whole neighborhood may be saved from infection. To fail to limit or prevent a contagious disease when with reasonable effort and expense it could have been controlled, is among the most wasteful of expenditures, as well as inhuman. What should be known as the Health Board Hospital should be a part of the sanitary guard of every town. It may vary in cost from \$100 to \$5,000, according to the needs and to the amount of population.

First of all, there is great advantage in the ownership of a lot or locality before any question of sudden need arises. It prevents contention, opposition and delay, and does much to discourage that sentimental objection which is so often urged when a lot is chosen in an emergency. While it is true that a hospital, like a blacksmith shop, or cemetery, or station house, may not increase the value of surrounding property, with modern methods of management, the menace to health is less than that of most crowded and uncleanly portions of a city. If objections are made, they are rarely on real sanitary grounds.

With the single possible exception of small-pox hospitals, it is shown that hospitals for contagious diseases do not involve any increased risk to contiguous population. Even this apparent exception seems to be chiefly shown in London, where fog and smoke are complicating conditions, and is shown only as to a disease which is strictly preventable.

The sanitarian can safely assert that the contiguity of a Health Board Hospital is not a menace to the health of the adjacent population. It is only when by sudden purchase and occupancy, and consequent carelessness as to details, the cry of pest-house is raised. That impression and the talk of the many supplants knowledge and that deliberate preparation which is protective.

We shall not give details as to the character of the lot, which are the same as apply to all healthy localities.

In general it is accepted as a rule that the size of the lot should be such as to leave a space of 40 feet on all sides between the wards and surrounding premises. A tight fence 6½ feet in height is the usual inclosure in order to protect the

wards and grounds from undue observation. Besides proper drainage there should be such croppage or other care of the ground as will recognize that not only buildings but the inclosed grounds are to be kept in the best sanitary condition.

Suppose the case of a small town that as a rule needs but little hospital occupancy. We advise that, first of all, the purchase deed be such as will properly guard against the disposal of the chosen spot for any other purpose, under the pressure of future changes, unless with well-fortified precautions and the previous procurement of another spot. The title should be vested in the city; the control vested with the Local Board of Health, and its consent required to any changes. Questions as to the water-supply and the disposal of sewage should be early and definitely settled on a plan, and so much as may be needed supplied as soon as any building is erected. There may need to be careful and deep drainage of some part of the grounds. The Medical Health Officer should have entire authority in all matters relating to sanitary and medical care.

Where funds are not obtainable the simplest form of building is a shed with thorough roof of best approved construction, well and thoroughly built so as to admit of extension and of inclosure by canvas or panel sides which can be placed or replaced at pleasure. In most climates there should be a chimney at one end so that a stove can be readily put up, also a movable partition for kitchen or nurse bed-rooms.

We could cite cases where the having of only such a place has fully paid when it has happened that it has only been occupied once or twice during a year by a single case or two, which could thus be isolated at the very start, and so all anxiety as well as all extension of the disease avoided.

As presenting the idea of such a structure, and as also presenting at the same time what is feasible on a far more extended scale after the same method, we give with slight modification the plan of a cantonal hospital at Geneva, which was shown as a model at a session of the International Hygiene Congress there.

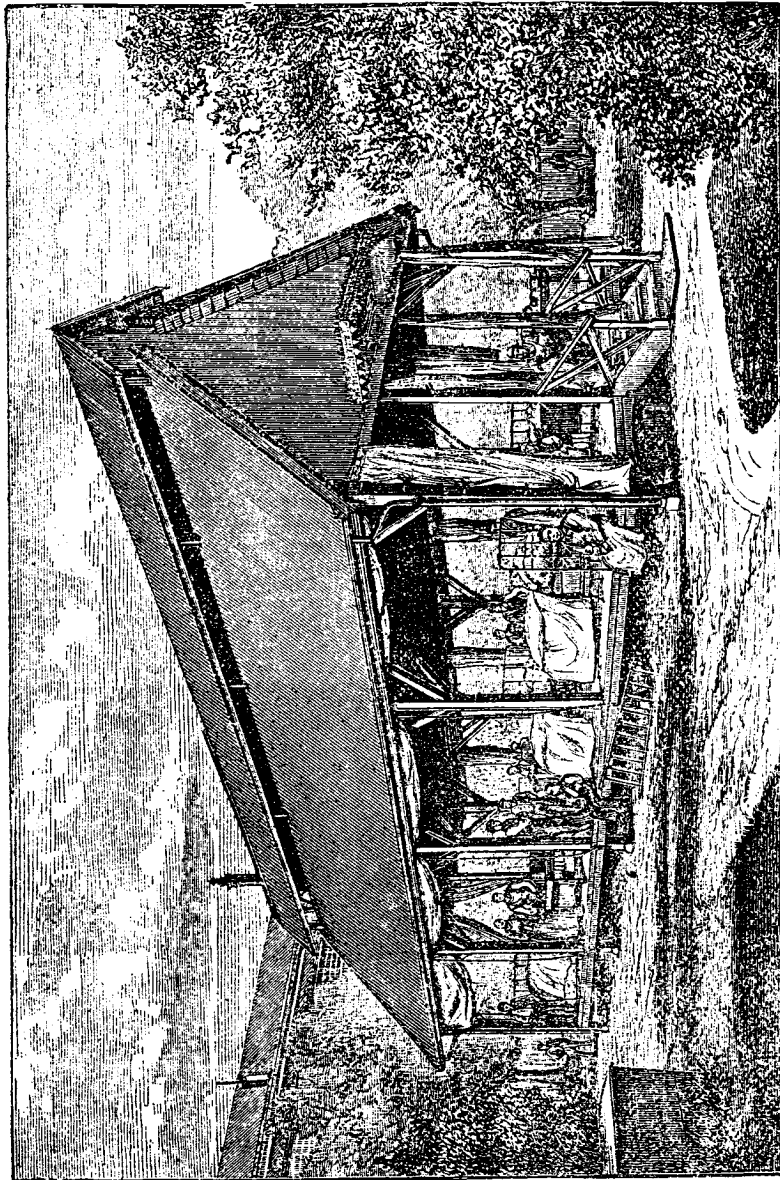
We borrow the following description of it :

“The sleepers and frame generally are of wood, fifteen metres (49 ft. 2 in.) in length and seven (22 ft. 9 in.) in breadth. The flooring is seventy-five centimetres (2 ft. 5 in.) above the ground. The lateral walls are formed by sail-cloth, which can be raised or lowered at will. The floor is of hard wood—tongued and grooved, oiled and waxed. The roof at ridge is or can be open its whole length. Each tent contains eight beds. During the night, or when rain falls or the wind is high, the sail-cloths are lowered. During the day they are raised, and the patients are thus surrounded by fresh air. These tents offer the following advantages: 1st. They supply a very superior aeration to that which the most perfected system of ventilation can yield. When the sail-cloths are raised, the patients are in the open air, sheltered from the sun by the roof; when they are lowered, the air penetrates through the meshes of the cloth and escapes by the apertures in the roof. The patients thus breathe always a pure and vivifying air, and the hospital smell is never perceived. * * * 2d. The abode in these tents is very agreeable, and the patients are more cheerful and happy than in the wards of the hospital. 3d. They afford an opportunity of completely emptying the wards of the hospital for nearly half the year, and we have thus a summer and winter hospital.

“The only objection that can be urged to these tents or huts is that the patients are exposed to cold and variations of temperature; but experience has taught us that this fancied objection was not a real one, as I have never noticed any bad results.

“Dr. Drouineau, Physician to l'Association des dames de la Charente Inferieure, then described the hospital tent employed there, presenting exteriorly the appearance of all huts with tent roofs. An open space, protected on each side by canvas, serves as a walk. The canvas may be raised and the panels of the side walls of canvas removed, and then there remains nothing but the skeleton of the hut, realizing thus the advantages of the cantonal summer ward. But if it is a question of making it available for winter, the canvas walls are replaced, the methods adopted for warming by stoves, or otherwise, employed, and with the double wall of canvas fastened down on the inside, the warmth is increased.”

A ridge roof for ventilation is preferable, but when the building is not large ventilation can be secured by movable slats in the end inclosure, similar to those on the ends of railroad cars or by side ventilation. If preferred, the canvas sides may be on

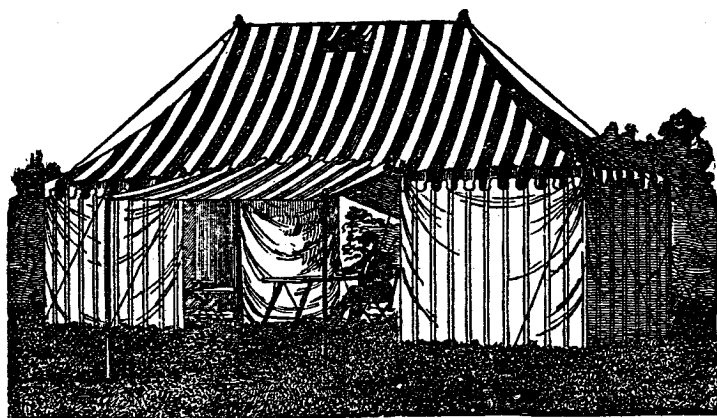


CANTONAL HOSPITAL AT GENEVA, VISITED BY THE DELEGATES TO THE INTERNATIONAL CONGRESS.
(Engraved from a Photograph contained in the Official Report.)

frames fitting in between uprights or joist and revolving on horizontal pivots.

The flooring can easily be made in adjustable parts, to be ready for placing as needed. Where the best kind of flooring cannot be had, it should be well covered with oil-cloth or linoleum. If such parts of the whole structure are on hand and properly stored, the preparation for occupancy is the work of only a very few hours.

Another form of tent structure, with description and details, we borrow from the Provincial Board of Health of Ontario:



“The following estimates have been supplied for tents of the following size and equipment:

“Size of tent—Length, 24 feet; width, 14 feet; height of ridge, 12 feet; height of wall, 6 feet.

“The tent is sub-divided into 5 rooms; the sizes are as follows, viz.: 4 sleeping-rooms, 7x7 feet (two in each end), and 1 large room, 14x10, in center. The divisions are of sheeting and made to slide on rope, and are same height as wall of tent.

“As shown in cut the tent has an awning on each side, also a large ventilator on each side, which ensures thorough ventilation. For comfort and security, this is the nearest approach to a house in tent form.

“In the manufacture of this tent the greatest care is taken to have every item of its construction perfect. The material used is 10-ounce white or 9-ounce striped duck of the very best quality.

“The poles of tent comprise 2 uprights, 12 feet; 1 ridge-pole, 10 feet, and 22 wall-poles, 6 feet.”

The price of tent complete, with poles, stakes, guys, &c., would probably be about \$100.

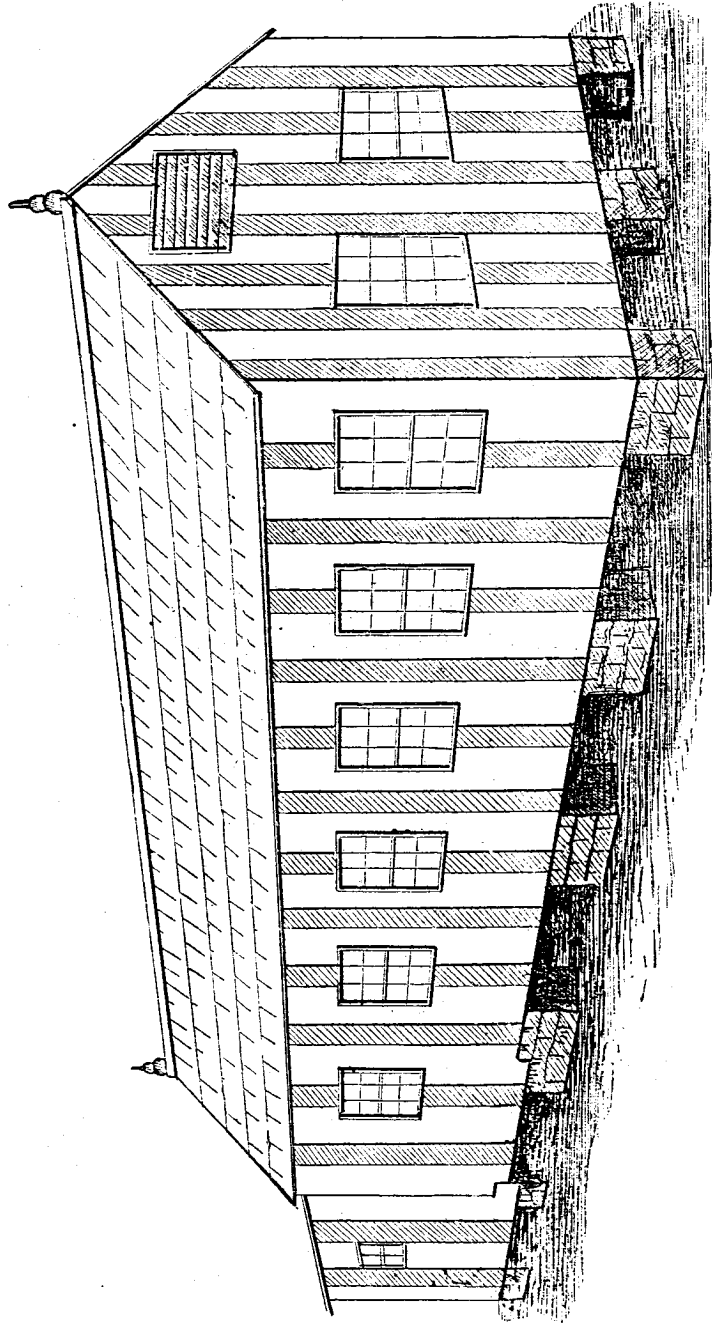
This is suggestive, but chiefly of value as a form that can be readily added to.

If more than one form of communicable disease is needing accommodation, it is now well understood that with a proper plot of ground permanently secured and some central structure to meet first cases, it is easy to add, either in tent or portable house form, at suitable points on the ground and with proper separation, temporary structures available for the emergencies of first cases.

With present modes of isolation, cleansing and disinfection, and with the strict military or police discipline which is essential to all sanitary control, a competent health officer would know how to accommodate cases of typhus and typhoid fever, scarlatina, diphtheria and even cholera within short distances of each other. With skilled arrangement of approaches and skilled direction the same cook-house, laundry and disinfecting plant answer for different diseases.

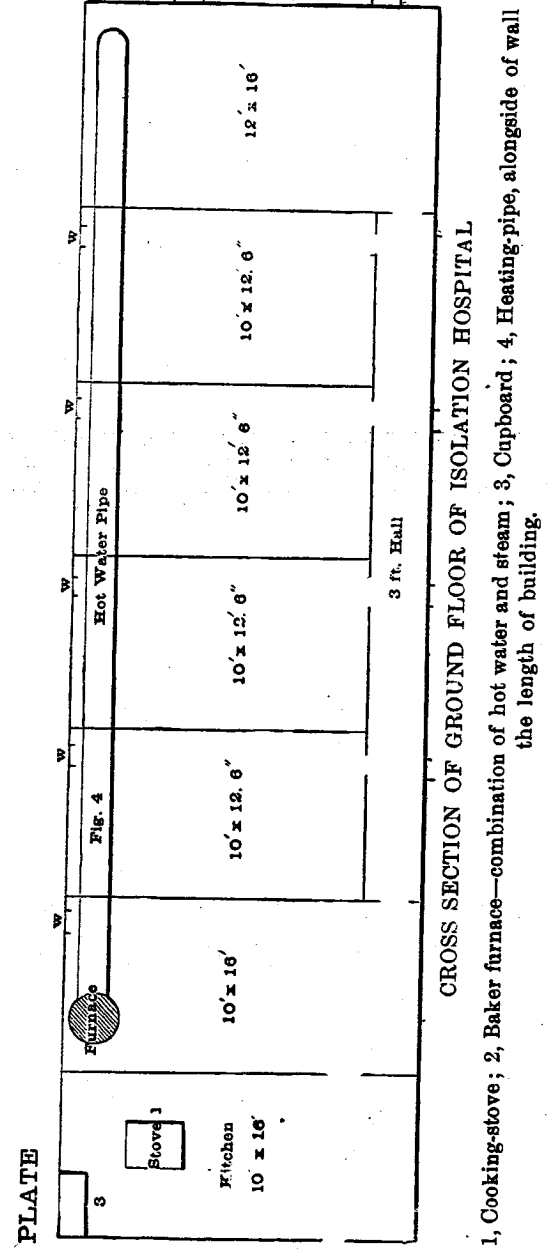
We copy also the plan of St. Thomas Hospital, Ontario:

“The following are the details of the St. Thomas Hospital: Size of building, 16x73 feet; height of ceiling, 11 feet; ventilator in gable ends, and regular ventilators in every room in ceiling; kitchen painted, and other rooms and hall twice oiled—all close-sheeted inside and hand smoothed. The cost of building, including stove and heater, was \$905. It will greatly increase convenience if a second story over the dining-room, for nurses' dormitory, be constructed. By placing a water-tank above the furnace and taps on pipes, hot water can be had in every room.”



ST. THOMAS' ISOLATION HOSPITAL, ONTARIO, CANADA, 1889.

An inexpensive hospital can be very quickly erected on a plan similar to that in the diagram below. One of double the capacity could, with little more expense, be built by doubling the width of that in diagram.



We have thus far suggested what is feasible for some populous townships and for smaller villages, towns and cities.

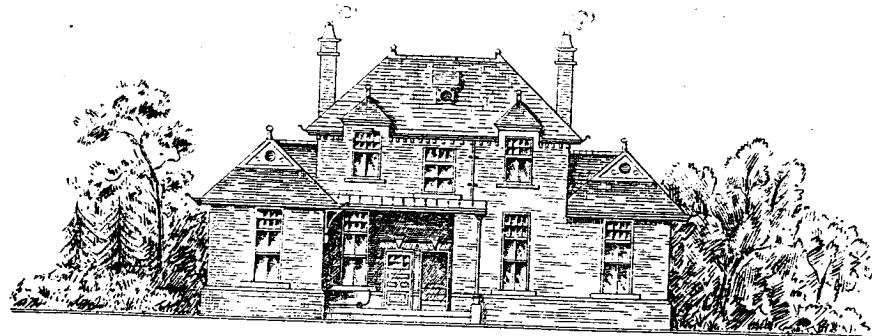
For cities of over 10,000 inhabitants a permanent structure, on the land which has been secured, as a center, is desirable. This for the reason that there is likely always to be some need of occupancy, and since all the details of administration need to be more thoroughly arranged and more actually in working order on call where there is more crowding of population. As to this we cannot do better than in the main to follow the outline recommended to local sanitary authorities by the Medical Department of the English Local Government Board, September, 1892. R. Thorne Thorne, the Medical Officer, thus speaks on this subject :

“ For a town, the hospital provision ought to consist of wards in one or more permanent buildings, with space enough for the erection of other wards, temporary or permanent. Considerations of ultimate economy make it wise to have permanent buildings sufficient for somewhat more than the average necessities of the place, so that recourse to temporary extensions may less often be necessary. And in any case it is well to make the administrative offices somewhat in excess of the wants of the permanent wards; because thus, at little additional first cost, they will be ready to serve, when occasion comes, for the wants of temporary extensions.

“ Plans illustrating the sanitary requirements of small hospitals for infectious disease are arranged on three sheets accompanying the present memorandum. Plan A, on the first sheet, is that of a little building to hold two patients of each sex. On the second sheet a plan and a section (B) of a rather larger hospital building are shown, providing for eight patients, with separation of sex, and also of one infectious disease from another. A convenient disposition of buildings upon site is also indicated on the same sheet. The third sheet shows a plan and section (C) of a small pavilion adapted to receive six male and six female patients suffering under one kind of infectious disease. It will be found that in all the plans proper standards of space are observed, viz., not less than 2,000 cubic feet of air space, than 144 square feet of floor space, and 12 linear feet of wall space to each bed; that means are provided for the adequate ventilation and warming of wards, and for securing them from closet emanations and the like. In plan A earth-closets, in other plans water-closets are indicated as the means of excrement disposal. The latter are to be regarded as preferable where efficient sewers are available. Places for washing and disinfection, and for a mortuary, are in-

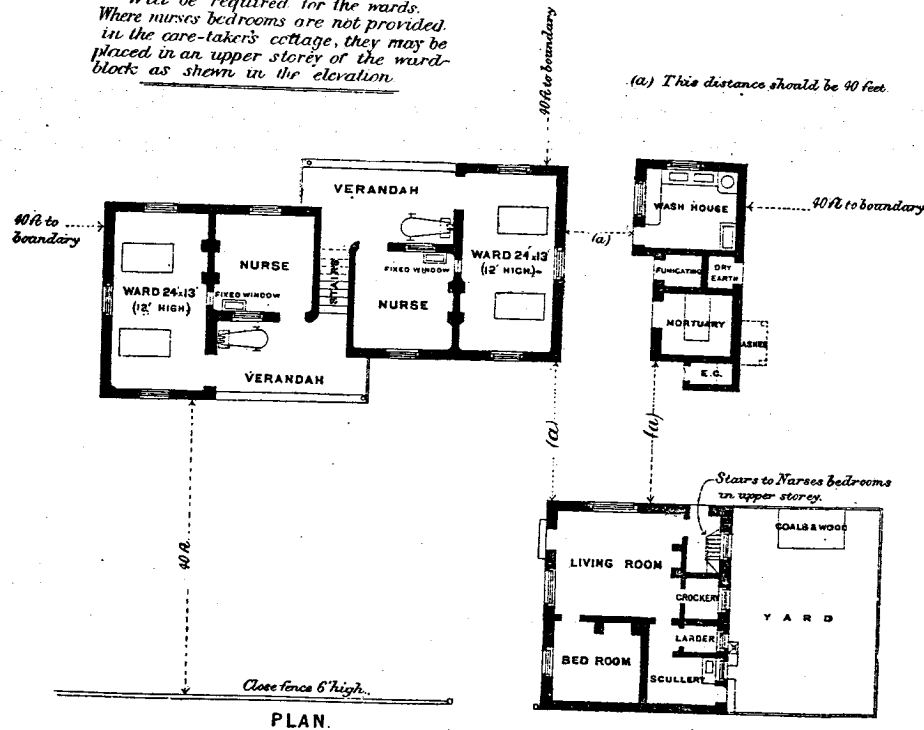
dedicated. It will be observed that an interval of 40 feet is everywhere interposed between every building used for the reception of infected persons or things and the boundary of the hospital site. This boundary should have a close fence of not less than 6 feet 6 inches in height, and the 40 feet of interval should not afterwards be encroached on by any temporary building or other extension of the hospital. In the construction and arrangement of such temporary buildings as may at times be wanted in extension of the permanent hospital, the same principles should be held in view.”

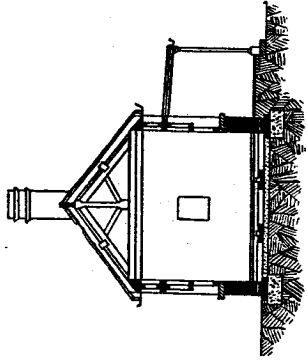
We prefer first to give these plans just as they are presented in the Memorandum of the Board.



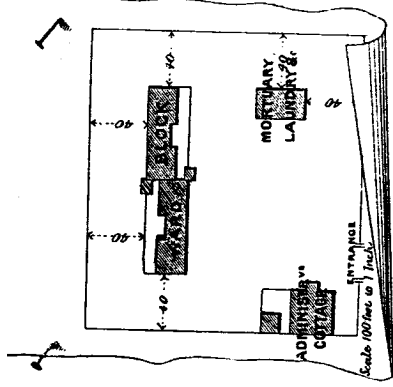
ELEVATION.

N B Moveable baths and Urth Commodes will be required for the wards. Where nurses bedrooms are not provided in the care-taker's cottage, they may be placed in an upper storey of the ward-block as shown in the elevation.



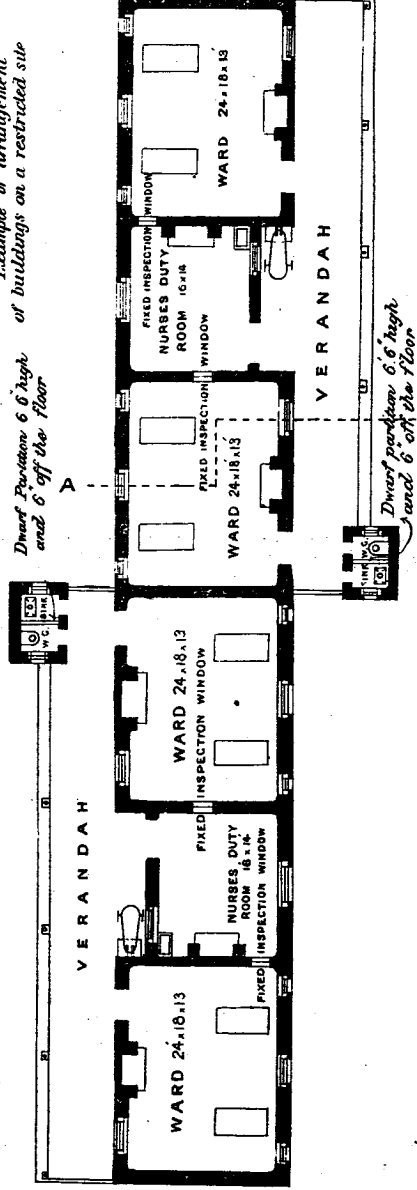


SECTION ON LINE A. A.



Example of arrangement of buildings on a restricted site

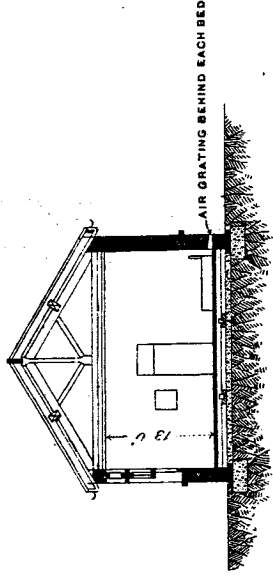
Direct Partition 6' 6" high and 6' off the floor



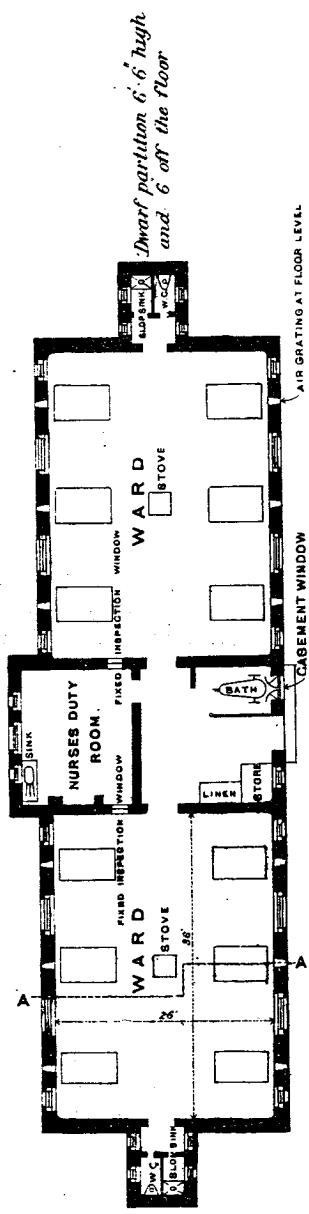
Direct partition 6' 6" high and 6' off the floor

PLAN OF A BLOCK FOR EIGHT BEDS

PLAN G.



SECTION ON LINE A.A.



PLAN OF A WARD PAVILION FOR 12 BEDS

From these various plans it will not be difficult to choose, or else to make them the basis of slight modifications. We have purposely chosen plans outside of the United States because our own are more accessible and because it must be confessed that methods of isolated hospitals have not been very fully studied with us, and good examples do not abound.

The addition of the various accessories to a hospital plant depend much on the demand, and need not be given in detail. Cook-rooms, kitchens, laundries, disinfecting plant, crematory, etc., are easily arranged when a full plan has been carefully elaborated as to administration building and wards.

The disinfecting plant of Paris, as given in our 11th Report, pp. 93-95, present the principle on which these are constructed and operated.

The rules as to laundry, as to disinfection, as to bath-rooms, disposition of cast-off material, etc., are such as guide in all thorough keeping and cleansing of premises where there is or has been contagious diseases.

Our chief design is to enforce and illustrate the need of some place where first cases of contagious disease, as well as subsequent cases, can be promptly attended to, and to give enough models to guide as to construction and arrangement. Our experience and that of Local Health Boards is constantly illustrating the necessity of provision for first outbreaks of contagious disease as for care of many others, if there are other outbreaks. It is only by the wise foresight of Local Boards that everything can be in readiness so as to avoid confusion and expense. These Health Board hospitals are an essential part of the system of report and isolation of communicable diseases, and convenient in various ways. We urge upon Health Boards and city authorities full consideration of the subject and timely provision of suitable facilities.

CHIEF ADDITIONAL HEALTH LAWS OF 1893.

DESTRUCTION OF CLOTHING.

CHAPTER CCXII.

A FURTHER SUPPLEMENT to an act entitled "An act to establish in this state boards of health and a bureau of vital statistics and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty-seven.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That whenever the state board or any local board of health, in order to prevent the spread of contagious disease, destroy, or order to be destroyed, personal effects or bedding, it shall be the duty of the said board to make, or cause to be made, an inventory of the said personal goods, and immediately thereafter to certify the value of said personal goods so destroyed to the state treasurer, in case they have been destroyed by the state board of health, and to the municipal authorities in case of local boards, and it shall be the duty of the state treasurer or municipal authority to pay over to the owner of said goods, or his or her legal representatives, the sum so certified.

2. *And be it enacted*, That all acts and parts of acts inconsistent herewith be and the same are hereby repealed, and that this act shall take effect immediately.

Approved March 17, 1893.

POLLUTION OF STREAMS.

CHAPTER CLVII.

AN ACT to amend chapter fifty-two of the laws of one thousand eight hundred and eighty, entitled "A supplement to an act entitled 'An act to prevent the willful pollution of the waters of any of the creeks, ponds or brooks of this state'" [Supplement Revision], approved February twenty-seventh, one thousand eight hundred and eighty.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That the first section of the said act be amended so as to read as follows:

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That if any person or persons shall throw, cause or permit to be thrown into any reservoir, or into the waters of any creek, pond or brook of this state which runs through or along the border of any city, town or borough of this state, or the waters of which are used to supply any aqueduct or reservoir for distribution for public use, any carcass of any dead animal, or any offal or offensive matter whatsoever calculated to render said waters impure, or to create noxious or offensive smells, or shall connect any water-closet with any

sewer, or other means whereby the contents thereof may be conveyed to and into such creek, pond or brook, or shall so deposit, or cause or permit to be deposited, any such carcass, offal or other offensive matter that the washing or waste therefrom shall or may be conveyed to and into any such creek, pond, brook or reservoir, such person or persons shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine not exceeding one thousand dollars, or by imprisonment not exceeding two years, or both.

2. *And be it enacted*, That all acts and parts of acts inconsistent with this act, in so far as they are inconsistent herewith, be and the same are hereby repealed, and that this act shall take effect immediately.

Approved March 14, 1893.

GRADED PENALTIES.

CHAPTER CCLXXIII.

A SUPPLEMENT to an act entitled "An act to establish in this state, boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty-seven.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That any local board of health may prescribe a penalty for the violation of any ordinance, section of code, or amendment thereof, heretofore or hereafter passed by such board, not to exceed one hundred dollars and not less than two dollars.

2. *And be it enacted*, That such board shall not be required to provide a penalty specific in amount for the violations referred to in section one hereof, but they may provide that the penalty shall not be less than one given sum nor greater than another given sum, the amount of such penalty between the maximum and minimum inclusive shall be left to the discretion of the court or magistrate before whom complaint may be made; *provided, however*, that this act shall not be construed so as to invalidate any ordinances now in force.

3. *And be it enacted*, That all acts or parts of acts in conflict herewith be and the same, in so far as they may conflict, are repealed.

4. *And be it enacted*, That this act shall take effect immediately.

Approved March 27, 1893.

SEARCH WARRANT.

CHAPTER CCXXXI.

A SUPPLEMENT to an act entitled "An act to establish in this state boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, anno domini one thousand eight hundred and eighty-seven.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That all police justices, recorders, justices of the peace and all other magistrates are hereby authorized on complaint founded on information and

belief, supported by oath or affirmation of any officer or agent of the state board of health or of any local board of health that there is in any dwelling house, store, stable or any building of any kind whatsoever any nuisance affecting health or any person sick of any contagious or infectious disease, or any condition of contagion or infection which may have been caused by any one recently sick of any such disease in such dwelling house, store, stable or any other building, to issue a warrant directed to the sheriff of the county within which such complaint shall be made, or to any constable, marshal, police officer or to any officer or agent of such board of health, directing him, them or any of them to search in such dwelling house, store, stable or other building for such nuisance affecting health; for any person sick of any contagious or infectious disease, or for any condition of contagion or infection which may have been caused by anyone recently sick of any such disease in such dwelling house or other place as aforesaid, and if such nuisance be found, to abate the same; and if such sick person be found to deal with him according to law and the ordinances of such board of health; and if such condition of contagion or infection be found to exist, to destroy the same by means of proper disinfection.

2. *And be it enacted*, That the officer to whom such search warrant shall be directed shall make return of his proceedings thereunder to the court or magistrate by which or whom such warrant may be issued.

3. *And be it enacted*, That the sheriff of the county and all constables, marshals and police officers of any county, city, borough or town, or such of them as shall be required, are hereby directed if required by any officer to whom such warrant may be directed, to be present and assist in the execution thereof.

4. *And be it enacted*, That this act shall take effect immediately.

Approved March 17, 1893.

CATTLE ACT.

CHAPTER CCVII.—1893.

SUPPLEMENT to an act entitled "An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto," approved April fourth, one thousand eight hundred and eighty-six.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey, That the local board of health of any city of this state shall by ordinance require from time to time a registry of all cattle kept within the limits of said city, which registry shall state the place of keeping, the number in each case kept, and the number of these intended, or used, as milch cows; and it shall be the duty of the owner of any such cattle to make registry thereof at the time, place and in the manner that the board of health of said city may direct, under a penalty not exceeding fifty dollars for any neglect of the same; *provided*, that no such registry shall be made by any board of health until after the examination of the stables and place in which said cattle are kept, and

until it is known to the satisfaction of said board that they are in good sanitary condition.

And be it enacted, That whenever any local board of health of any city shall have reason to suspect the existence of any contagious disease among cattle, or such as may be a risk or danger to the food or milk supply, or whenever they may deem it necessary, in order to prevent the occurrence of such risk or danger, they shall order the inspection of all cattle that are kept or intended for meat or milk production by a competent veterinarian chosen by them, and may for such inspection require so much payment for such service as may be necessary for the expenses attending such inspection; *it being, however, provided*, that in no case shall the amount charged exceed fifty cents a head per year for dairies of ten cows or under, and for all dairies above ten cows twenty-five cents per head per year; *provided further*, that no charge shall be made against any one keeping a single cow for family use.

And be it enacted, That whenever any local board of health, or any veterinary inspector appointed by said board shall find or suspect any disease in any cow, or in any herd of milk-producing cattle, which may prove harmful to the meat or milk supply, the state board of health and the state dairy commissioner shall be notified, and it shall be the duty of the dairy commissioner to investigate the same, and he shall prohibit the sale or use of the milk from any milch cow, but he, or the owner of said milch cow, may ask, through the state board of health, a report from some veterinarian appointed by the state board of health as to whether, or how long, it will be necessary to continue the prohibition of the use of said milk, and the dairy commissioner or the state board of health may prohibit the use of said milk or of meat of any animal declared by a veterinarian of the state board to be unfit for use.

And be it enacted, That this act shall take effect immediately.

The following Circular Letter (H) was issued to Railroad and Transportation Companies, in the fall of 1892, and is of permanent value.

CIRCULAR LETTER H.

NEW JERSEY STATE BOARD OF HEALTH.

To all Railroad and Transportation Companies:

The near approach or presence of Cholera in a country makes it needful that all Railroad and Transportation Companies exercise special vigilance as to passengers and their effects, and that they see to it that all cars and stations are in as perfect sanitary condition as possible.

To this end it is necessary that there be immediate sanitary inspection and cleansing of all cars and station fixtures. All waiting rooms must have clean floors, clean seats, clean walls, and, in general, evidence of the most thorough housekeeping. Closets, cesspools and sewer connections are such sources of disease, when in use by the public at large, that skilled construction must be secured and thorough cleansing and disinfection must have daily attention.

All cellars, coal or furnace-pits beneath buildings must be examined and put in the best sanitary condition.

All water holders, as well as the water contained in them, must be above suspicion. In a word, the fact that the mingling of people in stations along the lines of travel causes special exposure to infectious particles, must lead to extra diligence.

All cars must have daily cleansing and the most minute attention to water and water holders, to the water-closets, and to the condition of floors and seats. Scrubbing, wiping and disinfection must take the place of the ordinary care. Carpets or rugs must be dispensed with in passage-ways. There must be some method for the speedy separation of any who are taken seriously ill.

It is not probable that public opinion or sanitary law will long permit the present system by which excreta is distributed.

Car loads of mingled compost passing along railroads, and often side-tracked and distributed amid populous villages, must not be allowed. This last is a nuisance so often complained of that it never should occur, and cannot be tolerated now.

New vigilance must be given to all transportation of animals.

Already the leading railroads of the State have made prompt response to private address. This also occurred in 1884, when Cholera was threatened, but our health inspectors had then occasion to report great activity but a lack of knowledge of sanitary methods and of prompt attention to details. We feel confident that both because of present warnings and of the prospect of special travel this year, our railroad companies will find it their policy as well as their pleasure to spare no sensible efforts to secure great and needed reforms in railroad sanitation.

The State Board of Health of New Jersey and its inspectors were recently in conference with the Governor of this State on

this among other sanitary subjects. We were assured of the full support of the State authorities in the exercise of the powers conferred by Chapter 68, Section 4, Laws of 1887, in case of need. All were agreed that this care of the great highways of travel is a matter of the most vital importance in preventing Cholera and in limiting its spread should it occur. With confidence in their co-operation, we therefore address this circular letter to all the railroad companies of this State, and ask of them not merely inspection, but such *sanitary system and police* as will permanently improve the conditions for healthful travel, as well as ward off impending danger. The same is asked of all steam-boat companies.

Our Inspectors' Guide and Circulars of Directions as to Cholera, Disinfection, etc., will be promptly sent when desired and advice freely given when asked.

By order of the Board,

C. F. BRACKETT, *President.*

E. M. HUNT, *Secretary.*

THE NATIONAL QUARANTINE LAW OF 1893.

AN ACT granting additional quarantine powers and imposing additional duties upon the Marine Hospital Service.

1. BE IT ENACTED by the Senate and House of Representatives of the United States of America in Congress Assembled, That it shall be unlawful for any merchant ship or other vessel from any foreign port or place to enter any port of the United States except in accordance with the provisions of this act, and with such rules and regulations of state and municipal health authorities as may be made in pursuance of, or consistent with, this act; and any such vessel which shall enter, or attempt to enter, a port of the United States in violation thereof, shall forfeit to the United States a sum, to be awarded in the discretion of the court, not exceeding five thousand dollars, which shall be a lien upon said vessel, to be recovered by proceedings in the proper district court of the United States; in all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 2. That any vessel at any foreign port clearing for any port or place in the United States shall be required to obtain from the consul, vice consul or other consular officer of the United States at the port of departure, or from the medical officer where such officer has been detailed by the president for that

purpose, a bill of health, in duplicate, in the form prescribed by the secretary of the treasury, setting forth the sanitary history and condition of said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary conditions of the said vessel, its cargo, passengers and crew; and said consular or medical officer is required, before granting such duplicate bill of health, to be satisfied that the matters and things therein stated are true; and for his services in that behalf he shall be entitled to demand and receive such fees as shall by lawful regulation be allowed, to be accounted for as is required in other cases; the president, in his discretion, is authorized to detail any medical officer of the government to serve in the office of the consul at any foreign port for the purpose of furnishing information and making the inspection and giving the bills of health hereinbefore mentioned; any vessel clearing and sailing from any such port without such bill of health, and entering any port of the United States, shall forfeit to the United States not more than five thousand dollars, the amount to be determined by the court, which shall be a lien on the same, to be recovered by proceedings in the proper district court of the United States; in all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 3. That the supervising surgeon general of the Marine hospital service shall, immediately after this act takes effect, examine the quarantine regulations of all state and municipal boards of health, and shall, under the direction of the secretary of the treasury, co-operate with and aid state and municipal boards of health in the execution and enforcement of the rules and regulations of such boards, and in the execution and enforcement of the rules and regulations made by the secretary of the treasury to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, and into one state or territory or the District of Columbia from another state or territory or the District of Columbia; and all rules and regulations made by the secretary of the treasury shall operate uniformly and in no manner discriminate against any port or place; and at such ports and places within the United States as have no quarantine regulations under state or municipal authority, where such regulations are, in the opinion of the secretary of the treasury, necessary to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, or into one state or territory or the District of Columbia from another state or territory or the District of Columbia, and at such ports and places within the United States where quarantine regulations exist under the authority of the state or municipality which, in the opinion of the secretary of the treasury, are not sufficient to prevent the introduction of such diseases into the United States or into one state or territory or the District of Columbia from another state or territory or the District of Columbia, the secretary of the treasury shall, if in his judgment it is necessary and proper, make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries or into one state or territory or the District of Columbia from another state or territory or the District of Columbia, and when said rules and regulations have been made they shall be promulgated by the secretary of the treas-

ury and enforced by the sanitary authorities of the states and municipalities, where the state or municipal health authorities will undertake to execute and enforce them; but if the state or municipal authorities shall fail or refuse to enforce said rules and regulations, the president shall execute and enforce the same and adopt such measures as in his judgment shall be necessary to prevent the introduction or spread of such diseases, and may detail or appoint officers for that purpose; the secretary of the treasury shall make such rules and regulations as are necessary to be observed by vessels at the port of departure and on the voyage, where such vessels sail from any foreign port or place to any port or place in the United States, to secure the best sanitary condition of such vessel, her cargo, passengers and crew, which shall be published and communicated to and enforced by the consular officers of the United States; none of the penalties herein imposed shall attach to any vessel, or owner or officer thereof, until a copy of this act, with the rules and regulations made in pursuance thereof, has been posted up in the office of the consul, or other consular officer of the United States, for ten days, in the port from which said vessel sailed, and the certificate of such consul or consular officer, over his official signature, shall be competent evidence of such posting in any court of the United States.

SEC. 4. That it shall be the duty of the supervising surgeon general of the Marine Hospital service, under the direction of the secretary of the treasury, to perform all duties in respect to quarantine and quarantine regulations which are provided for by this act, and to obtain information of the sanitary condition of foreign ports and places from which contagious and infectious diseases are or may be imported into the United States, and to this end the consular officer of the United States at such ports and places as shall be designated by the secretary of the treasury shall make to the secretary of the treasury weekly reports of the sanitary condition of the ports and places at which they are respectively stationed, according to such forms as the secretary of the treasury shall prescribe, and the secretary of the treasury shall also obtain, through all sources accessible, including state and municipal sanitary authorities throughout the United States, weekly reports of the sanitary condition for ports and places within the United States, and shall prepare, publish and transmit to collectors of customs and to state and municipal health officers, and other sanitarians, weekly abstracts of the consular sanitary reports, and other pertinent information received by him, and shall also, as far as he may be able by means of the voluntary co-operation of state and municipal authorities, of public associations and private persons, procure information relating to the climatic and other conditions affecting the public health, and shall make an annual report of his operations to Congress, with such recommendations as he may deem important to the public interests.

SEC. 5. That the secretary of the treasury shall from time to time issue to the consular officers of the United States and to the medical officers serving at any foreign port, and otherwise make publicly known, the rules and regulations made by him, to be used and complied with by vessels in foreign ports, for securing the best sanitary condition of such vessels, their cargoes, passengers and crew, before their departure for any port in the United States, and in the course of the voyage; and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quaran-

tine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever or other contagious or infectious diseases; and it shall not be lawful for any vessel to enter said port to discharge its cargo or land its passengers, except upon a certificate of the health officer at such quarantine station certifying that said rules and regulations have in all respects been observed and complied with, as well on his part as on the part of the said vessel and its master, in respect to the same and to its cargo, passengers and crew; and the master of every such vessel shall produce and deliver to the collector of customs at said port of entry, together with the other papers of the vessel, the said bills of health required to be obtained at the port of departure and the certificate herein required to be obtained from the health officer at the port of entry; and that the bills of health herein described shall be considered as part of the ship's papers, and when duly certified to by the proper consular or other officer of the United States over his official signature and seal, shall be accepted as evidence of the statements therein contained in any court of the United States.

SEC. 6. That on the arrival of an infected vessel at any port not provided with proper facilities for treatment of the same, the secretary of the treasury may remand said vessel, at his own expense, to the nearest national or other quarantine station, where accommodations and appliances are provided for the necessary disinfection and the treatment of the vessel, passengers, and cargo; and after treatment of any infected vessel at a national quarantine station, and after certificate shall have been given by the United States quarantine officer at said station that the vessel, cargo and passengers are each and all free from infectious disease, or danger of conveying the same, said vessel shall be admitted to entry to any port of the United States named within the certificate. But at any port where sufficient quarantine provisions have been made by state or local authorities the secretary of the treasury may direct vessels bound for said ports to undergo quarantine at said state or local station.

SEC. 7. That whenever it shall be shown to the satisfaction of the president that by reason of the existence of cholera or other infectious or contagious diseases in a foreign country there is serious danger of the introduction of the same into the United States, and that notwithstanding the quarantine defense, this danger is so increased by the introduction of persons or property from such country that a suspension of the right to introduce the same is demanded in the interest of the public health, the president shall have power to prohibit, in whole or in part, the introduction of persons and property from such countries or places as he shall designate and for such period of time as he may deem necessary.

SEC. 8. That whenever the proper authorities of a state shall surrender to the United States the use of the buildings and disinfecting apparatus at a state quarantine station, the secretary of the treasury shall be authorized to receive them and to pay a reasonable compensation to the state for their use, if, in his opinion, they are necessary to the United States.

SEC. 9. That the act entitled "An act to prevent the introduction of infectious or contagious diseases into the United States, and to establish a national board of health," approved March third, eighteen hundred and seventy-nine, be, and the same is hereby, repealed. And the secretary of the treasury is

directed to obtain possession of any property, furniture, books, papers or records belonging to the United States which are not in possession of an officer of the United States under the treasury department which were formerly in the use of the national board of health or any officer or employee thereof.

February 15, 1893.

CIRCULAR

RELATING TO THE LABELING OF BAGGAGE AND THE ISSUE OF INSPECTION CARDS TO STEERAGE AND CABIN PASSENGERS.

TREASURY DEPARTMENT,
Washington, D. C., May 4th, 1893.

To Consular Officers of the United States, Medical Officers of the United States serving in Foreign Ports, and others:

In accordance with the act of Congress approved February 15th, 1893, it is hereby ordered that, until further notice, all baggage of steerage passengers destined for the United States shall be labeled. If the baggage has been inspected and passed, the label shall be a *red* label, bearing the name of the port, the steamship on which the baggage is to be carried, the word *inspected* in large type, the date of inspection, and the seal or stamp of the consulate or of the medical officer of the United States serving in the office of the consul. All baggage that has been *disinfected* shall be pasted with a *yellow* label, upon which shall be printed the name of the port, the steamship upon which the baggage is to be carried, the word *disinfected* in large type, the date of disinfection, and the seal or stamp of the consulate or of the medical officer of the United States serving in the office of the consul. It is understood, and it will be so printed on the blank, that the label is not valid unless bearing the consular or medical officer's stamp or seal.

It is further ordered that each immigrant or steerage passenger shall be furnished with an inspection card (see form below), on which shall be inscribed or stamped the port of departure, name of the steamship, date of departure, name of immigrant or steerage passenger and last residence, and the seal or stamp of the United States consulate or the detailed medical officer. This

card is to be retained by the immigrant until he reaches his point of destination in the United States, and is for the purpose of giving information to the maritime, quarantine officers of the United States and the health officers of the several States through whose boundaries the immigrant must pass, and will greatly facilitate his transportation. The card will also contain blank spaces for stamping at the local quarantines of the United States and at the immigration stations. On the same card are blank spaces to be filled in by the ship's surgeon or agent, when it is desired by the steamship company to utilize this card for compliance with article 13 of the Immigration Regulations promulgated April 25th, 1893; also a column indicating the inspection by the ship's surgeon of each immigrant during the voyage, as demanded by the local quarantine officer at the port of arrival.

On the reverse of the card is a certificate of vaccination, to be filled out when the immigrant has been vaccinated; also instructions, in several languages, to the immigrant to retain the card until he reaches his destination in the United States in order to avoid detention.

This card is to be issued by the consular or medical officer to each steerage passenger, to every member of a family as well as to the head thereof. If not used by the steamship in complying with article 13 of the Immigration Regulations, April 25th, 1893, a separate card must be furnished by the vessel, in compliance with the law.

Cabin passengers from cholera-infected ports or places shall be given a special inspection card, on which shall be printed the port of departure, name of passenger, name of ship, date of departure, and an indicated space for the seal or stamp of the consular or medical officer.

The baggage of said cabin passengers shall be properly labeled.

J. G. CARLISLE,
Secretary.

INSPECTION CARD.

(Immigrants and Steerage Passengers.)

Port of departure..... Date of departure.
Name of ship.....
Name of immigrant..... Last residence.....

Inspected and passed at	Passed at quarantine, port of....., U. S.	Passed by Immigration Bu- reau, port of.....
Seal or Stamp of Consular or Medi- cal Officer.	(Date.)	(Date.)

(The following to be filled in by ship's surgeon or agent prior to or after embarkation.)

Ship's list or manifest No. on ship's list or manifest.....

Berth No.	Steamship Inspection.	1st day.	To be punched by ship's surgeon at daily inspection.
.....		2 3 4 5 6 7 8 9 10 11 12 13 14	

The following slip was sent by the State Board of Health with the October Annual Report Blank :

SLIP FOR OCTOBER BLANK.

To the person to whom this Blank is sent, and to Local Boards of Health:

This is the time when each Board must be perfect in its organization. We must know what real work you are doing. This year, at the close of the report, add a statement as to it, and answer, as far as you can, the questions asked in the Cholera Memorandum herewith sent. If you give the report to the medical member of your Board, or an Inspector, to fill out in part, have him return it to you, and hold yourself responsible for sending it to us. Be sure and have it in our hands between October 15th and November 1st.

If yours is a Township Board, and you think the State Board should order your Board to appoint an Inspector, as it has the right to do, so state.

Give us the date of the last meeting of your Board and all it has accomplished.

EZRA M. HUNT, M.D.,
Secretary.

This notice and slip accompanying were prepared for immigrants arriving at Hoboken and Jersey City:

NOTICE TO LOCAL BOARDS OF HEALTH.

The following person from ship passed Quarantine as safe and booked for your locality; nevertheless, keep watch, as a possible case of Cholera might occur. If case occurs, your Board must fully take charge of it.

By order of State Board of Health of New Jersey.

Per Marine Hospital Inspector,
.....

SLIP IN ENGLISH AND GERMAN FOR EACH IMMIGRANT.

Having passed quarantine, we expect you are safe from cholera, but in case of any bowel sickness seek at once physician, and report case to Doctor _____, Hoboken, and to Local Board of Health where you are. For your own sake and for public safety conceal nothing. We only seek to aid you, but you must obey the orders of the State and Government as to report and prevention of sickness, in order to be safe and be protected by our laws.

By order of the State Board of Health of New Jersey.

Per Marine Hospital Inspector.

References to Chief Sanitary Laws of 1893.

Chapter V.—A Further Supplement to an act entitled "An act authorizing the establishment of hospitals in the cities of this state," approved February twenty-third, one thousand eight hundred and eighty-three.

Chapter XIX.—An Act to amend an act entitled "An act providing for sewerage in and from certain towns in this state," approved April twentieth, one thousand eight hundred and eighty-six.

Chapter XXIX.—A Further Supplement to an act entitled "An act to enable counties which have no county hospital to assist in maintaining hospitals located in such county," approved April twenty-sixth, one thousand eight hundred and eighty-six.

Chapter XXXII.—A Supplement to an act entitled "An act for the formation and government of boroughs," approved April second, one thousand eight hundred and ninety-one.

Chapter LIV.—A Supplement to an act entitled "An act for the formation and government of boroughs," approved April second, one thousand eight hundred and ninety-one.

Chapter LXII.—An Act enabling cities to construct connecting pipe lines or mains.

Chapter LXX.—A Further Supplement to an act entitled "An act to increase the powers of township committees," approved March eleventh, one thousand eight hundred and eighty.

Chapter LXXIII.—A Further Supplement to an act entitled "An act to provide for sewage and drainage in incorporated townships in which there is a public water supply," approved April fourteenth, one thousand eight hundred and ninety.

Chapter LXXXVI.—An Act to enable towns and townships in this state to construct water works for the extinguishment of fires and supplying the inhabitants thereof with pure and wholesome water.

Chapter CXIX.—An Act relative to the government and management of the insane asylums or hospitals owned by the state of New Jersey.

Chapter CXLVIII.—An Act to amend an act entitled "A further supplement to an act entitled 'An act to enable incorporated towns to construct water works for the extinguishment of fires, and supplying the inhabitants thereof with pure and wholesome water,'" passed March fifth, one thousand eight hundred and eighty-four, which said supplement was approved March seventeenth, one thousand eight hundred and eighty-seven.

Chapter CLVII.—An Act to amend chapter fifty-two of the laws one thousand eight hundred and eighty, entitled "A supplement to an act entitled 'An act to prevent the willful pollution of the waters of any of the creeks, ponds

or brooks of this state'" (Supplement Revision), approved February twenty-seventh, one thousand eight hundred and eighty.

Chapter CLIX.—An Act to regulate the practice of pharmacy in New Jersey.

Chapter CCVII.—Supplement to an act entitled "An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto," approved May fourth, one thousand eight hundred and eighty-six.

Chapter CCXII.—A Further Supplement to an act entitled "An act to establish in this state boards of health and a bureau of vital statistics and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty-seven.

Chapter CCXVI.—A Further Supplement to an act entitled "A general act relating to factories and workshops, and the employment, safety, health and work-hours of operatives," approved April seventh, one thousand eight hundred and eighty-five.

Chapter CCXIX.—A Supplement to an act entitled "An act to authorize the incorporation of rural cemetery associations and regulate cemeteries" (Revision), approved April ninth, one thousand eight hundred and seventy-five.

Chapter CCXXXI.—A Supplement to an act entitled "An act to establish in this state boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, anno domini one thousand eight hundred and eighty-seven.

Chapter CCLXVI.—An Act to authorize the construction of sewers and drains in cities of the first class and to provide for the payment of the cost thereof.

Chapter CCLXVII.—An Act to provide for the efficient sewerage of lowlands in the cities of this state.

Chapter CCLXXIII.—A Supplement to an act entitled "An act to establish in this state boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty-seven.

REPORT
OF THE
Bureau of Vital Statistics

OF THE
STATE OF NEW JERSEY

FOR THE
Statistical Year from July 1st, 1892, to July 1st, 1893.

With Locality, Population, Vital Records
and Climatology.

By EZRA M. HUNT, M.D., D.Sc.,
Secretary and Medical Superintendent of Vital Statistics.

Report on Vital Statistics.

INTRODUCTION.

BY EZRA M. HUNT, M.D., D.SC., MED. SUPT. OF VITAL STATISTICS.

In our earlier reports on Vital Statistics it was often necessary to define, explain and illustrate their meaning. This State had for some time kept an imperfect record of marriages, births and deaths, which could be referred to for legal purposes. It was not until a later period that in our own country the value of such statistics came to be considered in their relation to social conditions, the movements of population and the welfare of the masses as to the prevention of disease.

Now, such attention has been given to such statistics abroad that not only is political economy no longer the "dismal science" but it has come to be studied in all its details, among which none is more essential than that of vital statistics.

While corresponding progress has not been made in the United States there is nevertheless with us such a body of evidence as fully authenticates the work and has led to its full recognition by the National Government, as well as by many individual States. While it often requires patience to await the lapse of years in order to secure sufficient numbers from which to deduce conclusions and very much care as to combinations to be made and results to be affirmed, there is already such progress in the right direction and such consciousness that important material is being accumulated for future study as to furnish encouragement to all workers in this line.

Their meaning and value is thus well expressed in one of the earlier Massachusetts reports: "Statistics may be defined, the science or art of applying facts to the elucidation and demonstration of truth. They form the basis of social and political

economy, and the only sure ground on which the truth or falsehood of theories can be brought to the test. Mere columns of figures may or may not be statistics. They form, in any case, a small part only of the illustration; combination and deduction are required to give them full effect. We belong to that class of statisticians who have no particular fondness for figures, though we have a great fondness for facts. We use figures as the representatives of facts, not fiction; of truth, not falsehood, and find them very convenient for that purpose. We find it very difficult to prove or disprove many propositions without them. We are aware that some persons have a great antipathy to facts and statistics; but in this 'matter-of-fact age,' they are required; and they are far more useful and important than the fiction and theory, the assumption and assertion, that have occupied so much of public attention. We would follow, in estimating human life and human health, in all their various departments, bearings and relations, the same course that judicious men pursue in other matters.

"The state and condition, the statistics of a country, can be known only by gathering together the facts as to its movements and progress; and the statesman looks at the figures which represent these facts, and combines and deduces the truths they contain, for his guidance."

It may be worth our while just here to note a little more fully

WHAT CONSTITUTES MEDICAL AND SANITARY EVIDENCE OR TESTIMONY.
THE VALUE OF NUMERICAL METHODS.

There is great need that physicians and sanitarians have very definite ideas of what constitutes proof, or evidence, in the study of the causes and the courses of disease. Every sphere of reasoning must have its laws. In mathematics there is one special kind of proof, so convincing that when we write our Q. E. D. we know that we have reached a certainty. In logic we are able to proceed from premise to conclusion, according to laws of reasoning which have commended themselves to profound thinkers, and which are accepted as conclusive. Where there are limitations, or exceptions, these have been defined with a clearness and precision which gives definiteness to conclusions.

Thus the mind that is capable of logical analysis, and those minds capable of following its methods and weighing its results, have a definiteness of conviction well-nigh indisputable.

In physics and the study of the experimental sciences in general, we are called to a different method of study and conclusion. We first have to test by number and variety of experiments, which by their individual testimony before the senses give grounds for distinct belief. We then must repeat and renew these experiments, so as to obtain the value which comes from the test of large numbers.

We must try those collateral and incidental experiments which have a bearing on the subject in hand, and which by methods of exclusion or correction minimize the chances of error. All this must be done by various observers, in order to compare the testimony of their senses, to guard against pre-judgments, and so make intensely probable that which we cannot mathematically or logically demonstrate.

Even yet we have not science, which is the classification of a sufficient number of facts for us to deduce from them rules and principles. Through such classification, we come to what, in this field of knowledge, we feel justified in calling certainty. The variety of observations, once accepted, but now shown to be erroneous, the abandonment of theories, once proven, but now denied, the finding of defects in the materials used which have given uniformity of results owing to these defects and various other limitations, have shown us what a technical field this is. We have profound respect for the naturalist who tried his experiment a thousand times before he dared to present it to the world as worthy of credence, as the annunciation of a principle.

When we come to medical or sanitary evidence, although a department of experimental inquiry, it is more complicated and empirical than any other. The life, which is the subject, does not submit to crucible or any form of laboratory test with precisely the same rules that apply to matter in other forms. The strange admixture of bone and nerve and flesh, of organ and function, of body, mind and spirit, gives us for analysis something without a parallel in any other of nature's products. It is a case in which the foundation of our evidence must rest on observed facts—facts which as to their reality are often obscured by too

early attempts to reason as to them. What is the fact? What constitutes it a fact? What is the assurance that my senses and other instruments of precision observe correctly? What are the possibilities as to its non-reality as a real fact just in the sense and to the degree that I view it as such? Questions such as these are to the front, and are too often pushed back or obscured by reason—prejudice and imagination stealthily gliding into their place.

The physician, or the student, seeking for the causes of things in animal hygiene has this simple, but severe problem, *just to get at facts, such as come from the closest observation, a sufficient number of times by competent observers.* It is a case of witness bearing, of testimony, of direct and cross-questioning, often as severe and acute as that of any lawyer or jurist, and when well executed often shattering a fair story and a self-deceived witness into minute fragments.

We have illustrations of the value and completeness of such proof. In the midst of prevalent small-pox, when ninety-nine out of a hundred of those exposed catch the disease I vaccinate a thousand equally exposed, and not one of these catches it. There may be some minor side questions as to how many such contrasts I must produce, or how many different persons must produce them in order to prove my point, or how I am to account for now and then one in a thousand who nevertheless catches the disease, but my fact still responds to the demands of experimental evidence. It is not shaken by any question of how or why it does it, by profound opinion, "that there is no scientific support for the practice, and that it is destined in more enlightened times to fall into desuetude," (Crookshank), or by the view that although, the sheep-pox, horse-pox and cow-pox are distinct, "yet the inoculation of the virus of any of these affections may be so modified as to protect from small-pox in man." (Fleming.)

A fact is one thing; our ability to account for it is another thing. Such a fact as this remains.

So in regard to quinine as an anti-periodic and prophylactic in a class of seizures such as chills and fever. Its power to interrupt malarial forms of disease is a matter for testimony which, if sufficient in quantity, and after rigid cross-examination, found adequate in quality, proves the fact independent of all inquiry as

to reasons therefor. It is for this reason that to be able to closely observe and accurately record a fact unbiassed by any hypothesis as to it, is the most elegant attainment of the practitioner of the preventive or the healing art.

It is for this reason that the numerical method of studying disease introduced by Louis and approved (often better than followed) by modern medicine has given to statistics a valued place in the study of disease, and made such observation and experience the chief reliance of practical medicine. The evidence rests upon the accuracy of observation, the number and capability of observers, the minutiae with which they record their observations and *a number of records adequate to make applicable the mathematical "Law of Probabilities."*

In medical reasoning the inductive method is, as a rule, only really adopted when there is all the fulness of detail and a large number of cases. It is very important fully to appreciate this since so much of the evidence which is properly accepted in order to arrive at medical or sanitary conclusions depends upon inductive reasoning. "The difficulty in the majority of cases is that the process of inductive reasoning has been too hasty, or else there has been no such reasoning at all." It is not inductive reasoning in its true sense when one event following another is assumed to have a vital connection therewith, such as there is between effect and cause.

Nor is it inductive reasoning when a law is assumed from *too few a number of cases*, or too meagre observation. *Inductive reasoning is not simply induction, but such a series of observations as proves the existence of a law.* No greater error afflicts the domain of sanitary and medical science or art, or is so often the failing of writers and talkers on these subjects, as that of giving undue force to one or two or three facts or cases that have happened to them or been reported. We are constantly meeting the fallacy. As Newcomer puts it, "The kind of error alluded to has a certain show of truth, because it seems supported by facts, the only difficulty being that it is supported by too few of them. The refutation may require an acuteness of perception or a patience of investigation not possessed by many, or it may depend on some fortunate discovery of one invalidating instance among a host of corroborative ones." "*A dozen concordant observations do not defi-*

nitely prove; one discordant one disproves." A physician knows or hears of a half dozen cases in which either a husband or a wife had Tuberculosis, and ere long his partner, apparently well, shows the same disease. He fails to fully investigate other possible sources, or to account for one hundred cases in which a husband or wife had similar exposure but remained well.

All this is most imperfect induction, and yet may almost be called the prevalent "*demonstration.*" It is spoken of as inductive evidence in numberless papers and in various medical societies.

Take note of the case, investigate it, record also the counted cases, hold all in readiness for evidence or disproof when there is some adequate assemblage of facts and of cases such as justify a provisional opinion or a law, but do not arrive at a conclusion until a whole series of tested and classified observations are at your command.

We must ask of the students and practitioners of medicine and hygiene that they lose not sight of the great defects in the quantity and quality of evidence and the increasing tendency there has been to accept a few apparent cases as sufficiently conclusive. This is not in accord with the laws of evidence in this line of proof. It does not accord with the rules M. Quetelet, or with Todhunter, or any more recent writer on the well-defined mathematical law of probabilities. It is neither the numerical method of Louis, the inductive method of Newton, nor the method of exclusion of all other factors or causes insisted upon by the best medical logicians.

We must have the collection and arrangement of a sufficient number of facts in accord with the demands of scientific accuracy. When we turn to 3,000 cases in obstetrics, studied to ascertain a certain law, or even to such a study as that of 676 cases of typhoid fever in Boston (see New York Medical Record, May 28th, 1892, and Boston Medical and Surgical Journal), we cannot but observe the contrast. There never was a period in medical and sanitary experience when there was as great need for the rigid application of statistical methods and real inductive deductions resulting therefrom.

We are aware that much of this habit has grown out of the felt need as to various diseases, of finding enough clinical evidence to support experimental claims. The practitioner has so often

been unable to bear testimony in accord with alleged discoveries that there has been undue strain to bring the two in harmony. There is the persuasion that a very large number of diseases depend upon a microphyte as their cause. When this is the all-pervading view, the persuasion that the disease itself is contagious is very pervasive and inclines the mind almost unconsciously to be satisfied with paucity or scantiness of evidence.

Indeed one of the things which itself needs to be tested in this numerical way is, how far and to what degree infectivity is necessarily an attribute in all microphytic diseases. If we arrive at some general law of probability as to it then also we need new evidence as to method and conditions of infection, for a reason thus recently stated by J. Burden Sanderson, M.D., Ed., F. R. S., etc. Speaking of the pneumococcus of pneumonia, he says: "It exemplifies the general principle that virulence is one of the most variable attributes of a microphyte, one which is most affected by environment." Further on, speaking of its presence in the saliva of apparently healthy persons, he says: "It seems evident that it cannot act alone. The sword of Damocles may be always there, but the moment at which it falls must be determined by other concomitant causes, a catarrh, a disorder of the circulation, or possibly the operation of some more subtle infection, such as that of influenza."

Outside of the line of chemical inquiry, in what is claimed as the more demonstrative method of the laboratory, it has often surprised us that so much credence is given to single investigators. There is here, too, great lack of numerical and accumulated evidence and of absolute verity as to correctness of observation. We have looked in vain, in many instances, for a half dozen experimental records by as many different biologists as to their finding as to this or that microphyte. We have now plenty of biological laboratories and of skilled observers in the United States, but how few of them have verified the experiments of Cornet, of Pfeiffer and others in detail enough to add scientific confirmation thereto. Our only insistence is that while receptive of real truths and while not captious, we should see to it that in all respects we hold ourselves rigidly to those principles of circumstantial, clinical and numerical proof which have been heretofore accepted; that we deal not with individual examples, ex-

cept as part and parcel of assembled cases, and that we remember that progress in science and art, both of medicine and hygiene, depends upon precision, scientific accuracy and the assemblage of sufficient cases, tests by various competent observers, to eliminate errors. Thus only we shall avoid erroneous conclusions and have real truth certified both by science and experience.

Dietaries for Wage-Earners and Their Families.

BY MRS. ELLEN H. RICHARDS, MASS. INST. OF TECHNOLOGY.

If a man eats not, neither can he work.

Food is the only source of human power to work or to think.

The cruelty of demanding the tale of bricks without giving the straw necessary, is often paralleled by the cruelty we practice on ourselves in demanding of ourselves a day's work on half a day's rations. The question so often asked, how shall the family be well fed? is not easy of answer. So many circumstances come in to modify any rule which may be given that in trying to give practical help to those who are asking for it, in relation to the choice of sufficient and wholesome food for a workingman and his family, it seems wiser to show what is actually done rather than to say what, theoretically, should be done.

In the accompanying tables will be found the actual weights of a week's food of four families, selected from among some fifty, which have been carefully gathered in the past year. These four were chosen for the several points they illustrate, as well as for the fact that they each closely approximate the estimated normal, in spite of the great variety. The family chosen for our type consists of the father, mother and four children under ten years or two under thirteen, the food required being that of three grown persons for seven days, or of one person for twenty-one days—hence to find the amount and cost for one person, the figures may be divided by twenty-one.

Two of the families lived in Philadelphia and two in Chicago. Two of the dietaries were taken in the winter, when fruits and vegetables were scarce, and two in the spring, when they were plenty.

TABLE I.

No. 1.	Lbs. bought.	Total lbs.	Cost.	Total cost.	No. 2.	Lbs. bought.	Total lbs.	Cost.	Total cost.
Beef (stew),	4.71		.345		Beefsteak,	1.51		.336	
Beef (roast),	4.71		.565		Beef,	1.92		.190	
Beef (corned),	3.14		.376		Veal,	1.92		.326	
Mutton,	2.35		.188		Sheep's Liver,	1.20		.096	
Sausage,	1.57		.188		Ham,	5.76		.576	
Haddock,	4.71		.280		Chicken,	2.02		.360	
					Codfish,	1.44		.144	
					Mackerel, . . . . .	.96		.130	
Total,		21.19		1.942	Total,		16.73		2.168
					Bacon,	1.92		.268	
Butter,	4.70		.940		Lard,	1.20		.120	
					Butter,	1.02		.336	
					Pies,	2.16		.096	
Total,		4.70		.940	Total,		6.30		.820
Eggs,	2.50		.520		Eggs,	1.44		.288	
Milk,	18.00		.690		Milk,	8.04		.307	
					Beans, . . . . .	.47		.048	
Total,		20.50		1.210	Total,		9.95		.643
Flour,	14.33		.420		Flour,	5.76		.192	
Oatmeal,	4.70		.230		Oatmeal,	1.44		.048	
Barley, . . . . .	.78		.050		Barley, . . . . .	.48		.024	
Cornstarch,	1.57		.080		Hominy,	1.92		.096	
					Rice,	3.84		.307	
Total,		21.38		.780	Total,		13.44		.667
Potatoes,	19.23		.550		W. Potatoes,	13.44		.192	
					S. Potatoes,	3.36		.048	
Sugar,	2.35		.280		Bread,	1.44		.072	
					Sugar,	4.80		.240	
Total,		21.58		.830	Total,		18.24		.552
Cabbage,	2.15		.080		Cabbage, . . . . .	.84		.038	
Onions,	1.27		.030		Turnips,	3.00		.048	
Turnips,	2.20		.040		Tomatoes,	1.80		.096	
Carrots, . . . . .	.53		.010		Total,		5.64		.182
Tomatoes,	5.59		.310		Unknown Sundries,			1.100	
Total,		11.74		.470	Total,				1.100
Tea, . . . . .	.39		.310		Total,				1.100
Total, . . . . .		.39		.310	Total,				1.100
Total,	101.48	101.48	\$6.482	\$6.482	Total,	74.10	74.10	\$6.12	\$6.12

TABLE I.—Continued.

No. 3.	Lbs. bought.	Total lbs.	Cost.	Total Cost.	No. 4.	Lbs. bought	Total lbs.	Cost.	Total Cost.
Beef (neck and shin),	2.56		.128		Round Steak,	2.60		.260	
Porterhouse Steak,	1.28		.150		Porterhouse Steak,	3.90		.620	
Round Steak,	1.28		.096		Boiled Ham,	1.30		.390	
Roast Rib,	3.20		.320						
Mutton Chop, . . . . .	.64		.080						
Ham, . . . . .	.96		.190						
Bologna Sausage, . . . . .	.32		.030						
Round Veal, . . . . .	.96		.096						
Total,		10.880		1.092	Total,		7.80		1.270
Lard, . . . . .	.64		.080		Bacon, . . . . .	.72		.130	
Butter,	2.56		.820		Salt Pork, . . . . .	.65		.078	
Cream, . . . . .	.86		.070		Butter,	2.60		.780	
Pies, . . . . .	.64		.064		Cream,	2.92		.270	
Total,		4.700		1.034	Total,		6.89		1.258
Eggs,	2.88		.310		Eggs,	1.95		.200	
Milk,	9.38		.270		Milk,	19.06		.540	
Cheese, . . . . .	.64		.100		Beans (dry),	1.27		.600	
Total,		12.900		.680	Total,		22.28		800
Flour,	15.68		.380		Flour,	12.74		.360	
					Oatmeal,	1.30		.060	
Total,		15.680		.380	Total,		14.04		.420
Potatoes,	18.00		.350		Potatoes,	18.20		.360	
Bread,	8.90		.450						
Buns, . . . . .	.80		.076		Sugar,	5.20		.310	
Ginger Cakes, . . . . .	.32		.032		Total,		23.40		.670
Syrup, . . . . .	.96		.060						
Sugar,	6.00		.370						
Total,		34.980		1.338					
Cabbage,	1.60		.089						
Green Onions, . . . . .	.12		.060						
Dry Onions, . . . . .	.80		.038		Dry Onions,	1.95		.130	
Asparagus,	1.08		.096						
Tomatoes (canned),	1.14		.060		Corn (canned),	1.69		.190	
Cucumbers,	1.28		.064		Total,		3.64		.320
Corn (canned),	8.38		.076						
Green Peas,	1.74		.096						
Total,		8.598		.579					
Apples,	2.88		.096						
Bananas,	1.92		.096		Bananas,	3.90		.190	
Strawberries, . . . . .	.84		.147						
Rhubarb,	1.28		.030		Coffee, . . . . .	.65		.230	
Raisins,	1.28		.060		Tea, . . . . .	.32		.190	
Coffee, . . . . .	.64		.220		Total,		4.87		.610
Tea, . . . . .	.32		.160						
Chocolate, . . . . .	.16		.045						
Catsup, . . . . .			.060						
Ginger, . . . . .			.030						
Total,		9.320		.944	Total,		82.92		\$5.348
Total,	96.758	96.758	\$6.05	\$6.05	Total,	82.92	82.92	\$5.348	\$5.348

In No. 4 the man was away from dinners, and although due allowance was made in the calculations, it is probable that the lower amount of meat in this dietary was largely due to this fact. Also, there were bought in this week no spices or other condiments.

The waste was little or nothing in either of these families, the house mother being intelligent and painstaking in each case, and in two cases advantage was taken of the large markets.

Besides No. 1, showing in detail the amounts and cost of each article, an average has been made up and shown in No. 2. This will give a basis of comparison for those who have either less or more expensive markets or who raise a part of their vegetables.

In No. 3 is given the relative cost of the food substances in per cents. This shows the wide variation possible in order to obtain substantially the same results.

No. 4 shows the number of pounds of food purchased per day per person and the cost per pound of this food as well as the cost per day per person.

No. 3 is perhaps the best dietary in its variety, its full food value and in the right proportion of the essential elements. The meat is not excessive, although a little higher than the generally conceded proportion.

There is really very little choice in the main articles of diet. Meat, milk, cheese, eggs, butter, sugar, flour and cereals, vegetables and fruits. The skill of the housewife is demanded in choosing the proportion of each kind according to season and price and in the preparation of the several articles so that they may be most available for force-producing or for working power.

As to the selection of kind and quality the following general rules may be of service with the aid of Table V:

TABLE V.—THE WEIGHT, IN POUNDS, OF DRY NUTRITIVE SUBSTANCES IN THE FOUR DIETARIES.

	No. 1.	No. 2.	No. 3.	No. 4.	Average.
Nitrogenous substances in meat.....	2.67	3.05	1.90	1.43	2.25
Eggs, milk and cheese.....	0.89	0.44	0.85	0.97	0.79
Vegetables, grains and fruit.....	2.81	2.44	3.37	2.61	2.75
	6.37	5.73	6.12	5.01	5.81
Fat in all kinds.....	6.76	7.09	6.66	6.52	6.76
Starch and sugar.....	23.85	19.32	29.89	21.22	23.57
Ratio of nitrogen in meat to that in vegetable substances.....	1 to 1	1 to 0.7	1 to 1.7	1 to 1.8	
The normal is 1 to 2.					

The choicer meats, as steak, chicken and chops contain about twelve and one-half per cent. or one-eighth of nitrogenous substance, while the leaner meats, shin, neck, liver and ham, contain about seventeen per cent. or one-sixth, so that to secure the average weight of 2.25 pounds of dry nitrogenous substance (at once the most necessary and most costly) one must buy six times or eight times 2.25 pounds for the week, namely, 13.50 or 18 pounds, according to the kind or cut.

But if for any reason this quantity is not desirable, then some of the meat substitutes must be used. Eggs and cheese are quite as rich in nitrogenous substance as the best meats. One pound of cheese is usually as valuable as two pounds of meat, if it is real cheese.

For the children, milk is an excellent substitute for part of the meat. It contains about four per cent. of nitrogenous material.

But for the workingman and woman, there is no better meat substitute than some one of the legumes—beans, peas and lentils.

They contain twice as much nitrogenous material as most meats, and cost about half as much; therefore, their value may be said to be four times that of meat.

The essential point is that they shall be rightly cooked, so as to be digestible. They are best in the form of a purée or thick soup, and they should be cooked not less than eight hours—best twelve hours.

The cereals—wheat, corn, oatmeal, etc.—are the next important articles, indispensable, in fact. They contain about ten per cent. of nitrogenous material, and about 16 pounds a week are required for the mixed diet used by most families.

If very little meat or meat substitutes are used, then twice that amount would be needed by the family under consideration.

Potatoes, vegetables and fruits contain only about two per cent. of nitrogenous material, so that 30 pounds will not add very much to the amount.

If meat is used to the amount of 15 pounds a week, there will be fat enough, as there is usually as much fat as lean, and in bacon more fat. The meat substitutes, except beans, have an equal quantity of fat. If a larger proportion of flour or cereals is used, then butter or suet must be added accordingly, to make up the six pounds needed.

The third substitute essential to a right dietary—starch—is found mainly in the grains, wheat, corn, etc., which contain about 70 per cent. of it.

The 16 pounds of cereals given above would yield about 11 pounds of starch, or about half the total weight of starch and sugar which one family requires.

The 30 pounds of potatoes, vegetables and fruits, after allowing for waste of skins, etc. (about 10 to 12 per cent.), will average about 15 per cent. of starch, sugar, gums, etc., and give 7.5 pounds.

This leaves 2.5 to 5.5 pounds of sugar to be added, according to the requirement of the active children or the hard-working man.

Sugar not in excess of one-quarter of a pound a day is a valuable force-producer or work-sustainer. Milk is a good source of a portion of this sugar, and for children the best source. Three quarts of milk will yield about the desired quarter of a pound. So will the usual skim milk of farms.

The rules, which may serve as guides in a general way, are summarized in table VI.

TABLE VI.

	Nitrogenous Substances.	Fats.	Starch or Sugar.
13 50 lbs. lean meat contains	} 2.25 lbs.	2 25 lbs.	.....
18.00 lbs. choice meat contains			
2.00 lbs. butter contains.....	0.06 "	1.75 "	.....
2.5 lbs. eggs (2 doz.) contains.....	0.31 "	0.31 "	.....
14.0 lbs. milk (7 qts.) contains.....	0.55 "	0.55 "	1.60 lbs.
16.0 lbs. flour, oatmeal, &c., contains.....	1.61 "	0.50 "	11.20 "
30.0 lbs. potatoes, bananas, &c., contains	0.60 "	.....	7.50 "
4.5 lbs. sugar contains.....	.....	.....	4 50 "
Total for the family a week	5.38 lbs.	5.36 lbs.	23.80 lbs.
Or for one person one day.....	0.256 "	0.255 "	1.13 "
The normal American ration contains...	5.87 lbs.	5.87 lbs.	21.00 lbs.
The German contains.. ..	5.54 "	2.64 "	23.47 "

As to the cost of this quantity of nutritive substances, we can only say that the average of these families is 28.6 cents a day a person, or \$2.00 a week. While it is true that a wise woman and a skillful cook may make this cost less, yet from the best evidence

at hand this sum seems a very good average of what good living may be obtained for in most parts of the United States.

TABLE II.—ESTIMATED AMOUNT AND COST OF ONE WEEK'S PROVISIONS, AN AVERAGE DEDUCED FROM THE FOREGOING TABLES.

The family numbering two adults and four children under ten years.

Meat.....	14.15 pounds, at 11.4 cents a pound.....	\$1.61
Milk, 7 quarts	13.87 " " 3.2 " " .....	.44
Eggs, 2 dozen	2.50 " " 13.0 " " .....	.33
Butter.....	2.71 " " 26.4 " " .....	.72
Flour and cereals.....	16.00 " " 3.5 " " .....	.56
Vegetables and fruits....	28.70 " " 1.27 " " .....	.33
Sugar	4.5 " " 6. " " .....	.27
Sundries unclassified—Tea, coffee, pies, cakes, &c., &c.....		1.73
		<u>\$5.99</u>

TABLE III.—RELATIVE COST OF THE DIFFERENT FOOD SUBSTANCES.

	No. 1.	No. 2.	No. 3.	No. 4.
Meat	30 per cent.	35 per cent.	18 per cent.	24 per cent.
Fats	15.0 "	13.0 "	17.0 "	24 "
Eggs and milk.....	19.0 "	10.0 "	12.0 "	15 "
Beans and cheese.. ..	.....	.....	.....	.....
Total animal substance..6.40	58	47.0	63	
Grains	12 "	12.0 "	14 "	8.0 "
Vegetables	15.0 "	8.0 "	15.00 "	12.0 "
Fruits.....	.....	.....	7.00 "	3.0 "
Sugar, tea, coffee, &c.....	9.0 "	22.0 "	17 "	14.0 "
Vegetable substance.....36	42	53	37	
Total.....	100.00 "	100.00 "	100.00 "	100.00 "

TABLE IV.

	No. 1.	No. 2.	No. 3.	No. 4.
Pounds per day per person	4.8	3.5	4.6	3.9
Cost (cents) per pound	6.4	8.0	6.2	6.4
Cost (cents) per person per day	31.0	29.0	29.0	25.4

DIETARY FOR A FAMILY OF FIVE WAGE-EARNERS FOR ONE WEEK,
WITH NOTES AS TO COOKERY, ETC.

SUNDAY.

Breakfast.

Fried corn mush and molasses or syrup, creamed fish or fish-balls.

Dinner.

Broiled beefsteak or fricasseed chicken, mashed potato, cranberry sauce (grape sauce or dried-fruit sauce), apple shortcake, or Brown Betty with pudding sauce.

Supper.

Buttered toast, the remaining sauce or pudding.

MONDAY.

Breakfast.

Polenta, sausage, or minced beef or chicken, boiled potatoes.

Dinner.

Mutton stew with potatoes, turnips (onion,) and bread crusts, rice pudding.

Supper.

Mutton broth and bread crumbs, cookies.

TUESDAY.

Breakfast.

Rice-milk, bacon and corn-bread.

Dinner.

Roast beef—plain or pot roast, or roast veal in season, with bread dressing, baked potatoes—white or sweet, gingerbread and cheese.

Supper.

Potato salad, bread and butter, stewed prunes or other dried fruit.

WEDNESDAY.

Breakfast.

Oatmeal mush, baked potatoes, with a relish of broiled salt codfish, salt mackerel or smoked herring.

Dinner.

Bean soup, baked, boiled or fried fish, stewed potatoes (tomatoes), bananas or dates.

Supper.

Milk-toast, gingerbread, cheese or doughnuts.

THURSDAY.

Breakfast.

Crushed wheat, hot muffins, eggs—either boiled or as omelette, or fish hash.

Dinner.

Boiled corn-beef and cabbage, turnips and potatoes, cottage pudding, or steamed pudding with syrup.

Supper.

Cold meat of Tuesday, warmed-up muffins of morning, or milk-toast of bread or crackers.

FRIDAY.

Breakfast.

Griddle cakes—buckwheat or wheat, corned-beef hash.

Dinner.

Pea soup, fish chowder or boiled ham, oranges or apples.

Supper.

Barley porridge, toast and cheese.

SATURDAY.

Breakfast.

Hominy, liver and bacon, or tripe.

Dinner.

Beef stew or beef pie, Indian pudding or suet pudding.

Supper.

Hasty pudding with molasses, apple, pumpkin or squash pie, and cheese.

Breakfast for the man starting off for work in the outdoor air, as well as for the man who has been already at work for two hours, can be as hearty and strong as dinner, but for the indoor worker a little caution should be given against beginning the day with too indigestible food, for after the repose of the night-time the body is more or less sluggish and the digestive forces not as active as later in the day.

If, however, a man has his breakfast early, so as to be at work at seven, and has only a cold dinner, his first meal must be the heartiest of the day, and one that will stand by. For this the world has not yet found a better material than the various hog products—pork, ham, bacon and sausages—partly for their less

digestibility and partly for the good flavor of which they have enough to spare to the hearty corn bread.

For the children, who cannot be expected to do themselves credit in school when their stomachs are overloaded with greasy and indigestible food, there is no more suitable breakfast dish than oatmeal, cornmeal, hominy or crushed wheat, because these grains contain in abundance the phosphates absolutely necessary for bone and brain and tissue. Molasses or syrup can never take the place of milk as eaten with these grains, for milk also contains these mineral salts and skimmed milk has them as abundantly as whole milk.

The one simple rule in cooking the grains is to cook them long enough to develop the rich flavor which makes them so palatable as well as nutritious. Two hours is a very good rule and it is convenient to put the grain on in a double kettle or boiler [or a dish set into another large dish containing water] at night to cook slowly with the dying fire and then it has only to be heated through in the morning. The quantity of water to be added depends on the taste of the family, whether the mush is liked thick and stiff or thin. It is an observed fact that less milk is used with a thin mush than with a thick one. Molasses and brown sugar [sugar C] having a stronger flavor than syrup or white sugar, also go farther.

Since there is considerable difference in the nutritive qualities of the different grades of grains, it is wiser both for pocket and health to buy a good, well filled-out, well-ripened grain. Rice is an excellent food for a change, but it has less fat and less mineral matter than wheat, oats and corn. Good bread should always be on the table; that is, bread made from good grain, light and sweet and well baked. Home-made bread is apt to be the best, more palatable and nutritious. "Potatoes admit of varied cookery."

If the children do not each much oatmeal and crushed wheat they should have whole wheat bread and muffins of wheat or oatmeal, since they must have the bone-making salts.

The other breakfast dish for the older people may be a relish of fish or a mince of any meat left from the previous dinner, or it may be of liver and bacon or of ham or eggs, or of Hamburg steak or meat balls, which is chopped beef of a kind very nutri-

tions, but too tough to cook as steak. The use of eggs for breakfast is limited only by the price at certain seasons of the year; it is well to have them two or three times a week. Smoked and salted fish is a much-neglected relish; a little goes a long way, and as it keeps well it is useful to have on hand.

The warm drink, which is so necessary to the breakfast of most grown people [the children should have only milk or milk and hot water, until they are older than those in this family], may be of the very nourishing cocoa or chocolate or some kind of coffee. There are many good coffee substitutes made of roasted grain, of chicory, &c. It is better to buy these separately and mixed with the pure coffee than to buy an unknown mixture. Buy the coffee in the grain and see it ground, if you have not a coffee mill.

The Sunday dinner should be good and leisurely eaten, but it should not require much time to prepare. It is the day when the family need not hurry through the meal, hence the nice steak is suggested or the fricasseed chicken which has been prepared on Saturday; the pudding may either bake slowly all the morning, as the Brown Betty, or have been made the day before, as the apple cake.

Monday, the dinner should not require much care; hence the stew which sets on the back of the stove and takes care of itself, and the rice pudding which bakes slowly all the morning.

If Tuesday is ironing day the top of the stove should be left free for the irons and the oven be utilized in cooking the dinner, which should take very little time to prepare. The sheet of gingerbread may be stirred up right after breakfast and baked while the irons are heating.

Since there is always much heat left after the baking and ironing are done, it is a good time to put on beans for to-morrow's porridge or thick soup, so that Wednesday may be a freer and easier day for the housewife after the hard work of washing and ironing.

The many kinds of delicious fish now to be had can be used to great advantage. Nothing makes fresh meat taste so good as to come back to it after a day or two, just as a tea taster soon loses his sense of judging after a few trials and must renew it by tasting something quite different, so after fish day we have that

very palatable and rich dish, corned beef and cabbage. If it is possible the housewife should pickle the beef herself, then she will be sure of the quality of the beef, and if she allows it to stand only two or three days in brine it will be much nicer. Cabbage supplies potash and other mineral salts of great value. In their season beets, turnips, onions and carrots may be added, each or all.

The fire for cooking the corned beef will also be sufficient to cook slowly the peas for the next day's porridge. It is not possible to cook peas or beans long enough in the same day, for eight hours is the least time they should have. Lentils, on the other hand, may be cooked the same morning.

Fish is such an excellent food that our model family will have it in some form twice a week as a rule, but sometimes a ham will be boiled instead. After boiling it for several hours it may be baked in a slow oven for two hours until it is quite a different dish. No hearty puddings are needed after such a rich dinner.

Saturday, either the trimmings of Sunday's steak or a little of the rich and juicy beef neck is cooked slowly and the broth thickened into a gravy and the whole eaten as a stew, either with potatoes and dumplings or, better, biscuit, or it is put into a deep dish and covered with a pastry, or, better, a potato crust and eaten as a meat pie, perhaps with baked sweet potatoes.

The suppers should be for all mainly bread and butter, plain, toasted and as milk toast with sauce, a salad of the cold potatoes, cookies and gingerbread now and then, with pie once a week, perhaps. Cheese may be used often. Since it is not always possible to cook just enough and no more, there will be little "left overs" for the grown people, quite enough for them with the porridge and broth which the children share, two or three times a week.

The secret of good appetite and good health lies in the variety and the combination of food as well as in the tasty cooking. We have tried to illustrate this in the foregoing dietary. The secret of securing this variety at a low cost is in buying only what is needed and in using all that is cooked while it is best. This is why the various stews are so economical. A little meat goes a great way because none is wasted. In roasting or broiling meat a considerable portion is rendered unfit to be eaten. It is burned

or dried or it clings to the bone so that only half, perhaps, the weight is recovered. Then such a variety of flavors may be used that the skilled cook can make a different stew for every week in the year.

The following rules for marketing and receipts for the dishes given above have been selected from the best cook-books at hand and give a variety of methods and flavors.

E. A. EDWARD ATKINSON.

STEAMED POTATOES. [*Mrs. Lincoln*]

Wash and pare the potatoes. Place in the steamer, and cook about 30 minutes, or till they are soft.

CREAMED POTATOES. [*Mrs. Lincoln*]

1 pint cold potatoes, 1 tablespoon butter, $\frac{1}{2}$ cup of milk, $\frac{1}{2}$ teaspoonful salt, speck pepper, 1 teaspoon chopped parsley. Cut the potatoes into dice or thin slices. Put the milk into a shallow pan, and when hot add the potatoes and cook until they have absorbed nearly all the milk. Add the butter and seasoning, and cook 5 minutes longer, and serve hot.

POTATO CAKES. [*Mrs. Lincoln*]

Make cold mashed potatoes into small round cakes about $\frac{1}{2}$ inch thick. Put them on a baking tin, and brush them over with milk. Bake in a hot oven until golden brown.

LYONNAISE POTATOES. [*Mrs. Lincoln*]

1 pint cold boiled potatoes, $\frac{1}{2}$ teaspoon salt, $\frac{1}{2}$ saltspoon pepper, 1 tablespoon minced onion, 1 tablespoon dripping, 1 tablespoon chopped parsley. Cut the potatoes into half-inch dice, and season with salt and pepper. Fry the onion in hot dripping until light brown, add the potato. Stir with a fork until they have absorbed the fat. Add the parsley, and serve hot.

POTATOES.

Potatoes may be baked, boiled, or cooked in hot fat. While the cereals are better for long cooking, a potato should be eaten as soon as done, or should be cooled quickly if to be used another day. It is done as soon as it is fairly heated through to the boiling point of water. Therefore, the size of the piece or the potato determines the length of time of cooking. When cut in half-inch dice and stewed in water or milk, only a few minutes are required, while a whole potato may take 30 minutes. Saratoga chips are the thin slices of raw potato dropped into hot fat, and skimmed out in a few minutes. Potatoes may be used over in an endless variety of ways, warmed in sauce, fried, mashed, made up into cakes, mixed with meat or other vegetables, in hash, made into salad, etc., so that none need be wasted.

MEAT STEW. [*Mrs. Abel.*]

Use inferior parts of meat, cut into pieces, and cook until tender. One-half hour before the meat is done lay on top of it peeled potatoes, all of the same size, and serve, when done, with meat and gravy.

Flavors for stews.—Onion, salt and pepper are always in place. A little lemon juice, added as it is served, gives a delicious flavor, or even a tablespoon of vinegar may be used. Any herbs, a piece of carrot, a clove or a bit of garlic may be used for variety. Catsup is also good for a flavor.

CHICKEN FRICASSEE. [*Mrs. Lincoln.*]

Clean the chicken, and at the joints cut into pieces for serving. Cover with boiling water, add 2 teaspoonfuls of salt and one saltspoonful of pepper. Simmer till the meat is tender. Remove the larger bones, and cook them again in the water. Dredge the meat in flour, and brown in hot dripping. Put on toast on a hot dish. Strain the broth, and remove the fat. To one cup of chicken broth add one cup of milk, and thicken with 2 tablespoonfuls of flour cooked in one tablespoonful of butter. Add more salt and pepper, if needed, and one saltspoonful of celery salt, and one tablespoonful of lemon juice.

POLENTA. [*Miss Corson*]

Boil one pound of yellow Indian meal for half an hour in two quarts of pot liquor or boiling water, salted to taste, with one ounce of fat, stirring it occasionally to prevent burning. Then bake it for half an hour in a greased baking dish, and serve it either hot, or, when cold, slice it and fry it in smoking hot fat. This favorite Italian dish is closely allied to the hasty pudding of New England, and the mush of the South.

RICE MILK. [*Miss Corson.*]

Put half a pound of well-washed rice into two quarts of boiling water, with two ounces of sweet drippings, a teaspoonful of salt and a bit of cinnamon or lemon peel, and let all boil gently about an hour; then add one quart of milk, and stir the rice for about ten minutes. A little sugar or molasses may be added if you want it sweet.

SALT FISH-BALLS. [*Mrs. Lincoln.*]

One cup of potatoes, $\frac{1}{2}$ cup of salt fish, 1 teaspoonful butter, $\frac{1}{2}$ egg, speck pepper, fat for frying. Wash the fish, and shred it into half-inch pieces; pare the potatoes, and if large, cut into quarters. Put the potatoes and fish in a stew-pan, and cover with boiling water. Cook 25 minutes, or until potatoes are soft. Drain very dry, mash fine, add butter, seasoning and beaten egg. Beat well, shape on a spoon, drop into smoking hot fat, fry till brown, and drain on a paper.

BEAN SOUP. [*Mrs. Abel*]

Ingredients. One pound beans, 1 onion, 2 tablespoonfuls beef fat, salt and pepper. Additions to be made according to taste. $\frac{1}{2}$ pound of pork or ham bone, a pinch of red pepper, or an hour before serving, different vegetables, as

carrots and turnips, chopped and fried. Soak the beans over night in 2 quarts water. In the morning pour off, put on fresh water, and cook with the onion till very soft. Then mash or press through a colander to remove the skins and add enough water to make two quarts of somewhat thick soup. Season.

This soup may also be made from cold baked beans. Boil $\frac{1}{2}$ hour, or until they fall to pieces, then strain and season.

Split or dried pea soup made like bean soup.

BROWN BETTY PUDDING. [*Miss Parloa.*]

Take for this pudding a cupful of grated bread crumbs, two cupfuls of fine-chopped tart apples, half a cupful of brown sugar, a teaspoonful of cinnamon and one tablespoonful of butter, cut into bits. Butter a deep pudding dish, and put a layer of apples on the bottom; then sprinkle with sugar, cinnamon and butter, and cover with bread crumbs. Put in another layer of apple, and proceed as before until all the ingredients have been used, having a layer of crumbs last. Cover the dish, and bake for three-quarters of an hour in a moderate oven. Then remove the cover, and brown the top of the pudding.

Food and Regimen, During the Nursing Period of Child-Life.

BY EZRA M. HUNT, M.D.

Child-life is naturally divided into periods. In our own State, the school period has been made to extend from five years to eighteen years of age. By common consent the vital statistician classifies the first five years of life by itself, as fraught with especial peril. Under this, two divisions are not infrequently made; the one is, that reaching to the end of the first year; the other, that which extends from the end of the first year to the close of the fifth year. The first division is that which represents the nursing period. It is of it we here speak:

Taking the first five years together, the mortality and morbidity record is one which may well attract the most earnest and anxious study of the sanitarian. He looks around upon young life as presented in the animal world, with which he is most familiar, and sees its tendency to health and to vigor during its younger periods.

Passing the few short days of peril, it is a rare thing to the colt, the calf, the lamb or any other of our domestic animals to pine in sickness and perish with disease.

How comes it that in many cities one-half of the children born never live to reach five years of age, and that, as a rule, about two-fifths of those born into the world die before reaching this age?

During the fifteen years of our vital records, which began July 1st, 1878, there have been and recorded in this State about 401,366 births. The number of deaths during the same period, under five years of age, has been about 143,800.

It is plainly the duty of the social economist, the statesman, the vital statistician, the health officer, the physician, the citizen to be very inquisitive as to a fact which would be marvelous, if not

so frequent, and the frequency of which is still momentous. When we come to analyze as to these years and their records, we find that many perish in the first month from inherited feebleness or defects which we can attribute to bad heredity. Even this needs accurate inquiry since so many of the errors of parents, or of still earlier pedigree, find record not in what happens in the person, but in what happens to the child.

In the study of the first year, we have still this inherited relation to consider, together with all the information to be derived from the nutritive relation of the child to the mother, or to attempts to imitate by artificial methods the milk food which nature has provided. Here, also, many other studies, such as nurse-care, accident, exposure to heat and cold, places of living and sleeping, exposure to foul air, and to special diseases.

As we reach the age from one to five, the child is still supposed to be at home. Although under parental guide, it mingles more with others, seeks to care for itself, and is exposed to the perils which inattention, imprudence and its attempts to substitute its own imperfect methods of diet and discipline involve.

The student of all the five years of child-life soon finds out that the question of proper feeding is chief, if not the most prominent, among all the perils tending toward sickness and death. It therefore is well worth our while to spend a little time in a brief summary, the main design of which is to bring out the chief indications, the chief errors and the most recent and salient truths as to the food-care of children within this age.

As it is not our desire to present an essay covering the whole subject, we shall only seek to state the guides and cautions now most fully needed, and so to aid in diminishing the serious mortality which we have occasion to record.

We shall freely use, without individual reference in every case, the more recent views of Cheadle, Keating, Jacobi, Northrup and others, who have had large clinical experience with young children, as well as the opinions of chemists, such as Luff, Leeds and Vaughan, who have give much attention to the chemical side of the subject.

It goes, or ought to go, without the saying, that the milk of the mother is, before the teething period, the best food for the child.

Upon the common saying that milk is the only perfect food, if

we apply it to all persons, there might be some criticism. To furnish the required amount of carbo-hydrates to supply potential energy for moderate labor, twenty pints would be required, which would give an excess of fats and proteids. It is true, however, as applied to the young infant. "Milk," says Cheadle, "contains everything essential for the formation and nourishment of the child during the first months of life, out of which, without addition of other food, it can grow into complete perfection." This does not apply, in its fullness, for a child to any other than human milk. The milk of a goat or of a cow has limitations that do not apply to the usual milk of the mother.

As to quantity, it is to the usual amount furnished by the mother that we must look for guide.

The two breasts secrete, on an average, from three to four ounces every two hours. "It has been calculated that a mother's breast yields one pint of milk during the twenty-four hours for the first few weeks, and that this quantity gradually increases, until in later months it reaches three pints. This then may be taken as the standard quantity." Even during the first month the child needs about one pint of human milk a day. In the second month from a pint to a pint and a half, and increasing in about the same proportion to the fifth month, and more gradually afterward.

According to Rotch, as quoted by Keating, the stomach of an infant, five days old holds about six fluid drachms, and nearly three ounces by the end of the fifth month. This affords an indication as to the amount to be taken at any one time.

The composition of human milk may be safely taken as the guide to the demands of the child for nutrition. We cannot do better than take the proportions of the different elements as determined by the analysis of Luff:

Proteid	2.35
Fat.....	2.41
Carbohydrate.....	6.39
Lime.....	.019
Phosphoric anhydride.....	.026
Other constituents of ash .....	.295
Water.....	88.510
	<hr/>
	100.000

It is well to notice that this standard of food for an infant differs much in proportions from a similar one for an adult, which is given as follows :

Proteid.....	5.00
Fat.....	3.00
Carbohydrate.....	15.00
Salts.....	1.15
Water.....	75.85
Total.....	100.00

The most noticeable fact is the large proportion of fat provided in human milk and the small proportion of proteid. The carbohydrates are prominent although, as we shall hereafter see, there is little or no provision for the digestion of starch. The carbohydrate is represented by a substance known as lactine, lactose, or sugar of milk.

We have seen no better presentation of the important provision made for infant nutrition than that given by Prof. A. R. Leeds, which is as follows :

"These elements of nutrition are primarily the Inorganic, a great variety and complexity of compounds of sulphur and phosphorus; of carbonic, sulphuric and phosphoric acids; of magnesia, lime, alumina; potash, soda, iron; of chlorine and fluorine; bases and acids, salts and organo-saline compounds; these fundamentally devoted to bone building, but going also to supply essential principles in blood, digestive fluid, in nerve, tendon, muscle, tissue.

"And secondarily, the Organic, and herein what an adaptation for the food requirements of the infant! Its fuel or heat-giving constituent is lactose, or animal sugar, a carbohydrate intermediate in its chemical and physical properties between cane-sugar and starch, the latter being the carbohydrate supplied by his vegetable food to the adult man or woman. Lactose is a non-sweet sugar, a soluble, predigested starch. Having no starch-liquefying ferment in its saliva (this principle called ptyalin, which is abundantly present in the saliva of adults, being absent), the infant cannot digest starch, and must be provided instead with a soluble carbohydrate, which it obtains in the form of lactose. Its short digestive tract being prone to colics, vomitings and fermentative disturbances, it cannot safely be burdened with a vegetable sugar like saccharose or glucose, ready to pass into fermentation and produce gases and acids. And inasmuch as the human infant cannot keep up its animal heat by locomotion, and yet at the same time this animal heat must be kept up at any cost, and maintained at even a higher point than the temperature of the adult, the lactose is relatively the largest constituent of human milk, being between six and seven per cent. of the whole milk and more than half its total solid

matter. In cow's milk the same animal sugar or lactose is present, but for reasons which are evident, in much smaller proportion, constituting about four per cent.

"The other carbohydrate of milk is its fat. This is present as an emulsion in the form of innumerable microscopic, transparent spheres, which are as capable of instant appropriation and assimilation by the infant as though the fat were really in solution, or the infant had the developed pancreatic digestion which enables the adult to cope with the grosser fats in lumps and masses of the vegetable and animal kingdom. Its office is in part to supplement the lactose as fuel, but chiefly to supply that redundancy of fat which gives such exquisite roundness and fullness to the child's features, such grace and liveliness to all its motions.

"Last and far more important of all are the so-called proteids or albuminoids, which are the phosphorus, sulphur, nitrogen-holding constituents of milk, being the plastic material out of which the vital force builds up the muscle, tissue, brain and nerve of the infant.

"These proteids are chiefly :

"*Caseine*, the curd-forming ingredient of milk. In the milk itself it appears to be held in a colloidal condition in combination with alkali, and probably also with lime and phosphoric acid. The first step in the digestion of milk is the separation of this curd from the more soluble portion, or whey; the serous portion, or lactalbumin. When thus separated, or by the use of dilute acid, the curd or caseine of cows' milk comes down as large clots or cheesy masses; that of woman's milk as fine particles or flakes.

"*Lactalbumin*, which is a soluble proteid, not separating in digestion or by the dilute acid as a curd, but remaining in solution and forming nutrient substance for the serum of the blood.

"*Galactozmase*, which is a starch-liquefying ferment. It is present in both human and cows' milk, and, though in minute quantity, its function appears to be to supply the lack of ptyalin in the suckling's saliva, and to digest the starchy matters which soon come in with the vegetable food that the mother must give to the growing child, to supplement breast-feeding, and thus safely to make the transition from the breast to adult food.

"The caseine of woman's milk differs from that of the cow's, in its being more highly elaborated and refined. It is more perfectly prepared by the human mother, has been carried by her further along in the process of digestion, and, being capable of immediate appropriation and assimilation, it leaves the entire vital energy of the child to be expended in the development of its complex cerebral and corporeal organization.

"Such is milk taken as nature intends it to be taken, direct from the healthy mother by the human nursling, and used direct from the mammary gland. Herein is no opportunity for subsequent changes and decompositions, and herein is the reason for the superiority of breast-feeding to all other modes of nourishment."

While the power of starch digestion is sometimes slightly understated we see that full provision is made for its absence. It is also well to note that this power, both in the saliva and in the

upper intestine is evident in a few months and is sufficient after one year, so that there is not as much reason for the prolonged and exclusive use of milk after a few months as some seem to think.

The abundance of fat in human milk is ever to be borne in mind since there is no one article of such importance to the young infant and since it is not easily secured in so digestible a form in any other liquid or solid food.

It cannot be too much emphasized that there is no perfect substitute for the mother's milk. While due regard must be had for the physical condition of the mother there is too much evidence that in the inclination to artificial feeding minor ailments or lack of vigor are often unduly magnified. The child often runs a greater risk and the mother is less benefited by the change than is generally supposed. Disease does not in nursing pass readily to the child nor does the milk of mothers prove defective in its quality as often as is generally supposed. As to the conveyance of microphytes, Woodhead, in his recent work on "Bacteria and their Products," states that the finding of specific bacteria in the milk of consumptive mothers is so very rare that the claim has been made in only a very few cases.

Where substitution must be had a wet-nurse is indicated just because we are thus able to secure a liquid food which is likely to be far superior to any other.

The most available substitute for the human milk is cow's milk. "Its inferior digestibility," says Cheadle, "is due to the character of the casein, some difference in its chemical composition, or the arrangement of its molecules, so that when in contact with the acid of the gastric juice it coagulates in massive clots which are in striking contrast to the small, light, flocculent coagula of human milk."

It is chiefly owing to these coagula of cow's milk that it is not easily dissolved by the gastric juice and so there is fermentation and irritation and such indigestion as shows itself in colic, diarrhoea and general lack of nutrition. Yet, as this milk is our most hopeful food we endeavor so to modify its chemical composition and its tendency to massive coagulation as to make it conform more nearly to human milk.

The first approach to uniformity is to dilute it with water.

The water used for such purposes must be of assured purity, and, therefore, as a rule, should have been boiled within a few hours.

The general rule for a child under one month is one part of cow's milk and two of water, with a little sugar added. With many infants equal parts of cow's milk and water may be given by the third month, and the pure milk never before the sixth month.

The great difficulty is, that in this adjustment of milk by water, while we approximate human milk, we lose from a given quantity, in too large proportions, the fat and some of the proteids.

The loss of fat can, in part, be made up by the addition of a little cream, or still better, by the choice of fresh milk, known to have an extra proportion of fat. The proteids can be furnished by some of the artificial foods, of which we will hereafter speak, or in cases where there is an evident lack of nutrition by fresh meat-juice, prepared under the direction of a physician.

According to Bouchut, who is good authority, a child who must have cow's milk, should have it so as to get of pure milk ten meals of two ounces each for the first month and seven meals for the second, third and fourth months of six, eight and ten ounces respectively. The amount of sugar added, when two parts of milk and one part of water are used, should be about four per cent., or about two drams to a pint of milk. The addition of a minute quantity of salt is often of service.

There are two important arguments for boiling the cow's milk when used. The first is that often it is the only way to rid it of possible impurities, and the other is, that the casein in its coagulation in the stomach is reduced to a finer curd, more like that of human milk. It is the massive character of the curd of other than human milk when coagulated by the gastric juice of the child that causes most of the trouble in artificial feeding. This can be in part diminished by the addition of one part in twelve of lime water, or by diluting with barley water instead of plain water.

Cheadle expresses fully the views of those who believe that boiled milk should always be used:

"Always have the milk boiled, so as to render it sterile, prevent souring, and render the coagula of curd light and digestible. This is the first grand rule I would lay down, and it should be

an invariable rule. Nurses will fight against it, and mothers object, perhaps, for there is a common prejudice against it; they say it is less nourishing and that it is 'binding,' and that the children don't like it. Well, as to the first objection, there is just this much truth in it, that the milk loses by boiling exactly the small amount of soluble albumen which rises as scum to the surface. With cow's milk, where the casein is in excess, this is no great disadvantage. Yet that there is a slight loss of good digestible proteid must be allowed.*

"As to second objection, that it is constipating, there is also some truth. As I pointed out before, the smaller curd masses, and the absence of acidity from incipient fermentation, render it less provocative of peristalsis and of secretion from the intestine than fresh milk. But this is a fault which may be easily remedied by the addition of a small quantity of fluid magnesia or carbonate of magnesia to each bottle, and later by the addition of some food which is laxative, as a malted food, for example.

"The last objection, viz.: that children don't like it, does not apply to children who are given it from the first. They know no other, and take to it kindly enough. It is true that children who have been already accustomed to fresh milk will sometimes refuse it boiled; that is a different matter. Never let anything but boiled milk be used in the nursery from the first, and there will be no difficulty afterwards."

STERILIZED MILK.

Another method of dealing with milk when needed for artificial feeding is that known as sterilization.

The boiling of milk is really a process of sterilization, but the plan proposed is a modification for which advantages are claimed. By this method the milk is immersed in boiling water and can be preserved in hermetically sealed cans for transportation. It is then not necessary to bring it to the boiling point, and not even to that of the coagulation of albumen, which is 160° F. "A temperature of 70° C., or 158° F., will destroy the active bacteria."

Prof. Leeds, we think, has shown that by heating it to 68° C., or 155° F., for six minutes the same object can be obtained. In this case the taste is better, little or no indigestible scum gathers on the surface and the nutritive value is more closely maintained. Where much milk has to be thus prepared, a steam bath is often

*According to Dr. Winter Blyth this coagulable albumen is equal in amount to about one-fifth of the casein.

used instead of immersing in boiling water. What is known as the Arnold steamer is the most convenient form.

There are some criticisms upon the use of sterilized milk. Pure, fresh milk is itself a germicide and this effect of it is of value.

In sterilization the albumen of the milk is generally coagulated. The milk sugar is either destroyed or changed, the fat no longer exists as a pure emulsion and the casein of the milk is somewhat changed, as is shown by the action of rennet upon it. The starch fermenting power is also destroyed.

According to Dr. Davis, of Philadelphia Hospital (*see American Journal of Medical Science, 1891*), while there is temporary improvement from the use of sterilized milk, its continued use results in insufficient nutrition.

We regard the use of sterilized milk as still strongly indicated for artificial feeding, but there is need of more exact and numerous clinical methods and record of results.

The next and allied process of preparing milk for artificial feeding is that known as Pasteurization.

In this process "the sterilization is not carried further than that afforded by heating the milk to a temperature of about 160° F. and then cooling it rapidly. If this temperature is maintained for a brief interval the germs of typhoid fever, pneumonia and tuberculosis are effectually destroyed. And while these pathogenic organisms are killed and the milk is practically sterilized, its taste, appearance, chemical and physical qualities and its value in nutrition, are not sensibly altered." Prof. Leeds speaks of Pasteurized milk as follows:

"Noticing first the results from the chemical standpoint we find that they are excellent, at least for the lower temperature. As we have seen, the coagulation of the albumen does not occur at temperatures under 70° C., and the destruction of the starch-fermenting enzyme certainly does not occur at a lower temperature. Hence it follows that milk which is Pasteurized at a temperature below 70° is very slightly affected, so far as its chemical nature is concerned. The taste is not changed and indeed it is impossible to distinguish such milk from raw milk by the taste or smell. The milk behaves normally in its relation to rennet, and even the fat seems to be still in a normal condition. At all events, the cream will rise to the surface in a normal manner or it can be separated from the milk by the centrifugal machine without difficulty. In short, so far as chemical and

physical tests have thus far progressed such milk is in all essential respects normal and not materially affected by the Pasteurization."

Another form is that known as condensed milk, prepared by a process of heating and by the addition of sugar. The water being driven off by heat, it furnishes a sterilized milk in a concentrated form. The following are the comments of Dr. Cheadle as to it:

"Under certain circumstances, where fresh cow's milk does not agree well, or when it cannot be procured fresh and good, as on sea voyages, for example, or on long journeys, condensed milk may be used.

"The advantages of condensed milk are that it keeps perfectly, that it is always at hand sound and good, and that, as we have seen, the casein is rendered more digestible than that of fresh cow's milk.

"One mistake commonly made in feeding young infants on condensed milk is that of making the solution too strong at first. The directions on the label state that for infants 7 to 14 parts of water are to be added. But this is far too concentrated for a child at birth, or during the first month, at any rate, to begin with.

"I have found by experience that it is not safe to give it, at first in early infancy, of greater strength than a dilution of 24 parts of water. This, of course, as you will see by the Table, is far too weak—only about one-quarter the strength of human milk—to give sufficient nutriment for long. It must, therefore, be steadily increased until the dilution of 1 in 10 or 1 in 7 is safely reached.

"The objections to the ordinary condensed milk are that it contains a large excess of sugar, much of this being in the form of cane sugar, added for the purpose of preserving it.

"As a matter of physiological necessity, the cane sugar has to be converted into grape sugar before it can be absorbed. In the meantime it is liable to ferment; lactic acid is formed, which sets up irritation of the stomach, flatulence, and discomfort.

"The excess of sugar also tends to make children, fed on condensed milk, wax fat out of all proportion."

"There is no doubt," says Prof. Leeds, "that milk may thus be preserved without suffering to any great extent in the process. This method of preservation of milk is certainly a very valuable

one, and one which may perhaps offer to us in the future the best solution of the milk problem.

"Condensed milk again, if properly diluted, is more digestible than fresh unboiled cow's milk. This is due to the fact that the process of heating which it undergoes alters and lessens the coagulability of the casein. On the addition of acid it coagulates in lightish masses, coarser than those of human milk, or the milk mixed with barley water or lime water, or carbonate of soda, but vastly different from the great clots of fresh cow's milk."

Other forms have been proposed, such as artificial human milk, but none of them can be considered equivalent to human milk.

It is thus, that during what may be especially called the milk period of infancy, we are to seek to depend upon the mother's milk, or human milk, given in frequency and quantity according to the natural indications we have noticed.

If failing in this, we are to substitute some other form of milk which, as far as possible, we are to bring into chemical uniformity with human milk. It is at once apparent that to be successful in this there must be the strictest rules as to the sources of milk, as to its handling for keeping and use, and as to the methods for modifications when such are attempted.

Taking the masses it is seldom that this can be left to the judgment of each individual mother or nurse, so that it is not remarkable that bottle-fed children are those that are recognized as having the least chance of living.

MILK DISPENSARIES.

Will the time not come when, under the exact discipline of city Health Boards, proper milk can be had to be dispensed at cost, only to those who, by ticket, shall show their special need of having this provision made?

Even then there will be need of a double set of nurse bottles, of printed rules as to their cleansing and change and as to the keeping of the milk during the 24 hours. It is more and more being shown that milk often does harm because kept in foul places and because of its ready medium as a culture fluid of the lowest forms of vegetable life.

It is entirely feasible to diminish the death rate of our cities among milk-fed children by guarding in detail the sources and methods of supply, and by adding this cheaper plan to tenement inspection, fresh air funds and other methods of preserving the infant population.

Much of the talk as to the perils of the second summer is owing to a sickness and mortality that is not caused by weaning after a full year of age, or by teething, but by a combination of influences that co-operate just at this time. The child has acquired locomotion. So, in spite of all effort, it now cares for itself and by exposures to various foods, to heat, to bad air, filth, foul places and to general uncleanness, suffers to a degree not possible when wholly dependent on the mother's arms. Generally the peril is not to be avoided by continued nursing, but by affording conveniences of living and of food to those needing them, and by some distinct method of child oversight.

In addition to methods of milk use already spoken of, we pass to notice

PEPTONIZED MILK.

We separate this from the former part, because, instead of being an attempt to make other animal milk conform to human milk, it is an attempt to supply defects in the digestive juices of the child's stomach.

It thus forms an introduction to the whole array of patented child's foods. It is an attempt to predigest, and so relieve a stomach regarded as incompetent for its natural work. Yet, for a time, it is often available and of distinct value.

Its intent is to supply pepsin to the milk so as to furnish it to the stomach, to this degree, predigested. We need not enter into any detail as to preparation, because a knowledge of this forms a part of the ordinary practice of physicians.

"Peptonized milk properly diluted with water agrees excellently; there is only a small proportion of casein unchanged to peptone, so there is no curd difficulty.*

*Casein..... 0.96 per cent.

Peptone..... 1.88 "

(Dr. Vieths' analysis, kindly supplied by the Aylesbury Dairy Co.)

"Peptonized milk contains, of course, the same amount of nutriment as an unpeptonized milk. But although peptonized milk is satisfactory as far as digestibility and nutrient value are concerned, there are reasons against its continued use. It is an excellent preparation for use in emergency, or in special cases of illness, but it is not fitted to be the regular diet of a healthy infant.

"The chief reason is that the continued use of predigested food weakens the digestive power of the stomach, which becomes enfeebled by want of exercise of its proper function. This objection is a most serious one, and prohibitive of its use as a permanent food. Peptonized milk does excellent service as a temporary food in gastro-intestinal disturbance, or as a transition food between human milk and cow's milk, but it cannot be safely given for more than a few weeks. I have twice seen scurvy arise upon peptonized, condensed milk.

"Another reason against the adoption of peptonized milk is its bitter flavor, so that some infants refuse it altogether. This difficulty may, however, usually be overcome by using peptonized condensed milk, which is highly sweetened. If peptonized milk is given, the peptonizing process should be gradually reduced, both by lessening the quantity of the peptonizing agent, and also by shortening the time during which the process is continued. By using peptonizing powders this graduation can be effected with great ease and certainty."

PANCREATED FOODS—PREPARED OR PATENTED FOODS.

The principle of these is closely allied to that of furnishing peptonized milk. It is to present food in a predigested form with the addition, however, that for some reason, milk alone is not regarded as sufficient or does not agree with existing conditions in the child. It attempts to supply farinaceous foods as this addition. Most of the patented foods are of this class.

Recognizing that these foods are not a part of the original supply for early infancy, and that they contain starch, for the digestion of which the young infant's stomach is not prepared, the attempt is to supply a carbohydrate in the form of dextrine or grape sugar instead of starch, and this generally as an addition to milk or for a temporary substitute therefor to furnish a suitable food. The whole subject is so well stated in the recent book of Cheadle, "On Artificial Feeding of Infants," that we quote as follows:

"The value of the artificial farinaceous foods consists really in their being supplements to animal foods. They are not to be regarded as sole foods or even as chief foods, yet if the child cannot take cow's milk more than 1 part to 2 or equal parts, then farinaceous foods supply in digestible form additional nutriment. They supply additional proteid, they supply additional carbohydrate, but they supply hydrocarbon in infinitesimal degree only.

"ELEMENTS SUPPLIED BY THE ADDITION OF ARTIFICIAL FARINACEOUS FOODS—THE FORM OF PROTEID AND CARBOHYDRATE.

"These artificial foods then are to be regarded as a means of supplying an additional amount of carbohydrate and some additional proteid.

"The proteid, in the form of gluten, appears to be digested and assimilated by the child's stomach with ease. The carbohydrate element is in some in the form of starch, in others converted, or in process of conversion, more or less completely into dextrine, maltose, or grape sugar.

"Now starch, I need hardly remind you after what I have said previously, is a form of carbohydrate, which infants have only the most limited power of digesting, and its use in its simple unchanged state is most objectionable in very young children. It gives rise to acidity, flatulence, and is to a great extent useless as food, because unassimilable. For a child's use it should either be converted into maltose or grape sugar, or the process at least set in motion to be carried on to completion in the duodenum and small intestine.

"THE ELEMENTS—PROTEID AND DEXTRINE, OR MALTOSÉ.

"As a general proposition it may be affirmed that these foods are admirable in proportion to the amount of nitrogenous matter they contain, and in proportion to the conversion of the starch through some of the stages into sugar.

"Some medical men object to the use of these foods altogether. I think they are undoubtedly in error.

"For the proteid supplied is a valuable addition; and if the carbohydrate is in the form of dextrine, maltose, or grape sugar instead of starch, this is far better than the cane sugar used to sweeten foods, for this latter is more liable to ferment during the process of digestion, since it has to be changed into grape sugar before it can be assimilated. The maltose or grape sugar, ready made, can be absorbed at once. Moreover, the mixture with

milk appears to favor mechanically the formation of smaller curd masses, and thus increase its digestibility.

"The principle of a malted food, first suggested by Liebig, is the conversion of starch into sugar, and there are numerous preparations now manufactured on this principle.

"Malt meal is mixed with wheaten meal, and the action of the diastase in the malt upon the starch of the wheaten meal, at a certain heat, changes it chemically; first into dextrine, then into maltose, and then into grape sugar.

"Malted foods may be divided into two classes, according to the extent to which the process is carried.

"In the first, the finest wheaten flour is mixed with malt flour, but the process of conversion into sugar is only carried to a slight extent. The process is set in motion again actively on mixing with water for use. The starch is then converted very rapidly, partly in the cooking, partly in the child's stomach. In the course of 10 or 15 minutes after mixture with warm water, only the merest trace of starch can be discovered. This food contains in the form of flour only 1 per cent. of sugar, 10.7 of dextrine to 64.12 starch, and at first sight this would appear unsatisfactory. But the work of conversion goes on quickly in the preparation for use, and the food is transformed into a sugar food instead of a starch food.

"Now I wish to draw your attention to this point. The process of converting the starch into dextrine and grape sugar artificially is not weakening and demoralizing to the child's digestive functions like the peptonizing, pancreatizing process. It is physiologically correct that the conversion of starch should take place *outside* the child's stomach. The diastase of the malt only does for the child what the mother does for her infant, viz., convert starches and sugars into lactine before they are supplied to the child in the mother's milk. With the other processes it is different. Peptonizing digests proteids alone. Pancreatizing, on the other hand, digests not proteids only, but starches and fat also. This office of digesting proteids and fats the child's stomach is fitted to do for itself."

* * * * *

"The second form of malted foods differs from the preceding chiefly in this, viz., that the process of conversion of starch is completed in the first preparation of the food flour; not a trace of starch remains. It is all changed into dextrine and sugar. According to the analysis of one of these foods the proportion of nitrogenous element is lower, viz., 5.43 only. There is also an inferiority in fat—a remarkable one, 0.16 only as compared with 0.313 in the other malted food—due possibly to the process of

preparation, by which the soluble portions are chiefly retained, the other parts being strained off.

“Mixed with water only, it fails in all points. Mixed with equal parts of milk and water, it is still somewhat below the standard in fat, in nitrogenous element, and in carbohydrate. But duly enriched in fat and proteid by the further addition of milk, or of raw meat juice and cream, it forms an excellent food, the total absence of starch being its especially favorable feature. For this reason it is better suited for very young infants than the other class of malted foods.

“PREDIGESTED FOODS—PANCREATIZED FOOD—CHANGES EFFECTED BY THE PANCREATIC FERMENT—OBJECTIONS TO CONTINUED USE.

“Another form of food largely used now is pancreatized food. I have no actual analysis of it; but it is made of the best wheat flour, containing a high proportion of proteids, probably about 12 per cent., the proportion which obtains in the finest wheaten flours, and in most of the foods made from them.

“Mixed with a due quantity of pancreatic ferment, the starch is converted into dextrine and grape sugar as with the malt process.

“But there is a further change. The pancreatic secretion acts also on proteids, converting them into peptones, and upon fats, emulsifying them. Now this, I must again insist, at once usurps a proper function of the infant's digestive organs. It is *not* their physiological function to convert starch into sugar, but it *is* their physiological function to convert albuminoids or proteids into peptones, and to emulsify fats.

“Pancreatized food of this kind, being always prepared with milk, should have the essential animal and anti-scorbutic elements. It is nutritious and easily digested; an excellent form of nourishment for a weakened or invalid stomach. It is often of great service as temporary or additional food in sickness and debility.

“All predigested foods, however, infallibly debilitate and demoralize a healthy stomach, after a time, by relieving it of work which it ought to do for itself. They are, therefore, not fitted for permanent use, and especially as a regular food for little children whose digestive powers require to be developed and improved—not impaired. Moreover, they fail to impart full nutrition after a time, and the anti-scorbutic property appears to be injured by the process. I have now seen a considerable number of children under a year old, who have been brought up entirely upon one of these farinaceous predigested foods with

milk. They conform curiously to one type. They are large, fat, soft, flabby, white—not markedly rickety in bone, but late in teething, given to sweat profusely, prone to laryngismus and convulsions. Two children became scorbutic, with swollen gums and periosteal swellings and tenderness. A significant feature in these cases was the difficulty which attended the attempt to place them on ordinary milk food, which caused vomiting and diarrhœa when given in quantity, and the change had to be carried out very gradually. Simple peptonized milk and peptonized condensed milk are open to similar objections. Children fall off and fail to thrive after a time when kept on these foods alone, and the difficulty of getting the child's stomach to deal with ordinary milk foods arises, as in the former case. Moreover, I have twice seen genuine scurvy supervene on a diet of peptonized, condensed milk continued for four or five months.

“All predigested foods, even those made with fresh milk, should only be used temporarily to tide over a difficulty for a week or two, and then gradually replaced by natural diet.

“If a predigested food is given, the farinaceous part should be gradually replaced by some ordinary food, such as a malted food, or finest prepared entire wheat flour, which may be mixed with it in increasing proportions, the pancreatized food being reduced in like ratio, but the proportion of milk retained. Or some other home peptonized or pancreatized food may be given, and the degree of peptonizing agent and time of digestion gradually reduced to nil. Peptonized milks may be modified by reducing the degree of digestion in the same way, or by the gradual substitution of boiled milk and water, which may be mixed with the peptonized form in slowly increasing quantity.

“The chief evil of farinaceous food does not lie in the mere *positive* quality of the presence of starch only, as commonly believed, although this is a grave fault, but rather in *negative* qualities: in the deficiency of proteid, in the still greater deficiency of fat, in the entire absence of all animal element, and of the essential anti-scorbutic property.”

Beside these patent farinaceous foods of which we have so many, a few contain some animal element in addition. Besides the malted or predigested flour, they have dried or condensed milk, and so seek to furnish proteid, and fat, and animal matter in due proportion.

We avoid speaking of any one of these patented preparations by name because the chief point is to know the principle on which they are prepared.

Chemical examination and experience in use can alone determine their adaptability to infant life where inability to nurse, disagreement of milk, or special conditions of disease, require an artificial diet.

THE TIME OF WEANING.

At what time shall the child pass from exclusive dependence upon milk food? This has long been a question for discussion, chiefly for the reason that it varies somewhat with different children and different mothers and because the transition should be somewhat gradual. The fact that between the seventh month and the twentieth the child is furnished with teeth, surely points to a change that must take place sometime during these months. There is a general consent that up to one year of age most children can safely depend upon milk. The peril comes not so much from teething, nor from the second summer, but from the fact that the child after one year is running about and able often to help itself, while it also finds its way to the family table and is supplied with many things wholly foreign to its needs. Most children do better to be weaned after one year if only there is continuance of some proper form of milk food together with some other animal food and some form of bread-stuff. Eggs should at this time enter in as a part of the food of children much more largely than they do. They are an animal food, they are hermetically sealed so as not readily to come in contact with any foulness and can be prepared in various digestible forms. Mutton broth, or some other simple form of animal broth, is much better than tea or coffee, although milk or milk and water should still be the chief drink. There still remains the indication for the supply of fat of which butter spread on bread is the best form. Bread and potatoes to a moderate degree may well enter in as a part of diet. By this we mean not very fresh and clammy bread or potatoes that cut like soap. The child is now capable of disposing of a fair amount of starch while the other ingredients of these vegetable foods are indicated. We should also mention sugar except that the foods already named furnish this and most children get enough in the tendency which there is to allow it.

The main point in the feeding of children from twelve to twenty months of age is to come by degrees to a mixed diet, reg-

ulated as to quantity, quality and times of use, and chiefly restricted to the articles we have named. The family table is too often a dangerous place during this period unless the child is under such control as will, without excitement, insure these restrictions.

We have thus outlined the general indications as to the feeding of the child for the first twenty months of its life, leaving the remaining period up to five years for later consideration.

Comments on Special Outbreaks of Disease and on Selected Diseases.

PREFATORY NOTE BY SECRETARY.

[We change slightly our usual heading in this particular in order to notice in addition some special outbreaks which have occurred. The Secretary makes report as to cholera, with special reference to Jersey City, several persons, as named in the report, having contributed valuable information as to it. Diphtheria at Hightstown is specially reported upon by A. Clark Hunt, M. D., Sanitary Inspector, and an outbreak in Milburn township by D. E. English, M. D., of the Local Board. Smallpox and vaccination is treated by the Secretary, with full and valuable additions by John H. Cook, Esq., Secretary of the Local Board, and Henry Mitchell, M. D., Sanitary Inspector. The Secretary, in comments on influenza, continues the history from a former report with various facts as to its occurrence since and up to the present date. Leprosy is also made the subject of special note because of special attention that has been given to it by an English commission and because of its sporadic occurrence in immigrants arriving from the Orient. One such is now in one of our county almshouses. As various other selected diseases have been fully noted in recent reports we only add brief notes as to any of these.]

CHOLERA IN 1893.

Although there were so few cases of Asiatic cholera in the United States in 1892, and these within narrow limits, there were many reasons why all health authorities felt it needful to be very inquisitive and watchful as to it for the year 1893.

After its approach it often happens that the second or third year is more serious than the first, either because of fresh ar-

rivals, or because the contagium has sometimes seemed to be latent from the former years.

It is also well known that during the winter of 1892-3 it had not disappeared from Asia, that there were cases occurring on the Russian frontier, and that there were grave suspicions of its presence, here and there, in France.

Besides smaller outbreaks in France, it was admitted about the first of August, 1893, that there had been six hundred deaths from cholera in Marseilles since the middle of May. It had been worse in Moscow than the year before, and early in the year there were cases at Hamburg and Altona. In August the disease prevailed in Southern Russia, had passed into Roumania and Galicia and was known to be in Italy. Its presence in Naples was not acknowledged until we were notified of it through the medical officer of the Marine Hospital Service. Very soon after it prevailed so extensively as to cause a panic, the cases reaching to as many as fifty per day.

Up to September there were cases occurring in Berlin, Galicia, Rotterdam, Italy and in France. In the United States, besides a few cases at New York Quarantine, one death had been reported in Jersey City.

It was not until September 4th that its presence in England was recognized. This was at the fishing town of Grimsby. It soon after was recognized as at Hull, also a fish mart, and during the month, here and there, cases occurred at about twenty localities in England.

It is difficult to give the precise date at which the first case of Asiatic cholera occurred either at Grimsby or Hull. From August 1st to August 21st the unusual number of eighty-two deaths from diarrhœa had been reported at Grimsby. Through August and up to September 4th, returns began to be made of deaths from cholera nostras, choleraic diarrhœa, cholera, and on September 2d one case was set down as Asiatic cholera. There were of these, in all, about thirty cases, when on September 2d ten cases of choleraic diarrhœa and the one of Asiatic cholera were reported. Soon after it came to be recognized that actual cholera existed. Up to September 14th over 350 cases, under the general name of cholera had been reported at Grimsby and the smaller town of Cleethorpes, which adjoins it. For the same

period about one hundred cases had been reported at Hull. At Hurst, Ashbourne, Middleton, Mitcham and at St. Bartholomew's Hospital, London, one or more cases had been reported. We refer to these both because of the marked prevalence of diarrhœa at Grimsby and because single choleraic cases and deaths were occurring here and there without extension of the disease. Local authorities were on the alert, and the observation methods used in England, instead of strict quarantine, were closely observed.

During September and October cases continued to be reported, but there was no extended epidemic or approach thereto. This, together with the fact of the existence of severe diarrhœal cases, which could not be traced to any Asiatic cholera source, is worthy of special note. An English editorial (*see Lancet, Sept. 23d, 1893*), makes the following comment:

"In only two or three out of some twenty towns and villages affected has there been more than one attack. Indeed, so striking is this that the question has arisen as whether some of them were cases of true cholera of the Asiatic type. In point of symptoms and post-mortem appearances they have resembled the major disease, as also in point of rapid fatality, and when judged by the bacteriological test they are stated to be quite indistinguishable from results obtained in cholera when studied in the valley of the Ganges. This is very remarkable, and it will give additional interest to the investigation which the President of the Local Government Board states that, on the advice of Dr. Thorne Thorne, he is about to have undertaken, namely: The relations that exist between cholera of the Asiatic type and those fatal forms of diarrhœa which have hitherto been styled 'English cholera.'"

CHOLERA AT NEW YORK QUARANTINE AND AT JERSEY CITY, N. J., 1893.

The experience of the former year had placed all quarantine officers of the United States, the Marine Hospital service and the various State and Local Health Boards on the alert to be prepared for any invasion of cholera which might occur this year. It was not until late in the summer that the first vessel made the port of New York with any evidence of cholera on board.

The *Karamania*, of the Anchor line, arrived here August 3d, having left Naples two days before cholera was admitted as being

present there. When boarded by Dr. Jenkins, of the port of New York, it was found that there had been three deaths from intestinal disease, the last two having died and been buried at sea within one day of port. The vessel was placed in quarantine, and the passengers, about 450 in all, were transferred to Hoffman and Swinburne Islands. About 20 were separated as suspects, and a case that died soon after proved to be Asiatic cholera. There were in all four deaths, the last taking place August 19th. August 17th, 1893, 12:30 P. M., Dr. Jenkins reported as follows:

"QUARANTINE, S. I., Aug. 17.—Health Officer Jenkins issued the following bulletins to-day:

"12:30 P. M.—The health of the passengers detained in quarantine continues to be good. There are no new cases. It is now four days since the last case of cholera was removed from Hoffman Island, and 104 hours since he was isolated from his fellow-passengers.

"The census of the Karamania's passengers shows: Detained on Hoffman Island, 448; convalescent on Swinburne Island, 20; died in hospital at Swinburne Island, 3. Total, 471.

"If there are no new developments before 4 o'clock to-morrow morning, the time of expiration of the period of incubation of the disease since the last case was discovered and isolated, we may assert that the infection is destroyed, although we extend the time eight hours later to complete the period of five days after the removal of the patient from Hoffman Island."

"QUARANTINE, S. I., Aug. 20.—Dr. Jenkins issued the following bulletin at 9 o'clock to-night:

"Antonio Carlove, aged fifty years, who was convalescing from cholera on Swinburne Island, died at midnight. The autopsy confirmed the diagnosis. The detained passengers will be sent to Ellis Island to-morrow. All the preparations for their departure are complete."

At 12:30 P. M., Tuesday, August 22d, Dr. Jenkins issued his last bulletin, stating that the Karamania's passengers had been discharged, *i. e.* transferred to Ellis Island, from which their distribution soon took place.

The next and only other case suspicioned at Quarantine was that of the steamship Russia, which arrived from Hamburg at the port of New York, October 8th. There had been three deaths on board, two of them occurring only a little time before

arrival. The ship surgeon did not regard them as Asiatic cholera, but as a precaution the vessel was detained, and the persons nearest those affected with sickness removed as suspects. After transfer, one patient, Ida Aue, died.

The following is the statement of Dr. Jenkins under date of October 10th.

"QUARANTINE, N. Y., Oct. 10.—Dr. Jenkins, Health Officer of the port, issued the following bulletin at 9 o'clock this evening:

"All of the passengers and crew of the steamer Russia are well. They have been inspected twice to-day, and all of the steerage passengers have been transferred to Hoffman Island for observation, 288 having been taken yesterday, and 120 more to-day. They have all received a bath, and all of their clothes and other effects have been thoroughly disinfected by steam.

"The bacteriological examination in the case of the woman Aue has been delayed somewhat longer than usual. Up to noon to-day the results were negative, when it was discovered that the lens of the microscope was defective. Another instrument was obtained from the city, and on examination this evening the plate cultures showed the presence of comma bacilli."

No further cases occurred.

JERSEY CITY CASES.

The group of cases in Jersey City, known as the "crab cases," occurred from August 20th to 30th, but we have been unable to connect these with any immigrant.

We present the following outline of facts as to these cases. The first notice of any unusual sickness was contained in a local paper of Jersey City, and was as follows:

"JERSEY CITY, Aug. 25—A report reached police headquarters this afternoon from West Bergen that four persons had died there during the past few days under circumstances which indicated that they died from poisoning.

"Mrs. Ann Lewis, who kept a boat-house at the foot of Culver avenue, West Bergen, on Sunday last entertained John Ford, a colored man, Gustavus Hatchlocker and a woman of the name of Connelly, and gave them a dinner. They all ate crabs, and it is said that afterward they were attacked by violent pains and died, despite the efforts of Dr. Pyle, who was called in to attend them."

The deaths here noticed took place on August 24th. August 19th was a day of unusual hilarity in this part of Jersey City known as West Bergen. An association known as the Fox Association, composed chiefly of men from the Bergen Steel Works, held a picnic in the Schuetzen Park. The house, or shanty, of Mrs. Lewis stood a little separate on the meadow quite near the steel works. It was a gathering-place for many of the residents of that neighborhood. The house itself was located so as to receive much of the surrounding sewage and the ground about it was in a filthy condition. As a place of low resort it was quite notorious. On the evening of Saturday, August 19th, a party of men and women, at the house, indulged freely in crabs and beer and the supply seems to have been on hand till the 21st, when there was a similar gathering. It is known that some from the picnic called there late on Saturday evening.

The cases of sickness would no doubt have attracted more attention, except that those sick were at their own homes and each seen by a different physician.

It now appears that one of the number, a colored man, went quite directly to Jersey City Hospital, where he was admitted on the 20th and died on the 21st.

Morton, whose sickness and death occurred next in a distant part of the city, it now appears, was at this picnic and not unlikely in the vicinity of the Lewis house, he having arrived at home about two o'clock on Sunday morning complaining of sickness. Mrs. Lewis, who kept the house and who died there, is said to have been suffering from diarrhœa for a day or two before and to have eaten very lightly of the crabs.

The weather at the time was somewhat unusual. After a long period of drought, there were dashing storms, with hail on the night of the 19th, followed by alternations of close and oppressive weather until the 24th, when the great coast-storm reached New York.

As none of the cases were reported as cholera and as they came in separate from each other, they did not attract the attention of the health authorities until about the time of the newspaper notice we have quoted.

The Secrerary of the State Board of Health at once sent by special dispatch to the Jersey City Health Inspector urging that

although none of these cases seemed to be suspected as cholera yet that the premises be dealt with as if infected and all persons who had been exposed be watched. Under date of August 26th, he received the following reply :

JERSEY CITY BOARD OF HEALTH, }
OFFICE OF THE HEALTH INSPECTOR, }
JERSEY CITY, August 26th, 1893. }

Doct. E. M. Hunt,

DEAR SIR—Have disinfected, and will keep a sharp lookout for each person where said cases occurred and all those exposed. Hoping that all will end well, I remain,

Yours,

D. W. BENJAMIN,
Health Inspector.

The belief seemed so positive that the three deaths known to have occurred after the crab and beer banquet, were owing to imprudence in eating, that no further attention was fastened upon them until what is known as the "Smith case" occurred at the Jersey City Hospital.

The case of the negro, who died at the hospital on the 21st, had not at that time been associated with these cases.

The first case, indeed, which excited much suspicion, was that of Martin Crowe, who died at the hospital the night of August 29th, Mrs. Josephine Smith having died there earlier on August 29th. We here give a table of all the cases that occurred, all having died, and follow this with clinical notes of each case, so far as secured, as these will serve to throw important light upon the entire group.

The two cases not here given by medical attendants were only seen in *articulo mortis*.

We also subjoin a letter containing some details from D. W. Benjamin, the Jersey City Health Inspector.

Number.	Date of Reports.	NAME.	Age.	Sex.	Color.	Civil Condition.	Nativity.	Time in U S.	Occupation.	RESIDENCE.	Length of Sickness.	CAUSE AND DATE OF DEATH AS ON CERTIFICATE.
1	...	William L. Morton, . . .	29 years.	M.	W.	M.	N. Y. City.	Life.	Salesman.	{ 3 State street, Jersey City.	4 days.	{ Cholera Morbus, August 23d, 1893.
2	...	Augustus A. Haaslacker, . . .	17 years.	M.	W.	S.	N. Y. City.	Life.	.....	{ 79 Culver avenue, Jersey City.	1 day.	{ Cholera Morbus, August 24th, 1893.
3	...	Caroline E. Collins, . . .	55 years.	F.	W.	M.	England.	25 years.	Housewife.	{ 236 McAdoo avenue, Jersey City.	24 Hours.	{ Cholera Morbus, August 24th, 1893.
4	...	Elenor Lewis, . . .	45 years.	F.	W.	W.	Ireland.	35 years.	Housewife.	{ 121 Culver avenue, Jersey City.	1 day.	{ Cholera Morbus, August 24th, 1893.
5	...	John Elsworth, . . .	29 years.	M.	B.	S.	U. S.	Life.	Hostler.	{ 238 Monticello avenue, Jersey City.	3 days.	{ Gastro-Enteritis, August 24th, 1893
6	...	Martin Crowe, . . .	67 years.	M.	W.	M.	Ireland.	.....	Laborer.	{ St. Paul's avenue, Jersey City.	1 day.	{ Acute Entero Colitis, August 29th, 1893.
7	...	Josie Smith, . . .	28 years.	F.	W.	M.	U. S.	Life.	Housewife.	{ 3 State street, Jersey City.	4 days.	{ Sporadic Cholera, August 29th, 1893.

NOTES ON CASES. (All these persons died.)

No. 1.—Had, in last moments, Dr. A. C. Muttart.

No. 2.—Was seen by Dr. Wilkinson in collapse.

No. 3.—Dr. S. A. Hollister.

No. 4.—Dr. W. L. Pyle adds to cause of death, "Probably ptomaine poisoning by eating crabs." He saw her in collapse three hours before death. (See his letter.)

No. 5.—Had other names. Said to have been at crab supper. Came under treatment very soon by going to Jersey City Hospital.

No. 6.—Martin Crowe came to Jersey City Hospital, where he had long been known, August 19th. (See full report of his case herewith by Dr. John P. Cooney.)

No. 7.—(See report of hospital physician.)

REPORT OF CASE OF ASIATIC CHOLERA, BY JOHN P. COONEY, M.D., HOUSE PHYSICIAN, JERSEY CITY HOSPITAL, AUGUST, 1893.

Martin Crowe; age, 67; married; born in Ireland; laborer. Was an alcoholic subject. For the past eighteen months had spent the most of his time in or around the hospital. It was his habit to apply for admission to the hospital after a prolonged spree to be treated for some real or fancied ailment. After a few days he would express his willingness to work, and would then remain on the premises as a laborer on the hospital grounds for a longer or shorter interval, when he would leave, only to re-appear in a few weeks, as stated above. He was a strong, well-nourished man, muscular and well-preserved, and possessing a good appetite and digestion, despite his age and excesses.

About July 17th last, Crowe left the institution, and did not appear again until August 19th, when he applied for admission to the hospital, somewhat under the influence of liquor and complaining of diarrhœa and pains in the chest and abdomen. He was placed in the medical ward, and under treatment recovered from the diarrhœa entirely in three days. On the morning of August 23d I discharged him from the ward, although he still claimed to suffer greatly from the pains over the region of his stomach. I did not give much credence to his statements, as he was always inclined to exaggerate his ailments, at least until he had secured employment from the warden of the hospital. This he succeeded in doing, and accordingly was put at work digging a trench, the class of work at which he was most proficient. This he continued to do the remainder of the week, *i. e.*, 24th, 25th, 26th, always working steadily, with little or no complaint. I afterwards learned from the nurse in the medical ward that on Thursday, the 24th, Crowe complained to him of diarrhœa, and was given a powder containing Opium Gr. i, Bismuth Subnitrate Gr. xx. I did not hear of any more complaints from him during these days, and on Sunday night, the 27th, he is reported to have been in good spirits, and to have smoked his pipe and talked with his fellow-workers for some hours.

Monday morning, the 28th, he was again at work, but about eleven o'clock complained to one of his co-workers that his bowels were loose and that he had severe pain in the abdomen.

Previous to that I had seen him assisting the laundress in carrying a basket of clean clothes from the laundry, to be hung out to dry. About three o'clock in the afternoon of the same day he was seen lying on the grass, rolling about as if in great agony, vomiting, and screaming from pain in the calves of his legs and in the abdomen. He was told to go to his room in the hospital building basement. As I was busy in the operating-room they neglected to notify me until about six o'clock in the evening. I responded at once and met Crowe going to the basement from the water-closet in the yard. His appearance was startling; his face was deathly in its pallor; his lips were blue; his eyes were wild and staring, and his whole countenance expressive of great suffering. When asked his trouble, he begged for relief for the pain in his abdomen and legs, and for the diarrhoea and vomiting, which he said was continual. I told him to go to his room, which was apart from the others, and ordered for him Opium, Gr. *i*; Bismuth Subnitrate, Gr. *xx*, with whiskey $\frac{3}{4}$ ss; intending to see him again in a short time. About a half an hour later, while in the medical ward, I heard the man screaming, and then ordered that he be brought up-stairs and placed in bed. When he was brought into the ward I had him placed in a room where he was isolated from the rest of the patients. At this time his appearance was as described above, his extremities were cold, his pulse about 120 and barely perceptible at the wrist. He was screaming with pain and seemed in great agony. His fingers were cramped, great bunches appeared in the calves of legs, his finger tips were blue. His temperature was not recorded but seemed sub-normal. All this time he complained of excruciating pain in his abdomen, chest, the calves of the legs and the arms. He was tormented with a terrible thirst. He vomited continually without any nausea. His bowels moved every two or three minutes, and were of the peculiar whitish color, which has given them the name of rice-water stools. His face had the wan and pinched look of an infant moribund from marasmus. I ordered Morphine, Gr. $\frac{1}{4}$; Whiskey, $\frac{3}{4}$ ss; directed the nurse to place the patient's clothes temporarily in a tub of boiling water and cautioned him as to the means to protect himself. Satisfied that I had to deal with a case of Asiatic cholera, I immediately notified the visiting physician, Dr. Hommell.

At eight o'clock I again saw the patient, who seemed somewhat improved, his face presenting a healthier appearance and his pain not so severe. Dr. Hommell arrived about 8:30, verified my diagnosis and immediately set out to notify Dr. Converse, the County Physician. At 11:00 I again visited the patient, and found him in about the same condition. I then ordered the same treatment every three hours during the night.

At 9:00 A. M. I again visited the patient and ordered Opium Pulv. Gr. *i*. Bismuth Subnitrate Gr. *xx*. every 4 hours with Whiskey $\frac{3}{4}$ ss. He was also given milk and lime water at frequent intervals, but neither the drugs nor the milk would be retained on the stomach more than five minutes. About 9:30 Drs. Converse and Hommell saw the patient. Previous to this the man's clothing had been placed in HgCl₂ Sol. 1-1000, and the attendants given directions as to the care of their hands and person after contact with the patient. From that time until noon the condition of the patient remained about the same, the discharges continuing and remaining of the same character, and the painful cramps in the abdomen and legs still retaining their intensity. About noon the vomiting began to be less frequent, and the stools, also less frequent, changed their character, becoming more or less bloody until finally they seemed to consist entirely of blood. I saw him twice during the afternoon, and each time his general condition remained unchanged, although his pulse seemed slightly stronger.

At 6:30 P. M., while I was present, he sat on the pail in which his discharges were deposited, and although a moment before in fair condition, he suddenly fell to the floor in complete collapse. After being lifted into bed he recovered, and when asked how he felt, said that he was much better. From that time until he died, about 8:30 P. M., his discharges were less frequent, but two attacks similar to the one just described took place in the interval. At no time during his illness did his reason suffer; on the contrary, he was perfectly rational a few moments before his death.

Immediately after his death his body was removed to the morgue, and with all his clothing, as well as the mattress and bed. The clothing on the bed was placed in the coffin with the body; the room in which he died was closed, and the next day fumigated with Chlorine Gas, then washed with HgCl₂ Sol. 1-1000.

The next day, August 31st, Dr. Doty, of New York City, secured from the body some of the excreta for a bacteriological examination, and on September 2d, Dr. Herman Biggs reported the discovery of the bacillus of Asiatic cholera, thus confirming our diagnosis.

It might be of interest to note that the negro, John Elsworth, alias Morse, who had been suspected of dying from cholera, was admitted to *and died in the ward in which Martin Crowe was a patient*, Crowe being admitted August 19th and discharged August 23d, while the negro was admitted August 20th, and died August 21st. On the other hand, the woman Josephine Smith, the other cholera suspect, was a patient in another building from August 26th, till she died about 1.30 A. M., August 29th. Her soiled bed linen was in a tub in the laundry, separated from all other clothing. Crowe was seen helping the laundress about the laundry on the morning of August 28th.

JOHN P. COONEY, M. D.

September 10th, 1893.

It was on August 31st that material was procured from the case of Martin Crowe, at the Jersey City Hospital, for a bacteriological examination at the laboratory of the New York City Board of Health. Report therefrom was made as to it September 2d, namely, that the spirillum of cholera had been found. The following letter from the biological representative of the Marine Hospital Service is also confirmatory:

(Copy.)

MARINE HOSPITAL SERVICE,
MIDDLE ATLANTIC DISTRICT,
SURGEON'S OFFICE, PORT OF NEW YORK,
"QUARANTINE," Sept. 18, 1893.

Surgeon-General Wyman, U. S. Marine Hospital Service,
Washington, D. C.

SIR—In reply to your reference, forwarding a letter from Dr. Ezra M. Hunt, making inquiries confirming my confirmation of the diagnosis of Dr. Doty, &c.

I have to state that I was present in the laboratory of Dr. Briggs where the various cultures, plates, &c., were made of the suspected case, and was given an opportunity to examine them

and satisfy myself that the material gave all the bacteriological evidences of Asiatic cholera.

I have the honor to be, very respectfully yours,
J. J. KINYOUN,
P. A. Surgeon.

(Inclosure)

Two or three days after, the body of Mrs. Josephine Smith, who had died at the hospital, and been buried in a metallic coffin without change of clothing, was exhumed and examined by the same biologists. The results in the case were negative.

The following is the report of this case from the Hospital Physician:

REPORT OF SUSPECTED CASE OF ASIATIC CHOLERA, JERSEY CITY
HOSPITAL, AUGUST, 1893.

About noon of Saturday, August 26th, 1893, there was brought to the hospital in the ambulance, a woman with the following history: Josephine Smith, age 28, married, born in the United States, resided at No. 3 State street, Jersey City. On the preceding Monday, August 21st, her brother-in-law, William Morton, who also resided at No. 3 State street, had been suddenly taken ill with diarrhœa, vomiting, pains in the abdomen and legs. He suffered intense agony until his death, the next day, August 22d. Morton had been employed in Washington Market, New York City, and had handled a great deal of imported fruit, of which he had partaken freely. Mrs. Smith had been in constant attendance upon him during his short illness, and at that time was in her usual good health. Morton's body remained in the house until Friday morning, when it was buried.

On Thursday, August 24th, Mrs. Smith did not feel very well, being a little nauseated and having some diarrhœa. Friday morning, just before she left the house for the cemetery, she ate a piece of muskmelon and drank a glass of beer. While in the cemetery, she was suddenly attacked with severe pains in the abdomen, and felt great desire to go to stool. These pains continued after she returned to her home, and her bowels moved several times and she vomited continually. She said that she was very much prostrated, and for some reason laid on the floor of

her room for two or three hours, before receiving any attention. A short while after her return from the funeral, she began to have cramps in her legs and hands. These symptoms continued until the next day, when a physician was called who prescribed for her, and whose name was used by her friends in requesting admission to the hospital. (These facts were obtained from the patient with great difficulty.)

The woman's appearance when she was brought to the hospital was sufficiently alarming. Her face appeared pinched and pallid; her eyes had a peculiar staring appearance and she seemed completely apathetic; her fingers were cramped, the finger-ends blue; around her eyes were dark rings; the radial pulse was about 130 and barely perceptible; the skin had a clammy feel; in some respects her condition was like that of concussion or shock.

Regarding the patient as a suspicious case, but not feeling warranted in refusing admission under the circumstances, I ordered the woman placed in a small room in the female ward, where she would be somewhat isolated. I directed that all her clothing, with her soiled linen, be boiled apart from those of the other patients.

Immediately after being placed in bed she vomited, almost without effort, a considerable quantity of milky white fluid. This was followed by a copious discharge from the bowels of a peculiar whitish material. All this time she complained of excruciating pain in the calves of her legs, her abdomen and chest. I ordered *Opium Pulv. Gr. i*, *Bismuthi Subnitrat. Gr. xx* with Whiskey $\frac{3}{4}$, to be administered every 3 hours.

At 5 o'clock I again saw the patient, who showed some slight improvement, the pains not being quite so severe although still persistent. Great bunches of contracted muscle appeared on her legs and thighs at intervals. From the nurse I learned that the patient's bowels had moved four times and that she had vomited several times. I also learned that her menstrual discharge had returned, although only a week previous her regular menstrual period had been completed. At 6.30, when I made my regular evening rounds, her condition was unchanged, except that there had been no movement of the bowels since 5 o'clock. I ordered the same treatment continued during the night. From that time until 11 o'clock, when I paid my last visit for the night, there were three movements of the bowels and several attacks of vomit-

ing. At that time the general condition of the patient remained the same. All this time the diarrhoea was painless and entirely involuntary, almost unconscious.

During the night the same symptoms persisted, and at 9:00 A. M., August 27th, I ordered *Opium Pulv. Gr. i*, *Bismuth Subnitrat. Gr. xx*, with Whiskey $\frac{3}{4}$ ss, every four hours during the day. During the morning of August 27th; the diarrhoea and vomiting were relieved, and her general condition improved. During the afternoon she had two movements of the bowels, and vomited once, and then the diarrhoea and vomiting ceased, but the pains still continued. In the evening she reacted somewhat, her extremities became warm, her pulse more full, her color healthier, but her apathy still intense.

During the night she was given Whiskey $\frac{3}{4}$ ss, every three hours, and did not discharge anything from the rectum or stomach during that interval. When I saw the patient the next morning, August 28th, in company with Dr. Hommel, the visiting physician, she was in a semi-comatose condition and evidently moribund. Her pulse was imperceptible, her skin cold and covered with perspiration. On being spoken to she would respond, but inaudibly. During the day her condition remained the same, stimulants being administered at frequent intervals. Towards evening she became completely unconscious and remained so until she died, shortly after midnight. About two hours before her death she began to have general muscular spasm, which occurred at intervals until her death, and which were of the clonic type. Just previous to her death she discharged from her mouth a large quantity of frothy material.

On Saturday, September 2d, five days after her death, her body was exhumed and a specimen obtained from which a culture was made. A few days later Professor Biggs reported that the bacillus of Asiatic cholera had not been found.

The woman's body had been encased in an air tight coffin of metal, together with all the clothing about her when she died.

September 10th, 1893.

JOHN P. COONEY, M. D.

CASES OUTSIDE OF HOSPITAL.

JERSEY CITY, October 14th, 1893.

Ezra M. Hunt:

DEAR SIR—Your letter of October 9th, 1893, in reference to death of Elenor Lewis (August 24th, 1893,) received. In reply

would state that she was taken sick on August 23d, 1893, after a mild debauch of beer and boiled crabs. I saw her on August 24th, 1893, at 11 A. M. She was then in a state of collapse, pulseless, cold extremities, beady perspiration on forehead; was conscious, face showed anxious expression and pain, but was not drawn nor pinched.

Complained of much pain in the extremities; this pain was paroxysmal and most severe in the calves of the legs; had some abdominal pain. The diarrhœa consisted of four or five yellow watery movements. It was not profuse or rice water. The vomiting had been more severe and more profuse, occurring probably once an hour from beginning of sickness to time of death. It was greenish and watery, and was about a quart in amount. She died at 2 P. M. The case did not strike me at the time as one of cholera. Although I had never seen a case before to which I could compare it, yet I saw at once that the case was unusual, and appreciated the condition still more when other cases of sudden death were reported from that locality.

Respectfully yours,

W. L. PYLE.

124 HARRISON AVE., Jersey City.

E. M. Hunt, M. D., Trenton, N. J.:

MY DEAR DOCTOR—In reply to your favor of the 9th inst., would state that I was called upon to attend Augustus Hasslacker, who died August 24th, 1893, in West Bergen, a part of Jersey City. The patient, when I saw him, was beyond all aid, so far as recovery was concerned. He was in collapse, and free from pain. He stated that he had eaten crabs at Mrs. Lewis' hovel on the banks of the canal, and had also drunk freely of beer at the repast in which so many unfortunates met their deaths. The patient had had vomiting, serous dejecta and cramps. I diagnosed the case as one of cholera morbus, and have not seen any reason to alter my opinion.

As to causation, I would like to enlighten you somewhat. The shanty which was kept by the woman Lewis was one hot-bed of filth and uncleanness. The canal is rife with dead dogs and dead cats, and it is no new thing for the youths of the neighborhood to bring up a decomposed specimen of the feline or canine race, adherent to which are numerous crabs. My opinion is that the people in the shanty partook of such crabs, which were full of decomposing animal matter. It is more than likely that these crabs were thrown into boiling water without even any preliminary cleansing, and hence the result. Ptomaines, in all probability, played their part in producing havoc and death among the participants of that horrid feast.

Yours fraternally,

October 24th, 1893.

WALTER WILKINSON.

The following letter from the Health Inspector is worthy of careful notice:

JERSEY CITY BOARD OF HEALTH,
OFFICE OF THE HEALTH INSPECTOR.

JERSEY CITY, September 23d, 1893.

E. M. Hunt, M. D., Secretary State Board of Health:

SIR—In answer to your letter requesting me to trace the cholera case in this city, I will state the result of my investigation. Morse Ellsworth, the colored man who went to the hospital on the 19th of August and died on the 20th, came from the foot of Culver avenue, the home of the Lewis family.

William Morton died on the 23d of August. On the evening of the 19th of August Morton and some friends were at a picnic held in the Schuetzen Park, Greenville, by the Fox Association, composed of men employed in the Bergen Steel Works, the place where the Lewis' say they got the water in which the crabs were cooked. Morton returned to his home at 2 A. M. on the 20th of August, and complained of feeling bad; also of having diarrhœa. He retired to his bed in the evening at 12 midnight; got up and went to his work in New York. He returned on the 21st at noon time, still complaining and lounging around all the afternoon. At supper time his wife noticed that he was going to the closet continually. He retired early, but did not sleep, being up and down all night. On the 22d she noticed a great change in him. His face was drawn up, his eyes were sunk in. The change was so great that she asked him to let her send for a doctor, which he refused. But she went to a drug store and got some cholera medicine, and on her return, found him much worse, and complaining of his legs being cold and crying out that the cold was creeping up towards his heart, saying "go for a doctor or I will die." His legs and fingers were drawn up, and he died in great agony. About three hours before he died he was black from the hips down to the toes. Mrs. Lewis and Gus Haslach died August 24th. Mrs. Collins died August 25th. Josephine Smith, Morton's sister-in-law, who had nursed him, died August 28th. Martin Crow died August 30th. You will see that all traces point in one direction, to wit: toward the Lewis shanty, or the crab cases.

Ellsworth, Mrs. Lewis, Haslach and Mrs. Collins, it is admitted, eat of the crabs, Morton being to the picnic held by the people living in the vicinity of the Lewis home, and some of them in the habit of visiting her. Josephine Smith nursed Morton, and Martin Crow was at the hospital when Mrs. Smith died.

Yours respectfully,

D. W. BENJAMIN,
Health Inspector.

Full inquiry as to the business of Morton shows that he had nothing to do with foreign fruits, but assisted a firm in Washington Market who dealt with American fruits. At the time these cases were being investigated by the Local and State Boards and also in person by Drs. Jenkins and Edson of New York city, and Surg. Gen. Wyman of the Marine Hospital Service, all were unable to trace connection of the three groups that appeared, but by much inquiry thereafter, when all fears were allayed, the facts here given were ascertained and seemed to point to the Lewis house, at the foot of Culver avenue, as the foci around which all the cases seemed to center.

From the date of Martin Crowe's death the City Board of Health redoubled its energies and had present with it also an Inspector of the State Board, with readiness to furnish any additional assistance that might be asked. As soon as the result of the examination was known the City Board of Health of New York city, the Marine Hospital Service and the Medical Officer of New York Quarantine proffered any assistance that might be needed. The City Board, through Messrs. Feeney and Benjamin, informed all that they were in readiness to meet any emergency, except that there might be some lack of competent Medical Inspectors. Accordingly, the New Jersey State Board of Health furnished a Medical Health Inspector to be constantly at the Jersey City Hospital, and three others at the command of the Board for local use, while the Marine Hospital Service furnished four Medical Inspectors to aid in special care of any cases that might occur in the immediate vicinity of the threatened localities.

Although there had been these several cases of sudden sickness, it was fortunate that the exposure had not extended to many families. Yet such are the intimate relations of Jersey City to interstate transportation, as well as to steamship companies, that it was felt to be a point at which, for a few days, there could scarcely be an excess of precautionary measures. The railroad companies were at once prepared to cooperate with us, while the City Health Board showed that it had at its command an effective force ready to confront any more extended invasion.

It was the great joy of all concerned that there were no signs of any other cases, and that this group stands alone in the State and in the country for study.

This case, or group of cases, at Jersey City, as the only one occurring, outside of New York Quarantine, on this side of the Atlantic Ocean in 1893, and because of some peculiar facts, has excited much attention.

Those who regard the cholera spirillum as the irrefragible proof of Asiatic cholera seek to show how Martin Crowe received the micro-organism. He was well known in the hospital and had been there since August 19th.

Since it is known that the negro, Ellsworth, was of the beer-crab party, it is claimed that he contracted it from him, if not from Mrs. Smith, the sister-in-law of Morton, who had been to the picnic.

But here again the difficulty is to find how any of the beer and crab group had been exposed to Asiatic cholera. Mrs. Lewis, it is in evidence, had suffered from diarrhœa before the night of August 19th, so that she ate but a single claw of one crab. None of those who sickened and died seemed to have any relation to any immigrants, but were long and well known residents of their respective neighborhoods. As there had been no Asiatic cholera in Jersey City for twenty-five years, it hardly seems as if it was "recrudescence," or a living over of the germs.

We find that most of the physicians knowing of these cases regard them as the same in character and believe that all seven deaths were from the same cause.

Those who, with Buchner, Klein and many others, do not believe that the comma bacillus is necessarily indicative of Asiatic cholera, regard it as occurring in other cases of diarrhœa which become specialized into an infective type. While not regarding it as causal, or as denoting an Asiatic source, such nevertheless think it most important as of diagnostic value, because indicating a special form of infective bowel disturbance.

In view of such cases, and of others that have occurred in England and on the continent of Europe, and in view of the expressed belief of many physicians of India, we need very carefully to re-study all forms of diarrhœal flux in their relation to specific microbes.

It is significant that the question whether there are not other forms of cholera that are specific in their character is not being overlooked, and that many good authorities are looking

into the question whether the comma bacillus of Koch, or forms very closely allied thereto, do not occur in other forms of cholera than that known as Asiatic. "It requires to be definitely cleared up whether the bacillus is the invariable concomitant of Asiatic cholera and of no other disease whatever, or whether it is only the concomitant of a morbid process, or a condition commonly present in cholera and but rarely met with in any other disease."

Cases like the outbreak last year at Nanterre, near Paris, and like the recent epidemic at Greenwich workhouse, England, are not of very infrequent occurrence. On this latter we have this comment:

"The patients, according to the accounts, are suddenly seized with violent cramps, diarrhoea, and vomiting, and in many instances these symptoms have been accompanied by marked collapse. The vomit and motions do not, however, appear to have been of a typically rice-water character; specimens of the motions, as also pieces of the ilium from patients who have died, have been examined by Dr. Klein for the Local Government Board, and although he appears in the first instance to have been extremely suspicious of cholera, and to have found by microscopic examination numerous comma bacilli, he was apparently unable to substantiate his suspicions by subsequent cultivations. Whatever the nature of the disease may be, there seems to be distinct evidence pointing towards its infectious nature."

While all infective diseases are generally acquired by contagion from a previous case, the study of the possibility of changes and of evolutionary forms of bacterial products is becoming more and more interesting.

We can no longer rest upon the oft-quoted dictum of Harvey, "*omne vivum ex ovo.*" As to it Prof. Rudolph Virchow, in his Croonian lecture in London, March 16th, 1893, says: "Owing to the more extensive researches of modern investigators, this dictum, as is well known, proved too narrow for the whole animal kingdom, and is no longer exact when applied to plant life. Its validity for the higher animals, on the other hand, cannot be questioned."

Availing ourselves of the common faith in the value of the biological evidence, and of the origin of Asiatic cholera as being only from imported cases of the Asiatic disease, we do well to bear in mind the perplexing absence of links in the chain of

evidence of foreign origin as found in such cases as these. Let us also never lose sight of the undoubted relation of personal condition and environment to malignancy and death.

II.

THE DIPHTHERIA EPIDEMIC AT HIGHTSTOWN.

BY A. CLARK HUNT, M.D.

On the 25th of June, the State Board of Health was requested, by telegram, to send an Inspector to Hightstown at once, to advise as to a serious epidemic of diphtheria which had caused nine deaths and which seemed to be spreading rapidly. This request was at once complied with and the town was visited on the 26th. A meeting of the Local Board of Health and the Mayor was held and advice was given as to the enforcement of strict quarantine, isolation, inspection of all places where cases had occurred, and distribution of circulars giving information as to care of contagious diseases. While discussing the possible cause, local or otherwise, for the epidemic, the close connection between the cases and the delivery of milk by one milkman became apparent, so that it seemed wise to at once prohibit further supply from that dairy until more extended investigation could be had.

GENERAL HISTORY OF CASES.

Each of the physicians practicing in the town was visited and a list of cases, with particulars, obtained. All of them stated that during the early spring and summer they had quite a number of cases of follicular tonsillitis but no cases of true diphtheria, except as given in the adjoining lists:

I.—CASES IN DR. WILBUR'S PRACTICE.

	Age.	When Taken.	Result.	Milk Supply, &c.
R. M. J. S., . . .	Adult.	May 10th.	Recovery.	Had been to Trenton.
N. D.,	10 years.	June 17th.	Recovery.	Albert Chamberlain—at times.
F. T.,	17 years.	June 16th.	Recovery.	Albert Chamberlain.
F. C.,	12 years.	June 18th.	Recovery.	
J. D.,	16 years.	June 25th.	Recovery.	Albert Chamberlain.
Miss S.,	20 years.	July 23d.	Recovery.	Albert Chamberlain, at hotel.
B. O.,	7 years.	July 24th.	Recovery.	Albert Chamberlain.
A. C.,	10 years.	July 24th.	Recovery.	Albert Chamberlain.
N. T.,	19 years.	July 24th.	Recovery.	Albert Chamberlain, child of milkman.
N. T.,	Adult.	July 25th.	Recovery.	Albert Chamberlain.
M. B.,	Adult.	July 25th.	Recovery.	Albert Chamberlain.
V. N.,	8 years.	July 25th.	Recovery.	Albert Chamberlain.
M. D.,	Adult.	July 26th.	Recovery.	
S. T.,	19 years.	July 26th.	Death.	Albert Chamberlain.

Total—14 cases, 1 death, all but two using Albert Chamberlain's milk

II.—CASES OCCURRING IN DR. G. H. FRANKLIN'S PRACTICE.

	Age.	When Taken.	Result.	Milk Supply, &c.
E. D.,	4 years.	June 10th.	Death.	Albert Chamberlain.
Mrs. D. B. D.,	Adult.	June 15th.	Recovery.	Albert Chamberlain.
A. R.,	15 years.	July 18th.	Death.	Not known—worked on thresher.
G. L.,	19 years.	July 18th.	Recovery.	Worked at Chamberlain's and bottled milk.
L. C.,	Adult.	July 20th.	Recovery.	Chamberlain's—worked at Blauvelt's.
G. H.,	5 years.	July 20th.	Death.	Did not use Chamberlain's.
M. M.,	7 years.	July 22d.	Death.	Chamberlain's.
L. C.,	19 years.	July 24th.	Recovery.	Chamberlain's—contracted from Law-son.
H. A.,	5 years.	July 24th.	Recovery.	Chamberlain's—undertaker's child.
H. R.,	4 years.	July 22d.	Recovery.	Did not use Chamberlain's.
Miss B.,	Adult.	July 24th.	Recovery.	Albert Chamberlain's.
W. R.,	11 years.	July 25th.	Recovery.	Albert Chamberlain's.
R. M.,	4 years.	July 27th.	Recovery.	Albert Chamberlain's.
C. W. M.,	Adult.	July 29th.	Recovery.	Albert Chamberlain's.
C. W.,	15 years.	Aug. 2d.	Recovery.	Contracted at Hartman's.

Total—15 cases, 4 deaths, 11 using Chamberlain's milk, 1 not known, 2 did not use it, and 1 by direct exposure.

III.—CASES OCCURRING IN DR. JOHNSON'S PRACTICE.

	Age.	When Taken.	Result.	Milk Supply, &c.
P. P.,	3 years.	July 19th.	Death.	Albert Chamberlain's.
H. Q.,	Adult.	July 20th.	Death.	Albert Chamberlain's.
Mrs. P.,	Adult.	July 21st.	Recovery.	Albert Chamberlain's.
Case P. house,	Adult.	July 22d.	Recovery.	Albert Chamberlain's.
G. N., 5 cases,	Started July 21		One death.	Albert Chamberlain's.
Mrs. J.,	Adult.	July 25th.	Recovery.	Nurse of Norton cases.
Pr.'s child,	3 years.	July 23d.	Recovery.	Chamberlain's.
A. J. A.'s child,	10 years.	July 23d.	Death.	Chamberlain's milk, occasionally.
Miss F.,	Adult.	July 27th.	Recovery.	Worked at Blauvelt's and used the milk there.

Total—13 cases, 4 deaths, 12 used Chamberlain's milk, 1 by direct exposure.

IV.—CASES OCCURRING IN DR. TITUS' PRACTICE.

	Age.	When Taken.	Result.	Milk Supply, &c.
J. McD.,	Adult.	July 20th.	Recovery.	Albert Chamberlain's and Wilson's.
W. B.,	9 years.	July 21st.	Death.	Albert Chamberlain's and Kershaw's.
N. T.,	11 years.	July 22d.	Recovery.	Albert Chamberlain's. } Lived in
E. S.,	1 year.	July 22d.	Death.	Albert Chamberlain's. } same house.
R. V.,	1 year.	July 24th.	Death.	Albert Chamberlain's. } Died at
Mrs. C.,	Adult.	July 25th.	Recovery.	Albert Chamberlain's. } Eatontown
Mrs. S.,	Adult.	July 30th.	Recovery.	Albert Chamberlain's.
E. S.,	Adult.	Aug. 2d.	Recovery.	Albert Chamberlain's.
Mrs. V.,	Adult.	Aug. 2d.	Recovery.	Had visited McDaniels' two weeks before.

Total—9 cases, 3 deaths, 8 used Chamberlain's milk (two of whom used other milk besides), 1 by direct exposure.

It will be seen from an analysis of these cases that there are fifty-one in all, twelve of which were fatal. Of these fifty-one, forty-three used milk obtained from Albert Chamberlain's dairy. Three are known to have been exposed directly to the disease. Two are known as not having used the milk and the remaining three probably did not. Two had been occasionally from home but could not be traced to any infecting source.

Grouping the cases together as to date of onset, we have the following list:

May	10.....	1 case; very light; came from Trenton.
June	10.....	1 " } same family.
"	15.....	1 " }
"	16.....	1 " }
"	17.....	1 " }
"	18.....	1 " }
"	25.....	1 " same family as the case of June 17th.
July	18.....	1 " }
"	19.....	1 " }
"	20.....	4 cases.
"	21.....	7 " }
"	22.....	6 " }
"	23.....	3 " }
"	24.....	7 " }
"	25.....	6 " }
"	26.....	2 " }
"	27.....	2 " }
"	29.....	1 case.
"	30.....	1 " }
August	2.....	3 cases.

The case occurring May 10th may be excluded, as it was in an adult who had been away from home, and who recovered in a few days and showed none of the constitutional characteristics of the disease, although slight patches appeared on the tonsils.

Of the six cases occurring from June 10th to June 25th, four of them were in two families, so that only four foci are represented. One of the patients died but no public funeral was held and there is no connection traced between the cases.

It is noticeable that from June 25th there were no cases reported until July 18th, and from this date until August 2d, there are a number of cases recorded (44) and with no connection between them either by funerals being public or by visitation or public contact.

Why, then, at this time, should there have been this sudden increase of the disease? This leads us to the most interesting part of the history.

A boy by the name of George Lawson came to live with Mr. Albert Chamberlain, the milkman, April 27th. He left there July 3d, and visited Philadelphia going to 2135 American street. July 4th he attended a picnic at Roxborough, near Manayunk. He returned July 5th. July 22d he presented himself at Dr. Franklin's office and the diagnosis of diphtheria was made. The physician sent him at once to his home bearing a note to his employer, stating the nature of the disease and adding a word of caution.

Dr. Franklin states that the appearances were such as to indicate that the disease had been present for several days previous, which would make the date of appearance, July 18th.

Mr. Chamberlain sent for the overseer of the poor, who took a horse and carriage and drove to Princeton Junction the same afternoon and put the boy on a train for Philadelphia. He then went to the Hotel De Norris, on Third street below Norris street. He staid in the city a week, changing his sleeping place several times. Tuesday, after reaching the city, he visited the hospital of the P. E. Church, Front and Lehigh avenue, and says his throat was lanced, but a communication received from the hospital physician states that the diagnosis made was tonsillitis.

This boy had to wash the bottles and milk the cows and worked up to Friday night, July 21st. Miss Chamberlin, the daughter, who was attacked July 25th, also assisted in washing the bottles from July 19th to the 21st. The milk was not kept in the house. The habits of the boy as to personal cleanliness, from personal appearances, were not of the best.

The milk was served from this dairy until July 26th, when it was stopped by order of the Board of Health.

Dairy Commissioner McGuire was requested to make an investigation as to the condition of the dairy and cattle. He reported that the herd was in good condition and no disease of any kind was discovered. That the feeding was proper and that outside of a few potatoes no change from ordinary feeding had been made.

The herd was also examined by a veterinarian of the State Board of Health with like results.

Mr. Chamberlain supplied seventy-six customers in various parts of the town.

There are besides in the town six other milkmen supplying a much greater number, and on none of the other routes was there a case of the disease which occurred, although in one or two instances milk was taken from both Mr. Chamberlain and some other milkman.

An examination of the town was made and, outside of some pig-pens and a filthy pond, there were no special nuisances discovered. The disease was in the best localities and was widely spread.

CONCLUSIONS.

The theory is, therefore, that the boy Lawson had been suffering with diphtheria on and possibly before July 18th; that he had bottled the milk, and in the handling of it, in some way, the disease was transmitted to the various persons affected.

The objections to this theory are:

1st. That the disease had existed in the town long before the Lawson case, and that we should therefore look elsewhere for the cause.

2d. That several cases had occurred just before his, in the later outbreak.

The first objection is answerable, as there was an interval of twenty-three days between the first cases and the last outbreak.

The second is more difficult, yet we have occasion to suppose, from the statement of Dr. Franklin, that although Lawson did not present himself for examination until July 22d, he had been suffering from the disease for several days.

The evidence also is very striking that there were no sufficient local conditions discernible; that the disease spread so rapidly, that it occurred upon but one milk route out of seven in the town, and that the stopping of this particular supply, seemed to limit the extension of the disease.

We are therefore led to adopt the theory of milk contamination as the probable cause of the later outbreak.

Had there been more of diphtheria than two or three cases, before July 20th, we would here still have a group of numerous

cases, occurring with rapid frequency, in different parts of the town, which seemed to single out from all other families those families supplied with milk from this one source. The milk had every opportunity to become charged with the poison of diphtheria, not merely from the air, but from direct contact with one or more persons, who attended to the washing of bottles and the bottling of the milk.

One of the same family was taken sick July 25th. The contagion seems to have persisted in the house for over a month after. When the special outbreak at Hightstown had fully ceased, a lady and gentleman, of different families, and not living in the town, visited the house together and soon after had the disease. The lady while there tried on a dress belonging in the house.

Soon after the delivery of the milk was stopped, the disease began to abate in Hightstown. The cases were not seen by this Board in time for biological examinations, but the more we have examined into all the facts the more fully are we satisfied of the relation of this group of cases to the milk supply.

As a result of thorough co-operation of the local and State authorities, and the physicians of the town, the epidemic was soon controlled.

The special lesson to be learned, although daily taught, is that there should be the most careful supervision of all the details of milk collection, and that in dealing with these preventable diseases, we cannot insist too strongly that there must be prompt and thorough isolation of first or suspicious cases and the most perfect attention to the minutest details.

NOTE BY THE SECRETARY.

Dr. Ernest Hart, of London, at the International Medical Congress, 1881 (see Transactions, vol. 4, page 491), reported fifty typhoid epidemics, fourteen of scarlet fever and seven of diphtheria, which up to that date had been traced to milk.

In the reports of the Local Government Board since then, Mr. Power has shown extensive outbreaks of diphtheria to be traceable to milk supply. Various other papers and reports from year to year up to this date have settled the question that diphtheria may be conveyed by means of milk.

Dr. R. W. Parker, in his recent work on diphtheria, notices the fact that much depends upon the quantity consumed, and so concludes that "the dose in which the poison is administered largely determines the issue in any given case."

It is now well recognized that diphtheria, as a rule, arises from minute specks or particles of the membrane, or contagion, getting into the mouth and nasal passages. It is local before it is constitutional, and is conveyed both by inhalation and by means of food or liquid containing the infective particles. Some are more easily affected than others, and some not at all if in perfect health conditions. It is quite certain that both the quantity of the poison, the condition of the person and the degree of surrounding cleanliness have influence upon seizure or upon the gravity of the disease. There is, therefore, no disease in which there should be more precise methods.

We notice some defects as to the early dealing with this outbreak, not to censure persons or boards, but because similar oversights are too common, and, if not resulting in general epidemics, imperil individual lives.

So soon as a dairyman discovers diphtheria in his household, or knows of direct exposure thereto, he should see to it that the person, or any one waiting upon the case, has nothing to do with the milk. Milk is an active absorbent, a favorite culture fluid for low forms of vegetative life. Milking or handling of the milk so brings the person in contact with it as to give a special risk. We do not say that the vending of milk should at once cease when a case occurs in a milkman's family. In this case, as the milk was kept and handled outside of the house, isolation would have been easy had the danger been suspected.

There should be very early and complete isolation of all suspected cases.

There should be prompt notification. Health Boards should definitely require this, and physicians comply with it. It cannot be expected that each private family will know its importance. It will not always be necessary for an Inspector to visit. Often physicians who are known add to the notice that they will be responsible for due precaution, and will notify in case assistance is needed. There may be reasons against general publicity of each individual case, but all such questions of expediency should

be left to the Local Board. Our law fully recognizes this in the same section in which it provides payment for notification. (See Section 26, Chap. 68, Laws of 1887.)

Local Boards should exercise some control over milk supply. The law not only includes oversight thereof under its general terms (see Chap. 68, Laws of 1887, Section 12), but by special laws (Chap. 74, Laws of 1882, and Chap. 207, Laws of 1893), gives special powers either to the governing authorities of cities or to Health Boards. Every Board can inspect dairies, and, if need be, the governing authorities of a town may require license for the vending of milk. Where the family of a milkman supplying a town is being attended for diphtheria by a physician of the town, he should notify his own Local Board or the Board of the township in which the case occurs, so that these may be assured that all proper precautions are being used.

In no case should a patient, sick with diphtheria, be transported in public conveyance without medical oversight and with due precautions. In this case an employer and an overseer of the poor thoughtlessly united in a wholesale exposure of passengers and of the people by sending this boy to Philadelphia on the cars, without plan for proper guard in going or upon arrival. When the facts became known, great indignation was expressed by the railroad authorities as well as by the public at large.

We think that physicians need to be urged to a grave sense of responsibility as to the spread of disease. We know how faithful many of them are, but some, we are sorry to say, seem to forget the duty of protection which they owe to the family and the people, as involved in the duty which they owe to the patient. A word to the wise is sufficient.

Sad losses which occurred to families in this pleasant village, the entire prostration of business, and the perils to the public at large should be enough to re-enforce the cautions so often given in Circular 77 of this Board, and in its reports as to accurate methods in dealing with this disease.

III.

DIPHTHERIA IN MILBURN TOWNSHIP, ESSEX COUNTY—D. E. ENGLISH,
M. D., HEALTH PHYSICIAN.

There occurred in Short Hills Park or the immediate vicinity, between September 28th and October 7th, 1893, twenty cases reported as diphtheria and eighteen cases of sore throat not regarded as diphtheria by the attending physicians. It may be that some of the cases regarded as diphtheria were not that disease; it is extremely probable that some cases called simple sore throat or follicular tonsillitis were diphtheria. A positive diagnosis of diphtheria is often impossible without bacteriological investigation. The disease properly known as diphtheria is caused by the implanting on the mucous membrane of the mouth, throat or nose of a particular germ, known as the Loeffler bacillus, and of its development and multiplication there. Without this germ most say there can be no diphtheria. The germ is not of spontaneous origin, but each germ comes from a preceding like germ.

As it is necessary to plant grain in order to reap grain, so is it equally necessary to plant diphtheria in order to reap diphtheria. No matter how filthy a cellar may be or how full a house may be of sewer gas, there can be no diphtheria there unless the germ is brought and planted. But this plant, like others, prefers and grows most rapidly in certain kinds of soils. It seems to find a congenial soil in the human throat and in the throat of the domestic cat; also in the greasy filth from a kitchen sink and in rotting vegetable matter in dark cellars. It loves darkness rather than light and thrives on filth. Its greatest enemies are cleanliness, fresh air and sunshine. It is doubtful if a strong, healthy person, with a perfectly healthy throat and nose, can contract diphtheria, but one attack leaves the mucous membrane for a time in a condition favorable to the implanting of another crop of Loeffler bacilli whenever the seed presents itself. During an epidemic of diphtheria the people who escape are, in a general way, those with sound throats; those who have good general health; those who are much out of doors in the fresh air and sunshine; those who live in houses that are well lighted, well ventilated night and day, carefully plumbed and kept clean. The mild cases of diphtheria which pass for some other form of sore

throat are the most dangerous ones to the community, for as their virulence is not suspected they are often not quarantined or disinfected. The contagium from one of these mild cases can cause the most severe form in some other person. The disease is most often communicated by direct and close contact of one person with another, and especially by the act of kissing. It is also acquired by the handling or breathing in of particles of infected filth. There is also considerable evidence tending to prove that it can be carried from place to place and over long distances by infected clothing, books, etc. It is easily carried in the hair or whiskers and probably under the finger nails. It is also thought possible to convey the germ in milk, ice, water and food, and it can probably float through the air for a short distance.

From the foregoing statements you will easily appreciate the difficulties which beset any one who tries to find out the origin of an epidemic of diphtheria. In our investigation of the Short Hills epidemic we have been very materially aided by Mr. Albert L. Webster, of New York, a sanitary engineer of recognized ability, who was employed by Mr. Stewart Hartshorn to investigate the sanitary condition of the village. He has kindly communicated to us some of the results of his investigations. In the first place, he had secretions from the throats of six patients, living in separate houses, examined for the Loeffler bacillus by Dr. William H. Park, of the College of Physicians and Surgeons, New York. In every one of these the diphtheria germ was present. This finding is very interesting, for two reasons: First, these secretions were not obtained until the characteristic false membrane of diphtheria had disappeared from the throats of the patients, thus showing that danger from contagion is not past until some time after the disappearance of the membrane. Second, in one of these cases the physician in attendance emphatically declared that the patient did not have diphtheria. Now this physician is an able man in his profession, and is as capable of making as accurate a diagnosis as it is possible for any one to make without the microscope; which goes to show how impossible it is in some cases to recognize the true nature of the disease.

Mr. Webster also had the drinking water examined. The chemical analysis of the water was made by Dr. E. W. Martin,

analytical chemist to the New York Board of Health. The bacteriological analysis was made by Dr. T. M. Cheeseman, of the College of Physicians and Surgeons, New York. These examinations showed no evidence of contamination of the water supply. The milk was examined and the dairies inspected by Mr. George W. McGuire, of the State Dairy Commission of New Jersey, and were found to be above suspicion. The ice was analyzed by Dr. Cheeseman, and no Loeffler bacilli were found. Mr. Webster examined with great care the sources of the water supply, the sewerage system, and the plumbing of a number of houses, and although he found here and there minor defects, he found nothing to account for the epidemic. He pronounces the water supply, the sewerage system, and the general sanitary condition of the village, superior to most country places of its size. The surface drainage, he says, is adequate, and the source of the trouble is not marshy ground. As to the railroad improvements, he says the dirt removed is clean and free from refuse, and there has been no sickness among the workmen. He is positive the disease was brought from outside the village, and spread by contact from person to person.

Your Health Inspector also made a careful examination of plumbing and sewerage, and superintended disinfection. He will give his conclusions in a report separate from this.

Your Health Physician has made an earnest effort to trace the course of disease from house to house and from person to person. His conclusions in nearly all points coincide with those of Mr. Webster. The disease was introduced into Short Hills by two separate and distinct families, and can be traced case by case from these two sources with hardly a break. There was no communication whatever between these two families. The course of the development of the epidemic is shown in the following table:

This table includes all sore throats for the reason that some of these sore throats proved to be diphtheria, and it is impossible to tell now how many were diphtheria and how many not.

September 28th.—One adult in one house, two children in another house, with no communication between the two houses. As far as can be judged by clinical symptoms and signs these two children did not have diphtheria.

- September 30th.—One child. This case was, without doubt, diphtheria. This house was about as far from the first house as the limits of the village will permit, and there was no communication whatever between the two houses.
- October 1st.—Five adults with slight sore throats in two houses.
- October 2d.—Eight cases in three houses. These were very probably all diphtheria, although three of them in one house were not so reported. One of the three was proved to be diphtheria by the bacteriological examination.
- October 3d.—Eight cases in four houses. Three of these cases were not reported as diphtheria. These were in a house by themselves somewhat outside of the village.
- October 4th.—Three cases in one house, where there already was one case. Reported diphtheria.
- October 5th.—Five cases in five houses. In three of these houses there were already sore throats. Only two pronounced diphtheria.
- October 6th.—Three cases in three houses. In one house there were already several cases. Two were reported diphtheria; one, sore throat. The two reported diphtheria were fatal.
- October 7th.—Two cases in two houses, one house being already infected. One, reported sore throat; one, diphtheria.

Making in all thirty-eight cases, occurring in seventeen houses. Twenty of these cases were reported as diphtheria, sixteen as sore throat, and two cases were not treated by a physician and so were not reported. Of these twenty cases reported as diphtheria only two died. It is highly probable that of the thirty-eight cases thirty were diphtheria, and reasonably safe to say that twenty-five were that disease, for in one house, where there were five cases, all reported as sore throat, one of the five was proved to be diphtheria by the bacteriological examination. This would give a mortality of eight per cent. Recent statistics (see Medical Record, Nov. 11, '93, editorial) show that in diphtheria, proved genuine by bacteriological examination, and occurring in large cities (Boston and New York), and in hospitals, the rate of mortality is from forty to sixty per cent. In two recent epidemics reported from different parts of New Jersey the mortality was about forty per cent. The reason for our low mortality rate, we think, is to be found in the situation of Short Hills. The village is situated on an uneven

slope, having a southern exposure; the subsoil is a deep layer of glacial-drift gravel; the elevation is such that there is free circulation of air; the drainage is excellent; the water is pure; the houses are all modern and built on the best sanitary principles, and no nuisances are allowed. Truly, Short Hills is a good place to be sick in.

Great disturbances of the surface of the ground are very apt to cause sickness among the people living near by and among the workmen engaged in removing earth. The more common forms of sickness so caused are malarial diseases and sore throats. There have been a few cases of malarial nature among the workmen employed on the railroad improvements, but I have been unable to discover any cases of sore throats. The railroad improvements extend over five miles of territory, the diphtheria was confined to Short Hills village. There has been a good deal of diphtheria in New Jersey and vicinity this fall, where there were no great disturbances of the surface. These facts make it probable that the railroad improvements had nothing to do with the invasion by diphtheria, but also make it possible, if not probable, that they caused a condition of the mucous membrane of the throat, which would favor the growth of the Loeffler bacillus if they should come in contact.

In the fall and spring of the year, and during thaws in the winter sore-throats are common, and it is at these times also that outbreaks of diphtheria are most apt to occur. The one prepares the way for the other. It is our opinion that the recent outbreak in Short Hills was preceded by an epidemic of mild, simple sore-throat. These sore-throats may have been due to the season of the year. It was on these sore-throats that the Loeffler bacillus, introduced from outside the village, took so firm a hold and throve so well.

At the date of this writing, we are happy to be able to say that the epidemic of diphtheria at Short Hills is over and gone. Nothing remains of it but disagreeable and painful memories. Everything that can be done to prevent its re-appearance is being done. For the particulars of disinfection and general cleaning, we beg to refer you to the report of the Health Inspector.

IV.

SMALL-POX—VACCINATION—THE RED BANK EPIDEMIC.

BY E. M. HUNT, M.D.

In the 5th report of this Board (1881), in a series of articles from competent hand, the facts as to small-pox and vaccination up to that date were fully presented.

It is only our duty here to add any new facts that have since appeared, or to state the relative value of facts which since then may have undergone modification.

The disease itself is not claimed to have undergone any modification as to its origin, its type, its history.

No light has been thrown upon it by more recent researches in Biology and Epidemiology. In connection with the microphytic doctrine of diseases it was natural that it should at once be thoroughly scanned in the laboratory, and the clinique to know whether it had its specific micro-organism. All the more since what is now often called vaccination is applied as a mode of prevention for some of the microphytic diseases. But every oracle is dumb and science and art gives no response as to the microphyte of small-pox. In etiology, however, it has become a question, whether more than one disease is not related to it. Thus so good an authority as Fleming, November 12th, 1891, favors the conclusion that, although variolous diseases in the horse, cow and man are distinct, the inoculation of the virus of either of these affections protects from small-pox in man.

The valuable report of Mr. Powers, of the Local Government Board of Great Britain, as to the Fulham Small-Pox Hospital, sixteenth Loc. Gov. Report (1886), also serves fully to show the possibility of the dissemination of the disease from a small-pox hospital much further than was supposed, and teaches important lessons not only as to isolation, but as to the healing or destruction of infected clothing. (See also as to Warrington Hospital—*Lancet*, July 15th, 1893.)

The disease is regarded as contagious from the breath, the sputa, the skin, the secretions, as also that the scabs may long retain infected vitality. Susceptibility to it is so universal that even as to the few who, being fully exposed, have escaped, the question arises

whether they did not have the disease before birth or had not been self-vaccinated in milking.

Two eminent pathologists of England have their doubts upon the efficiency of vaccination. These are Prof. Creighton, of Cambridge, in his article in the *Encyclopædia Britannica*, and Prof. Crookshank, of London, in his two exhaustive volumes on "The History and Pathology of Vaccination" (1889). Yet, with all the elaboration of these works, the fact still remains that practice is greater than theory, and that as a result of actual experience, the profession still clings to vaccination as the great prophylactic. Indeed, it can be said to be gaining ground.

The use of bovine lymph has fully vindicated itself, and both it and humanized virus are used with success.

In recent outbreaks of the disease in New Jersey it has been a pleasant experience to note the increasing confidence, both in vaccination and isolation, as effective to prevent spread, so much so that the absence of such panic as was formerly common is generally very noticeable.

RE-VACCINATION.

As to the frequency with which vaccination should be performed, there has been in the last score of years a great change of opinion. It has long been advised that in case of exposure there should be re-trial, for fear that the first vaccination had been imperfectly performed, or because of its limitation by sickness, change of life and locality, etc. But the doctrine of to-day as set forth in the circular of the Local Government Board, G. B., and as also set forth in various societies and publications in this country, now is that all persons should be re-vaccinated at least once after twelve years of age. We quote as follows from the English report:

"Evidence of the additional protection against small-pox given by a re-vaccination can be found abundantly by any one who chooses to seek for it. It can be got from the experience of re-vaccinated communities living in the midst of communities not re-vaccinated, as in the case of the permanent officials of the postal-service living in London; or it can be got from the experience of nations, differing in their small-pox death-rates as their laws for re-vaccination differ; witness the contrast between the

German and Austrian rates of small-pox mortality since the time when Germany, but not Austria, enforced re-vaccination upon children of school ages. Or evidence to the same effect is to be had by observing the immunity from small-pox, for year after year, secured to nurses in small-pox hospitals by re-vaccinating them before entering on their service. This last is perhaps the most obvious of all such examples; and in the few instances where there has seemed to be exception to the rule of their immunity, it has almost always turned out that the requisite re-vaccination had been by some chance omitted.

"The re-vaccination which is proper to be done for every child ought to be a matter of regular system; done as regularly, it were to be wished, as primary vaccinations are done for infants. There should be no waiting until an alarm about small-pox is raised. The importance of these considerations will be obvious to any one who considers the conditions for the proper performance of re-vaccination. The lymph has to be obtained from cases of primary vaccination; it must not be taken from cases of re-vaccination; it ought to be used in the freshest possible state, and, whenever practicable, direct from the primary vaccine vesicle.

* * * * *

"Medical and sanitary officers and the medical profession generally are therefore invited to urge upon parents and guardians the importance of having their children re-vaccinated at the age of twelve years or thereabouts, and to urge upon all persons beyond this age who have not yet been successfully re-vaccinated the duty of obtaining for themselves the additional protection which may be had by this means."

In the German army re-vaccination is now made obligatory. Some very significant statistics as to the good results of re-vaccination are given in the sixteenth report (1892), page 536.

Too much emphasis can not be laid upon the importance of securing lymph from well-authenticated sources and performing the operation with technical skill.

The sources of supply of bovine lymph have so multiplied and the possibilities of supplying ineffective lymph are so great that we believe the time has come when all this supply should fall under the jurisdiction of the Boards of Health.

As now furnished, also at second hand through druggists, there is often too little security that the lymph is fresh. This, if true, is so radical a defect as to be alarming since at the time of an outbreak of small-pox, vaccination with ineffective lymph is a false security fraught with immediate peril.

Small-pox has broken out in a family, and several have been exposed; vaccination within a day or two days is an absolute protection. But if it is done with defective lymph or imperfectly done, it is almost certain that most of the family will have the disease. How essential that we run no risks in this regard. It has been our habit to send a messenger to some direct source of supply. At least somehow there should be assurance of reliability. As a specimen of how reliable is the result when proper precautions are taken we quote as follows in reference to the English National Vaccine Establishment at London for 1892:

HUMANIZED LYMPH.

"Primary vaccination was performed at the station on 7,529 persons, and out of 7,448 who returned for inspection the vaccination was successful in 7,430 cases at the first attempt. In no case was a third attempt at vaccination requisite to success."

It has recently been urged, as we think, with great force that physicians should not wholly depend on bovine lymph since in time of epidemic they may fail of supply, and since if choosing children from whom they take the lymph themselves they can have all needed security as to its reliability.

A NEW PERIL AS TO SMALL-POX ARISING FROM OUR ATTEMPTS TO PREVENT IT.

It is not only an established fact that *re-vaccination* is needed oftener than we formerly supposed, but that persons who have been re-vaccinated have the disease in a milder form. But also this operates not only in the valuable way of saving the life, but also makes the *mild case* a much greater multiplier of the disease than a pronounced case would be. It is not uncommon for a person with varioloid to be a walking case for two or three days, and so lead to the exposure of many others to the contagion. In the recent Red Bank epidemic, it was in evidence not only that there were cases so mild at first as to be mistaken for chicken-pox by reputable physicians, but that persons who had been once vaccinated or had been re-vaccinated (apparently without effect) had a mild form of the disease.

Leicester, in England, has for long been singled out as an example of a large city in which small-pox had never prevailed as an epidemic and yet in which reliance was placed on isolation rather than on vaccination. But it has recently suffered severely. The result has been to bring out some valuable facts as to vaccination and re-vaccination. We quote from Dr. Joseph Priestly, Medical Officer of Health, Leicester, who gives the following official statement as to cases of small-pox in that city during the recent epidemic:

"Since June, 1892, up to the present date (April, 1893), there has been 146 cases of small-pox in Leicester, all of which have come under my official cognisance; and from these cases I will make certain tabular statements, the accuracy of which has already been tested by outside observers. In classifying as between "vaccinated" and "unvaccinated" cases, I have trusted entirely to the presence or absence of vaccination scars as discovered by examination. This, in my opinion, is the only useful method to adopt for statistical purposes—efficient vaccination marks never becoming obliterated. All under 15 years of age are classified as children.

"I. 146 cases	{	89 adults...	Vaccinated	82
			Unvaccinated	7
		57 children	Vaccinated	7
			Unvaccinated	50

"II. Of the 82 vaccinated adult cases

64 were abortive.....	= 78.04 per cent.	
{	50 were very mild.....	= 60.9 "
	26 were mild.....	= 31.7 "
	6 were severe.....	= 7.4 "
1 died	= 1.2 per cent.	

whilst of the 7 unvaccinated cases

{	3 were very severe.....	= 42.8 per cent.
	4 were severe.....	= 57.2 "
	1 died	= 14.2 per cent.

"III. Of the 57 children lately attacked, 50 were unvaccinated, and of these

8 died = 16 per cent.

{	22 were severe cases.....	= 44 per cent.
	22 were very severe cases.....	= 44 "
	5 were mild cases.....	= 10 "
	1 was a very mild case.....	= 2 "
	24 were followed by abscesses	= 48 "

whilst all of the 7 vaccinated children who caught small-pox, had very mild attacks, 5 of the attacks being abortive.

"IV. Of revaccinated cases we have had some experience. They are as follows:

? W. P. P. revaccinated 6 years ago.		
? C. B.	"	8 "
W. J.	"	40 "
? Nurse W.	"	10 "
J. S.	"	40 "
? H. B.	"	2 "
J. U.	"	30 "

All the above were abortive attacks—limited to about half-a-dozen spots in each case—and offered difficulties in deciding as to the real nature of the disease, *i. e.*, whether small-pox or not, especially so, W. P. P., C. B., Nurse W. and H. B. In three patients (Nurse P., A. W. and A. B.) re-vaccination was performed during the incubation period of small-pox, with the result that the attacks (both of small-pox and re-vaccination) were abortive in each case; whilst in two children whom I vaccinated during the incubation stage the attacks were also abortive.

M. R. (a doubtful case of re-vaccination six years ago) has had a severe attack of small-pox; the spots, however, aborted, and the case recovered.

"IX. Of the mild and very mild cases

- 1 had one mark of vaccination.
- 20 had two marks of vaccination.
- 26 had three marks of vaccination.
- 20 had four marks of vaccination.
- 16 had five marks and upwards of vaccination, whilst six were unvaccinated (*i. e.*, had no marks).
- Of the severe and very severe cases
- 1 had one mark of vaccination.
- 1 had two marks of vaccination.
- 4 had three marks of vaccination.
- 0 had four marks of vaccination.
- 0 had five marks and upwards of vaccination, whilst 51 were unvaccinated (*i. e.*, had no marks).

We herewith give the record of the Red Bank epidemic as kindly sent us by Mr. Cook, the Secretary of the Local Board of Health:

OUTLINE AS TO THE RED BANK EPIDEMIC OF SMALL-POX, BY JOHN H. COOK, SECRETARY OF RED BANK BOARD OF HEALTH.

RED BANK, N. J., June 1st, 1893.

To the State Board of Health:

GENTLEMEN—In the recent small-pox epidemic in this vicinity, the number of cases were fifty-nine, including those in Middletown township, several miles from Red Bank, and also those at Tinton Falls, which is several miles from Red Bank. This number also includes several cases, which were so light as not to be treated by the physicians at all, but which we were led to believe were cases of small-pox, or varioloid, by new cases which sprung up some time after these extremely light cases had entirely recovered.

The first case in Red Bank is believed to have been that of an Italian baby, brought here from Newark. The baby recovered, and it was not until another member of the Italian family caught the disease that it became known that the cases were those of small-pox. The house was immediately quarantined, and vaccination on a large scale was begun. Before this case was well, another case had occurred in the Italian family, and a little girl in a neighboring family also caught the disease.

Many of the subsequent cases seemed to spring up mysteriously and their origin could not be traced. At one time, several weeks intervened between the recovery of the last case and the occurring of new cases, and when the new cases did occur, one was in a part of the town nearly a mile from where there had been any cases of small-pox. The other was in a wholly different part of the town, nearly a mile and a half from any previous case. In these cases, it was impossible to discover the origin of the disease.

Of the fifty-nine cases, thirty had been vaccinated and twenty-nine had not. Some of the very mildest cases were those of persons who had not been vaccinated. Six cases were fatal. Of these, five were of persons not previously vaccinated, and one had been vaccinated seventy-six years previously. Two of the fatal cases were of confluent type and four were of the hemorrhagic form. Of the two fatal confluent cases, one was complicated with pneumonia, which was really the cause of death, as the patient was recovering from the small-pox where pneumonia set in.

The following tables gives the ages of those taken with the disease:

Age.	Cases.	Fatal.
One to five years.....	4	1
Five to ten years.....	8	1
Ten to twenty years.....	15	2
Twenty to thirty years.....	12	1
Thirty to forty years.....	3	0
Forty to fifty years.....	6	0
Fifty to sixty years.....	7	0
Sixty to seventy.....	2	0
Seventy to eighty.....	1	1
Eighty to ninety.....	1	0
Totals.....	59	6

The cases were divided as follows:

	Cases.	Fatal.
Confluent.....	17	2
Confluent hemorrhagic.....	4	4
Discrete.....	22	0
Varioloid.....	16	0

The record of vaccinations is as follows:

	Cases.	Fatal.
Not vaccinated.....	29	5
Vaccinated during epidemic.....	7	0
" 14 years ago.....	1	0
" 20 years ago.....	2	0
" 22 years ago.....	2	0
" 27 years ago.....	2	0
" 30 years ago.....	3	0
" 36 years ago.....	1	0
" 40 years ago.....	2	0
" 45 years ago.....	2	0
" 50 years ago.....	5	0
" 76 years ago.....	1	1
" 80 years ago.....	1	0
Had varioloid at 15 (present age 45).....	1	0
Totals.....	59	6

The person who had varioloid at fifteen years of age was employed as a nurse. While thus employed she caught the disease from the patient. Of those who were vaccinated after exposure thirteen had varioloid or discrete variola. None of these cases

were fatal, all of those who were vaccinated after the fifth day from exposure and who afterward had the disease had it in light form.

Three persons who had been vaccinated previously and who were vaccinated after the outbreak of the disease here and on whom the vaccination did not take had varioloid or discrete variola.

Ten persons who had not been vaccinated within twenty years were quarantined with cases of variola and did not take the disease.

Forty-two persons who had been vaccinated previously to the outbreak and who were re-vaccinated after exposure and were quarantined with variola did not take the disease.

Eight persons who had not been vaccinated had the disease in so mild a form that they were not confined to the bed at all.

Two others came to the physician's office on the third day of the eruption, not knowing they had the disease. One of these cases was treated in his residence, the other in the small-pox hospital. No subsequent cases could be traced to them, although they had been attending to business, one as grocer the other in a real estate office, up to the time of the third day of eruption.

In six cases, of from six to eighteen years of age, the patients were vaccinated after exposure. The vaccination took and the patients had discrete variola at the same time, although they were exposed to and quarantined with severe cases of confluent variola. In these cases the attack was evidently modified by vaccination.

So many of these cases were apparently sporadic that they could not be traced and could only be attributed to some very mild cases, which had been so mild that the patients themselves did not know they had the disease and continued at their regular occupations. In several cases the disease was traced to persons who evidently had had the disease, but in so mild a form they had believed their sickness to be a mild indisposition and had called in no physician. Other cases among school children were believed to have been caught from some pupil or pupils who had had the disease in a form so light as not to be noticeable, and who had continued to attend school. In these cases the disease could not be traced at all. This feature—the springing up of cases from these unknown light cases and without apparent connection from any known case—made the work of the Board of Health much more difficult than it would otherwise have been and produced a state of terror among some of the people.

Red Bank has now a large hospital, fully equipped with accommodations for caring for from thirty to fifty patients at one time. The town also owns in connection with the hospital a large building suitable for the use as living and sleeping rooms

of the nurses and other employes of the hospital, a laundry building, storage rooms for supplies, and other necessary buildings. These buildings are completely furnished, and can be made ready for use at an hour's notice in case of an outbreak of small-pox or other contagious disease.

JOHN H. COOK,

Secretary Red Bank Board of Health.

In addition to the above we have from State Inspector Dr. Henry Mitchell the following statement:

“The outbreak of small-pox in Red Bank in the fall of 1892, found that community entirely unprepared to defend itself against the spread of the disease.

“Systematic vaccination had never been practiced there, and quarantine and isolation of communicable diseases had not previously been enforced in a methodical manner. No experienced sanitary officers were available for the prompt, judicious and efficient application of suitable measures for the prevention of an epidemic.

“Unfortunately the true character of the first case was not recognized, and therefore the infection was widely disseminated before the Board of Health was made aware of its existence in the locality. When quarantine of cases was first established it was so loosely executed that it was next to useless.

“I learned of the presence of small-pox in Red Bank November 17th, 1892, and immediately visited the town and attended a meeting of the Board of Health on the same day.

“I advised house-to-house free vaccination; thorough isolation of all infected persons, and disinfection or destruction by fire of all infected garments, bedding, furniture and property.

“These measures were agreed to, but they were not continuously applied with sufficient thoroughness until the following spring. Meantime new foci appeared, and about forty cases of smallpox developed in and near Red Bank. Business was almost wholly suspended for weeks during February and March.

“Early in April more energetic efforts were made to stamp out the plague. A hospital was erected, and every case then existing and every new case was rigidly isolated at home or removed to the hospital.

“At once these efforts were rewarded. The last new case in Red Bank was reported, and the epidemic quickly died out.

“The result may be stated as follows: Total number of cases, 59; number of deaths, 6; financial loss, about \$100,000.00.

“Had the same well-directed energy and vigor which was so successfully applied in April for the suppression of the disease

been employed in November, all of the sickness, suffering and death, and all of the attending damage to business, and the alarm and inconvenience which the citizens of Red Bank experienced, would have been averted. No better illustration could be furnished to show the value of intelligent sanitary administration, and the great loss which attends neglect of sanitary precautions.

"Too much credit can hardly be given to Mr. John H. Cook, Secretary of the Red Bank Board of Health, for his unceasing efforts to stay the progress of the scourge. To him and to Dr. Edwin Field is very largely due the finally successful struggle with the epidemic.

Very respectfully,

"HENRY MITCHELL,
"S. I."

Although the outbreak at Red Bank was the only one that became largely epidemic, besides the prevalence of the disease in such towns as Trenton, Paterson, Newark and Jersey City, there were cases in various smaller towns and rural hamlets.

The one at Carteret, in Middlesex County, occurring in a boarding-house and among factory operatives, gave great facilities for the spread of the disease, but there were comparatively few cases. Here again the mildness of the attack was marked. One woman, for instance, had no other symptom except distinct variculous pustules on the forehead and in the hair. This mildness of cases seems to have had an analogue in Reading, Pa., where the Board of Health reports, up to February, 1894, or one year after the outbreak, 713 cases with 18 deaths, there being 7 cases still in hand. Most physicians in this State who had many cases, noted the mildness of some attacks even where there were no signs of vaccination. Yet, in an outbreak at Orange, in a colored family, there were five cases, and all died.

Taken as a whole, the various outbreaks greatly emphasized the importance of careful vaccination and re-vaccination, of prompt isolation and of Health Board hospitals.

INFLUENZA.

In the report for 1890 we gave a resumé of the history of influenza and the facts as to its occurrence at the close of 1889 and during the early winter of 1890. In the report of 1891 we also noticed the fact of its recurrence, although in a much less degree. Yet there were localities where the visitation was severe. In this country and in Europe instead of reaching its height in the

winter it prevailed toward the last of March, but continuing somewhat through April.

It was reported from many parts of the continent of Europe, and especially in Russia, Germany, Austria and France. It re-appeared in England early in April on the eastern coast. In London and Sheffield it was especially severe. In America it was widespread, and in Chicago and St. Louis and some other localities much more severe and prevalent than the previous year.

It was marked with no special incidents to distinguish it from the type of the former year. It was hoped, both here and abroad, that the disease was in part the sequel of the previous year, and that its prevalence would not again become serious. But the winter of 1891-92 marked a still more unusual seizure.

In England it did not in 1891 reach its highest prevalence until May, and it tarried somewhat during the summer. "With the advent of October (1891) news of the invasion of fresh localities began to accumulate, many large centers of population being involved, both at home and abroad."

From thence on there was constant increase throughout Europe, until early in December it was reported as intense in Berlin, and in fact prevailed in the whole German and Austrian empires. Italy, which had before not been noted for its prevalence, was seized to such a degree that in some cities, like Milan, business was quite suspended.

The London *Lancet* of December 5th, 1891, had this record :

"The outbreak of influenza is spreading fast, with its customary concomitant of a highly increased mortality from respiratory affections. In the metropolis, for the week ending November 28th, thirteen deaths were attributed primarily to influenza, the total death-rate being 19.9 per 1000, or slightly less than the preceding week. It may be noted that the death-rate at Plymouth for the week ending November 28th was 38.3, or precisely double what it was three weeks previously. There has also been a rise in the death-rates of Newcastle-on-Tyne and Sunderland. Influenza continues to be very prevalent in Scotland; it has appeared in a severe form at Sandy, one of the isles of Orkney. In Glasgow it is said that it has never been so widespread and severe as at the present time; and almost the same is true of Edinburgh. In both places the resources of the profession have been severely taxed. Abroad the accounts are of like import. At Berlin it has been prevailing during the past month; it has been very severe at Hamburg and Dusseldorf, and is also spreading rapidly in the Silesian provinces and Schleswig-Holstein. It has appeared again in Paris, where Professor Brouardel has stated that it was responsible for 100 deaths during the past week. The Australian mails bring accounts of the deaths of several prominent Melbourne citizens from influenza, and it will be noticed that our New Zealand correspondent also speaks of its prevalence."

Early in January the following is the record as to Italy :

"At Milan one hundred and five deaths from influenza between Saturday, the 2d inst., at 4 P. M. and Sunday at 4 P. M., were registered on the latter of these days. The registration office is hardly equal to the task of entering the cases reported to it; funeral carriages are insufficient in number; and the gravediggers at the cemeteries, in spite of repeated reinforcements, are still

calling for more hands. The Ospedale Maggiore is filled to repletion, and the same is announced from all the branch hospitals and lazarettos. At Como the mortality is almost as high, though, singularly enough, at the resorts on the lake itself the disease is inconsiderable. At Venice scarcely a family has escaped, and most of the public offices have their *personnel* reduced by one-half. At Bologna the malady is equally diffused, though the mortality is not so great as in other cities. At Rome it is spreading, several thousand cases occurring daily, and in the Carceri Nuove (new prisons) four-fifths of the inmates, convicts and keepers, are on the sick list. Hitherto, however, the deaths have been comparatively few. Florence, which suffered so severely in 1890, has proportionately few cases, and these comparatively mild."—*Lancet*, Jan. 16th, 1892.

It continued to prevail severely all through England. The following brief summary is of date January 16th, 1892:

"Seldom in the records of previous pandemics of influenza has a third annual recurrence of this remarkable disorder exhibited such virulence as at the present time. Indeed previous experience has mostly been to show that after the first outbreak the malady may recur in a more or less sporadic manner, and then disappear almost entirely. But there is no question now that the recurrence of this winter, which commenced in this country in Cornwall and in Scotland, has equalled in severity the first outbreak of the winter of 1889-90, as well as in the extraordinary diffusion of the disease which has taken place during the past fortnight. So widespread has this extension been that it is difficult and bewildering to follow its course from day to day, so as to give any coherent account of the progress of the pandemic wave. There is no question that the influenza has once more gained a marked foothold in the Metropolis. For weeks past, it is true, the Registrar General's return has given a certain number of deaths directly attributed to the disease, but last week this number rose remarkably, reaching ninety-five, as compared with thirty-seven in the preceding week and nineteen in the one before that."

The accounts furnished from the Continent show that influenza is still raging in many parts, and, indeed, in some towns—*e. g.*, Hamburg—it has re-appeared after a month's abeyance. In France it prevails in all parts, from the Pas de Calais in the North, where it is extremely severe, to Marseilles and the Riviera in the South, where its type seems to be milder. In Paris it continues to spread; at Montpellier it is largely on the increase. In Germany the epidemic has been present for several weeks at Berlin, where it is now on the decline, but where it has attacked the horses. At Munich it has only recently broken out, and is spreading rapidly. Of other cities where it has prevailed, or is still occurring, may be mentioned Kiel, Breslau, Dresden, Magdeburg, Brunswick, Stettin and Cologne. In Denmark the outbreak has been especially severe; at Copenhagen itself the number of cases has been enormous, and the attacks have been characterized by great suddenness of onset. In Belgium it is very general, being severe at Brussels and Luxemburg, and seriously interfering with trade at Mechlin and Ghent. It is still causing great mortality in the lunatic colony of Gheel. In Austro-Hungary it still exists in Vienna, and at Pesth it seems to be unusually virulent. In Italy, where it has hitherto chiefly attacked the northern cities, it is spreading in Florence, Venice and Rome,

and is getting much worse in Naples. It has reached Turkey and Greece, for many cases have occurred at Constantinople and Athens. At Malta the Mediterranean Squadron has suffered severely from its effects. It has ceased to occur at Gibraltar, but prevails in many parts of Spain and Portugal, where, however, it is on the decline."

The following is the record for the week previous to January 30th, 1892:

"So far as can be gleaned from the reports in the daily press there is no appreciable abatement in the epidemic of influenza, for although the disease is leaving some districts it is still spreading in other parts of the country. In the metropolis there is no question as to the great prevalence of the malady; but none of the hospitals seem to be so overwhelmed with cases as they were during the first week of 1890. However, there is much sickness from bronchitis and pneumonia, of which several cases must be attributed to an antecedent attack of influenza, without any correspondence in severity between the primary illness and its sequel. The registrar-general's return for the week ending January 23d, shows, as regards mortality, a great increase in the deaths primarily attributed to influenza in London, viz., 506, the number for the previous week being 271; and in addition there were eighty-six cases in which influenza was returned as a secondary cause.

"On the continent influenza is still prevalent in Paris and the south of France, notably Lyons, but it is abating in the northern departments. It is also subsiding in Italy, and has almost ceased at Malta and in most parts of Germany, although it is still very severe at Mecklenburg. There is a decrease in its virulence at Copenhagen, but it has appeared with considerable severity at Christiania, Bergen and other parts of Norway. It has once more appeared at St. Petersburg, and is very severe in Odessa and South Russia generally. The number of deaths in Berlin from influenza, not counting its sequelæ, from the beginning of last November till the New Year was 411. Eight of the fifteen normal schools in Saxony are closed owing to influenza. The number of cases officially determined in Vienna from the 3d to the 9th inst. was 521. Dr. Ripperger, of Munich, has published a book entitled, 'The Influenza, its History, Epidemiology, Etiology, Symptomatology, Treatment, Complications and Sequelæ.' It gives an account of all the influenza epidemics on record since 1387. The number of references is over 3000.

"As to other parts of the world, there is still much sickness from this cause in the United States, and this week has brought information of an outbreak at Cape Town."

The following is the record of February 6th, 1892:

"There can be, happily, no question that the epidemic of influenza is at length subsiding in this country, and although it still prevails with considerable severity in some districts, we do not hear of its extension to districts which have hitherto escaped; whilst the cases are diminishing in several counties that have been particularly attacked.

"On the Continent, it still prevails to a considerable extent in some parts of Germany, especially in Mecklenburg, and in Vienna it is said to be 'alarmingly on the increase.'"

January 26th, New York reported 12 deaths. In Boston, New York and various places it had made a marked increase of the death-rate by Christmas and was prevalent all through the month of January, 1892, at various points throughout the United States. While marked with less severity its prevalence was probably equal to that of 1890-91. In New Jersey the Southern counties suffered most. It was especially severe at Camden and in Cumberland and Gloucester counties and subsided the last of January. As to symptoms and treatment few new facts were brought to light. It was more generally accepted by the Medical Profession as an infective disease spread by contagion. Theories as to it abounded. The view as to origin most generally credited was that it broke out in the immense marshes of Bokara and first seizing upon Russia spread its way over continents and islands. The discovery of the germ of influenza was publicly announced on January 7th, 1892, in the Lecture Hall of Koch's Institute for Infectious Diseases. Dr. Richard Pfeiffer was the accredited discoverer and his observations were confirmed by Dr. Canon, of Moabit Hospital, by Dr. Coke and Dr. Kitasato. The same variety of type in the disease is noticed as heretofore, although many claim that Bronchial and Pneumonic symptoms were more marked, as also the disturbance of circulation and weakness of heart. Many new remedies have appeared, but they are still under discussion.

The work of Dr. Sisley, London, sums up the chief facts as to it, although he is too strongly an advocate for strenuous measures grounded on its infectivity, which he seems to think also includes horses, cats, etc.

We quote a valuable comment on the subject from the London *Lancet* of January 23d, 1892, because we believe it important as a caution not only as to this, but other diseases:

"It must not be forgotten that until the present pandemic, which began in the autumn of 1889, opinion was not only much divided as to the contagiousness of the disease, but rather, we would say, predominantly opposed to this view of its nature. Miasm rather than contagion, certain obscure atmospheric agencies rather than direct transmission of germs from individual to individual, were held to be most fitting to explain the remarkable phenomena it exhibits. The extreme rapidity with which the malady spreads over the surface of the globe, the simultaneity of outbreaks in widely separated countries, the similar general incidence upon large numbers of people at one and the same time, these and many other considerations weighed in favor of its non-contagiousness. Nor is it possible to entirely divest the mind of the idea that the disease is spread in other ways than by direct or indirect infection, although Dr. Sisley, who is a leading exponent of the infectious doctrine, considers that general susceptibility, or vulnerability added to marked brevity of an incubation period, can explain all these apparent anomalies. Whether it be miasmatic or not, it is, however, indubitably infectious."

Influenza was not prolonged into the spring of 1892 to any great extent, either in this country or abroad. We heard comparatively little of it again until early in March, 1893, when in a mild form it made its appearance on the continent and in Great Britain and in the United States at occasional localities. It was not at all diffused as before. It was reported most extensively

from Paris in April, 1893, and to some extent in London. In the United States a few deaths were reported from New York late in March and early in April. It was spoken of also as appearing in a mild form in various localities. There was a marked increase of death-rate in pulmonary diseases, especially in New York City. The extreme death-rate of 30 per 1,000 having been reached for two or three weeks in March and early April. In New Jersey it was referred to as occurring during the winter of 1892 and the spring 1893 in sixteen counties of the State, but generally in a very mild form. It was more prevalent in Hudson county, Newark and Trenton than at most other points. It especially seemed to disturb the type of other diseases and to increase nervous and pneumonic symptoms.

In November, 1893, it again began to be prevalent in various parts of Europe and in Great Britain. The following is a note as to it in the *Lancet* of December, 1893:

"Reports continue to reach us of the increased prevalence of this disease, and there can be little doubt that at the present time it is distributed pretty generally throughout the country. The disease seems to prevail extensively in Wales, and cases are reported from as far westward as Falmouth and as far to the north as Dunblane. At Liverpool the disease is said to have produced a considerable rise in the death-rate. * * * In some of the mining districts the miners have been seized while at their work in the pits, and in other parts of the country school closure is being resorted to, owing to the large number of children attacked. The disease, though still of a milder type than in former epidemics, is nevertheless claiming a by no means inconsiderable number of victims, and in London alone, during the week ending November 25th, there were thirty-six deaths attributed directly to influenza. As will be seen from our correspondents' letters from Scotland, Ireland, and the Northern counties, in addition to the above facts, this recrudescence has been almost simultaneous in all parts of the kingdom. This is a suggestive contrast to the manner in which the disease spread on its first importation three years ago."

About the 1st of January there was a sudden cessation of the disease, so that by the end of the month it showed great mildness and much fewer cases. Similar facts reached us from various parts of the United States, although its mildness at the start was marked. In New Jersey it prevailed as much as in the previous year. While few deaths were recorded it added much to the usual amount of sickness in December and in January, 1894.

The scattered notices of it here and there lead us to regard it as likely to range itself more than ever before as a disease likely to occur more frequently during the winter and spring. The discovery of a bacillus characteristic of it seems to be confirmed, and the following remarks of Dr. R. Pfeiffer, March, 1893, who first identified it, are worthy of note:

"THE ETIOLOGY OF INFLUENZA.

The bacillus grows very rapidly in pure cultures on a suitable soil, but no growth takes place at a temperature under 26° C. (78.8° F.) or over 43° C. (109.4° F.). In water at ordinary temperatures (60° F.) the bacillus dies rapidly (in eight hours). In bouillon it retains its vitality for from fourteen to

eighteen days. Hence sputum, &c., if not allowed to dry, is probably infectious for at least fourteen days; and we may here find the explanation of cases, recorded by competent observers, in which the infection appears to have been communicated by means of letters, clothing, &c. The bacillus is very rapidly affected by drying. Cultures exposed to dry air at a temperature of 37° C. did not survive for more than two hours, and even in moist air usually not more than eight hours and never more than twenty. Sputum, if dried, was quite sterile in thirty-four to forty hours. Dr. Pfeiffer draws the following conclusions from these facts:—(1) The influenza bacillus is not capable of multiplication outside the human body, either in water or in earth. (2) The spread of influenza by dry sputum can occur but seldom. (3) Infection is, as a rule, effected by means of the still moist secretions of the air-passages. Dr. Pfeiffer considers the catarrhal form of influenza to be by far the most frequent. In mild cases, scarcely to be distinguished from ordinary catarrh, he found the bacillus in enormous numbers in the secretion of the nose, whereas in cases of simple catarrh the secretion is almost sterile and certainly contains no bacterium to be mistaken for the influenza bacillus. During the acute stage the bacillus is present in the expectoration in large numbers. It sometimes persists in it for weeks, or even months, thus explaining those cases of prolonged convalescence which have been noted especially amongst tuberculous individuals. The general symptoms are to be regarded as the result of the absorption of influenza toxine. The bacillus may reach the pleura and there excite a pleuritis. No animal is known to be spontaneously affected by influenza. Guinea-pigs are very susceptible to the influenza toxine, exhibiting symptoms of fever, dyspnoea and extreme muscular weakness, strikingly resembling the clinical appearances in man. In conclusion, Dr. Pfeiffer points out the importance of thorough ventilation in all places where many people are assembled, such as theatres, schools and barracks, since every cough or sneeze expels infectious material into the air. He further suggests the use of disinfecting washes for the nose and mouth and the inhalation of antiseptic vapors, and concludes by expressing the hope that the knowledge of the cause of this remarkable disease may lead to the discovery of a specific remedy.”—*Lancet*, April 8th, 1893.

Although not quite so prevalent in 1893, our former and continued experience with it leads us to feel that it must be closely studied, both in itself and as modifying other diseases. The two excellent Reports of the Local Government Board of Great Britain and various single papers throw much light upon it. We subjoin from the *Lancet*, September 9th, 1893, the following note as to it:

“The issue by the medical officer of the local government board of the further report on epidemic influenza concludes the history of a four years' epidemic, which commenced in 1889, continued until the close of 1892. A few cases of death from the same disease have been reported somewhat recently this year, but the epidemic as such seems to be at an end. Dr. Parsons' two reports, together with that of Dr. Klein, constitute, we believe, the most complete statement that has yet been published on the subject from the etiological and public health point of view, and the matters with which the recently issued volume deals are interesting at the present moment, and will also afford valuable material for reference should the disease at any time recur. After a lapse

of forty-one years influenza reached England again in 1889; it traveled steadily from the East towards this country, following the lines of human intercourse. We learn from the report that the incidence of the disease has been different in different places, and that it has varied in different phases of the prolonged epidemic through which we have passed. Why this should be so has not yet been made out, but a review of all the circumstances gives negative evidence to the effect that the differences cannot be accounted for by conditions of site, soil, occupation or any of the ordinary conditions which affect human life. How far the difference may be due to different qualities in the bacillus, as to which Dr. Klein reports so fully, is also not known; but there is some general evidence to show that the power for mischief of various micro-organisms varies from time to time, and these variations will doubtless some day be traced to their proper source. In the meantime, one method by which the disease is spread from person to person seems to be made clear. Dr. Klein finds, for example, that the sputa in all cases of influenza abound in the specific bacilli during the acute stages of the disease, and this for the moment indicates at least one method by which the affection may come to be in some degree controlled. It is now becoming more and more habitual to receive the sputa of patients suffering from diseases such as phthisis and diphtheria into vessels charged with some disinfecting fluid, and in so far as this may be practicable in the case of influenza it is suggested that it might be followed. The main difficulty as to this will probably arise from the fact that the bacilli of influenza manifest themselves in the bronchial tubes at a very early stage of the disease, and that some of the mischief which should be avoided will already have been brought about before the disease is recognized.”

“During the fourteenth week of the year there occurred at Paris 1436 deaths—a figure greatly superior to the mean of the corresponding season (1094) and also to the mortality of the preceding week (1296). What has caused this rise? Influenza, doubtless, despite the fact that only twenty deaths are attributed directly to that disease. But the considerable increase in the deaths (almost exclusively of adults and old people) attributed to pneumonia, bronchitis, congestion of the lungs, etc., leaves no doubt that these latter affections are due to influenza. Thus the deaths from acute bronchitis reached 56 (instead of 34 in the mean); chronic bronchitis, 68 (mean 43); broncho-pneumonia, 105 (mean 35); pneumonia, 137 (mean 67); and pulmonary congestion, 71 (mean 24). The deaths from pleurisy remain about stationary. Seventy-four aged persons are said to have succumbed to senile debility; the excess (42) over the average is due to influenza. Phthisis killed 233 persons (mean 210), and cardiac affections 72 instead of 60. Scarlet fever and diphtheria, with mortalities of 4 and 34, maintain the average; whooping-cough caused 16 instead of 5 deaths, whilst measles have diminished.”

Influenza re-appeared in Great Britain and on the Continent in November, 1893, and during the whole of December was in various places in the United States. It is yet too early at this writing (December 30th) to state its probable extent, but it seems likely to become quite general. The type is, as yet, not so severe as its first onset. We know of it at several points in New Jersey, but no deaths have, as yet, been reported to us. At present there are at Trenton quite a number affected.

In London, during the week ending December 23d, there were no fewer than 164 deaths reported from it, as against 23, 36, 74 and 127 of the four preceding weeks. During November there were over 30 deaths in Berlin, and deaths from it were reported from Amsterdam, Prague and Moscow. It seems likely often to recur.

LEPROSY

AND THE LIGHT IT THROWS ON OTHER DISEASES.

We have been so used to regard Leprosy as a disease of the East that it was not until its prevalence in the Hawaiian group of islands that much attention was given to it on the Western Continent. Its occurrence in a considerable number of cases in Canada, in California and in Minnesota, with a few scattered cases elsewhere in the United States, has served to mark it as worthy of the practical attention of physicians and sanitarians here.

In New Jersey but two cases have been reported to us. An alleged case in Monmouth county led to a careful examination on the part of the Board, and we were able to secure the diagnostic aid of a physician who had been familiar with the disease. It was soon settled that it was an unusual case of general Eczema, and not leprosy. The case which occurred in Harrison township, Hudson county, proved to be a real case of Leprosy, and the patient is now in a ward adjoining the almshouse at Snake Hill.

We draw attention to the disease just at this time because the important report of the English Commission on Leprosy, which was sent to India in 1890-91 by the Executive Committee of the National Leprosy Fund, has come to hand this year (1893), together with the comments of the Executive Committee and the Special Joint Committee nominated by the Executive Committee, by the Royal College of Physicians and the Royal College of Surgeons.

The members of the Commission were Drs. Beaven Rake, Physician of the Trinidad Leper Asylum; George A. Buckmaster and Alfred A. Ranthack, and the members appointed by the Indian Government, Surgeon-Major Arthur Barclay and Surgeon-Major Samuel J. Thompson, of the Bengal Medical Service. The members of the Executive Committee of the National Fund and of the Special Committee were as follows:

Nominated by the Executive Committee of the National Leprosy Fund.	{ GEORGE N. CURZEN (Under Secretary For India), Chairman. EDWARD CLIFFORD.
Nominated by the Royal College of Physicians.	{ DYCE DUCKWORTH, M.D., LL.D. G. A. HERON, M.D., F. R. C. P.
Nominated by the Royal College of Surgeons.	{ JONATHAN HUTCHINSON, LL.D., F. R. S. N. C. MACNAMARA, F. R. C. S.
[The above were the members of the Special Committee.]	
Chairman of the Executive Committee.	FERDINAND ROTHSCHILD.

Members of the Executive Committee.	F. L. LONDIN.
	ANDREW CLARK, M.D., F. R. C. P.
	JAMES PAGET.
	J. FAYRER.
	W. GUYER HUNTER.
	JONATHAN HUTCHINSON.
	E. CLIFFORD.
ALGERNON BORTHWICK and EDWARD LAWSON, Honorary Treasurers.	

We give these lists because there are no names that carry more weight on most medical and sanitary subjects.

The conclusions of the Committee are stated as follows:

"1. Leprosy is a disease *sui generis*; it is not a form of syphilis or tuberculosis, but has striking etiological analogies with the latter.

"2. Leprosy is not diffused by hereditary transmission, and for this reason and the established amount of sterility amongst lepers the disease has a natural tendency to die out.

"3. Though in a scientific classification of diseases leprosy must be regarded as contagious and also inoculable, yet the extent to which it is propagated by these means is exceedingly small.

"4. Leprosy is not directly originated by the use of any particular article of food, nor by any climatic or telluric conditions, nor by insanitary surroundings, neither does it peculiarly affect any race or caste.

"5. Leprosy is indirectly influenced by insanitary surroundings, such as poverty, bad food or deficient drainage or ventilation, for these, by causing a predisposition, increase the susceptibility of the individuals to the disease.

"6. Leprosy, in the great majority of cases, originates *de novo*—that is, from a sequence or concurrence of causes or conditions, dealt with in the report, and which are related to each other in ways at present imperfectly known.

"These conclusions are followed by some 'practical suggestions,' which amount to a declaration against segregation or compulsory isolation, but which favor the extension of retreats for voluntary isolation, with as little curtailment of personal freedom as possible, the permission of marriage amongst lepers and the formation of leper colonies." * *

"The Committee accept Nos. 1, 2, 4 and 5 of the conclusions of the Commission; but not being satisfied with the evidence offered by the Commissioners they express their disagreement with the concluding words of No. 3, viz.:

"That the extent to which leprosy is propagated by contagion and inoculation is exceedingly small."

"They cannot concur in the views expressed in No. 6—namely, that

"Leprosy in the majority of cases originates *de novo*—that is, from a sequence or concurrence of causes and conditions, dealt with in the report, and which are related to each other in ways at present imperfectly known"—being of opinion that the evidence adduced in the report does not justify such conclusions.

"The Commissioners have expressed opinions strongly adverse to compulsory segregation, either complete or partial. They say:

"No legislation is called for on the lines either of segregation or of interdiction of marriages with lepers.

"For India complete compulsory segregation may be considered to be absolutely impracticable. Neither do the conclusions given before as to the nature of the disease justify any recommendation for absolute segregation.

"It is impossible, for the same reasons, to advise compulsory partial isolation. Voluntary isolation is, therefore, the only measure left for consideration.

"In no case would the Commissioners suggest an Imperial Act especially directed against lepers as such.

"In conclusion, the Commissioners believe, from the considerations and arguments adduced in the foregoing report, that neither compulsory nor voluntary segregation would at present effectually stamp out the disease, or even markedly diminish the leper population, under the existing conditions of life in India."

"The Committee, having expressed their inability to accept the reasoning upon which the Commissioners have based the above conclusions, state that they are equally unable to accept the corollary that segregation in any case of leprosy in India is either impracticable or undesirable."

The following independent or dissentient opinions have been expressed by members of the Special Committee and of the Executive Committee:

"*Leprosy is not diffused by hereditary transmission.*' I do not think that this is proven."—J. FAYRER.

"*Contagious and also inoculable.*' This is also uncertain."—J. FAYRER.

"I understand the commissioners to mean by the expression *de novo* in reference to the origin of leprosy that they believe that the disease may begin independently of personal contagion and in connection with climatic dietetic causes. In that belief I entirely share. I also agree in the main with the rest of the statements in the Commissioners' report, to which exception has been taken in our committee. I feel convinced that if leprosy be contagious at all it depends but to an almost infinitesimal extent upon contagion for its spread."—JONATHAN HUTCHINSON, LL.D., F. R. S.

"I am in agreement generally with the recommendations of the Commission respecting *voluntary isolation* and the issue of *Municipal By-Laws* regulating the habits of lepers. I know no trustworthy evidence to prove that a leper in any community is a source of greater danger than is a consumptive patient, and I know that a person suffering from syphilis is a real and very positive source of danger anywhere. It would therefore be absurd on the face of it to adopt stringent laws for the leper and to let the syphilitic person go free.

"The intelligent layman now imagines that, because bacilli are an essential feature of leprosy, therefore the disease *must* be readily contagious. This is simply quite contrary to fact. The same thing holds goods exactly for consumption and for some other disorders in which microbes play a part.

"I think a well-empowered and vigorously supported Government medical executive officer should be appointed in every large town and in certain districts to supervise the leprosy populations and report regularly upon them. It should be his business to see that the local regulations are fully carried out, and on his requisition only should any action be taken when necessary.

"Suitable asylums should be provided and those now existing should be sufficiently enlarged to meet the needs that will arise under suitable by-laws.

"The project of leper-farms is, I think, a good one. More than this is, I believe, not within any practical scheme for amending the condition of lepers and for diminishing the spread of the malady."—DYCE DUCKWORTH, M.D., LL.D.

"I am strongly in favor of the maintenance (by Government or otherwise) of voluntary homes for lepers, but do not believe that segregation would effect anything in diminishing the prevalence of the disease. Compulsory segrega-

tion would, I think, involve injustice and entail much social misery. I believe that our Commissioners' report well expresses not alone the opinions of those who have signed it, but, in a general way, those of the educated classes of the present day throughout India."—JONATHAN HUTCHINSON, LL.D., F. R. S.

"I think the report a most valuable and excellent one, agreeing generally with the remarks of the Committee. I concur in the objections made by Sir Dyce Duckworth and Mr. Hutchinson. I have also noted two remarks which I do not consider can be accepted as proven.

"But, on the whole, I regard the report as most excellent, and, if the recommendations are acted on, one which will prove of the greatest benefit to the population of India. When leprosy disappears, it will do so as a result of improved hygienic and social conditions.

"In the meantime all that is possible—as suggested in the report—to be done should be done to ameliorate the condition of the sufferers, and I am glad to find that coercive measures of segregation or wild fear of contagion are not contemplated."—J. FAYRER.

FURTHER MEMORANDUM.

"We, the undersigned members of the Executive Committee of the National Leprosy Fund, desire to express our approval of the Commissioners' report, which we regard as a very careful record of well observed important facts. We concur with their suggestions of 'the practical measures to be taken for the control or restriction of the disease in India.' We dissent from the opinion expressed in the body of the report of the Special Committee on the subject of the contagion of leprosy and from the recommendations founded on that opinion. We believe that the spread of leprosy by contagion is not sufficient to justify the compulsory segregation of lepers, though the institution of homes in which they may voluntarily reside may be very earnestly advised. And we are of opinion that, although an unusual susceptibility of leprosy may be transmitted by inheritance, and the children of lepers may be more than others liable to the disease if, living in the conditions in which it generally occurs, this does not supply reason sufficient for prohibiting the marriage of the leprosy."

"ANDREW CLARK, M.D., F. R. C. P.,

"W. GUYER HUNTER,

"JAMES PAGET,

"J. FAYRER,

"JONATHAN HUTCHINSON."

Important as the report is of itself and in its bearing on leprosy, it seems to us almost equally important in the light it throws upon other diseases known as parasitic or communicable.

The evidence seems clear that the micro-organism associated with, or causing leprosy, is distinct, and although quite different from that found in tuberculosis, it has striking etiological analogies with the latter.

Yet so far from being chiefly propagated by contagion, the Commission is unanimous in its view that its propagation, either by contagion or inoculation, is exceedingly rare. From the erroneous impression that the leprosy spoken of in the Mosaic law was the same disease as that now known by this name,

and from what has been accepted as clinical evidence, leprosy has been regarded as typically contagious, and never arising, except from hereditary taint, or from a previous case. The Commission declares that in the great majority of cases it arises *de novo*, being indirectly influenced by insanitary surroundings and by sequences and concurrences of conditions related to each other in ways at present imperfectly known.*

The doctrine of heredity, too, is greatly modified or minimized. "Leprosy is not diffused by hereditary transmission," but insanitary conditions of persons and surroundings may by "causing a predisposition increase the susceptibility of the individual to the disease." The cases of the 160 lepers, emigrants from Norway, who settled in America over fifty years ago, as investigated by the Minnesota Board of Health and by Dr. Hansen, of Bergen, Norway, seem to confirm this view, although we could wish for more evidence as to the detail in all these cases.

While some of the two English committees, sitting in judgment on the Report of the Commission, take exception to the view expressed in items 3 and 6, one cannot read the confirmatory notes, or further memorandum, of Sir Andrew Clark, N. Guyer Hunter, James Paget, J. Fayrer, Jonathan Hutchinson and Dyce Duckworth, without seeing what a strong protest is furnished against some views so often taken for granted as prevalent and accepted as clinical opinions. Note especially as follows:

"The disease may begin independently of personal contagion and in connection with climatic and dietetic causes. In that belief I entirely share."
—J. Hutchinson, LL. D., F. R. S.

"The intelligent laymen now imagines that because bacilli are an essential feature of leprosy, therefore the disease must be readily contagious. This is simply quite contrary to fact."—Dyce Duckworth, M. D., LL. D.

Now is a period in clinical and biological study of disease, of the etiology of disease, and especially of those diseases which are regarded as communicable, or those with which one or more forms of micro-organism are identified, which may well demand the close and technical attention of all physicians and sanitarians.

These are great studies, the importance of which is not overestimated. But we need to keep constantly in mind the difference between a working hypothesis and an ascertained fact, between what is possible, probable or proven, between primary and secondary causes, or what is due to a partnership of causes. On most points the observations of any one or two men, or of any school of doctrine must be tested by those of various others. Prevalent beliefs must not be accepted except upon classified evidence. While to our view the Report of the Commission is open to criticism on some of the points named, it is very valuable for its observations, as a study of etiology, and as a guide to comparative studies of tuberculosis and some other diseases. In the meantime it is important that we see to it that Leprosy from any cause does not gain a foothold on this continent, since for very many reasons, it would be a very undesirable addition to our list of native or acclimated diseases.

* See editorial London *Lancet*, April 29th, 1893.

REMITTENT FEVER.

The record of the past five years shows considerable diminution in the number of deaths from remittent fever. It has often been observed that the various forms of malarial disease occur differently in different seasons, but this gradual and aggregate diminution leads to the hope that some of its causes are gradually abating. While its frequency is governed by various influences and by the concurrence of various causes, such as exposure, heat, moisture, vegetable decay, etc, the fact still remains that it has its chief origin in wet and undrained lands in which there is much vegetable decay or in which, by a period of excessive dryness, new strata of deep and rich soil are exposed to the fermenting influences of heat and moisture. We have former testimonies in various localities of drainage for health. The large example of the Pequest Valley has fulfilled expectations and we look hopefully to the important drainage of the Passaic river area, above Little Falls, now being pushed forward to its completion. There are various other smaller lowlands needing thorough drainage, and in the interests of health as well as of production we urge attention thereto.

DIPHTHERIA.

Since our last report no new facts have been accepted and settled as to this disease. The value of examination for the Klebs-Löffler bacillus, now called (bacillus diphtheriæ), as determining what is real diphtheria as distinct from throat lesions, in appearance closely allied, is now generally admitted.

The continued investigations of Dr. Klein, in the service of the English Local Government Board, seem to confirm the view that true croup is not, from a bacteriological standpoint, distinguishable from diphtheria. Such is now the judgment of most authorities. The same is true of those exudative and croupy forms of throat affection occurring in the later stages of scarlatina.

It is also generally admitted that there are forms of follicular sore throat, which closely resemble diphtheria, but do not take on the forms of this lesion. In the absence of special tests, it is wise to deal with these as at least "suspects," and to pursue the same general line of treatment, modified by the character of the symptoms. All the more because it is believed by so many that forms of sore throat, not diphtheritic in the start provide the planting ground for the specific disease and so glide into it.

So long as the highest authorities (Sir George Buchanan, etc.) are compelled to speak of it as "the least specific of all the contagions," as often of unknown origin, and, as at present, the greatest menace to child-life, we cannot be too full of forethought and foreact as to all that relates to isolation and treatment. Recently some Boards of Health, like that of New York City, have sought to define the line between true and false diphtheria in their modes of dealing with cases, but as yet we must depend on throat appearances and clinical symptoms, importance of mouth-cleanliness as a preventive of disease, and urge upon parents more care as to rinsing of the mouth and cleansing of the teeth as a habit for children.

Because of an error in our last report in the proportion of soap in a mouth and tooth powder recommended for general use, we repeat it here: Precipitated chalk, one ounce; powdered white soap, two drachms; pure phenol and eucalyptus oil, of each one-half drachm.

We refer to the Circular of the Board on diphtheria and to the full comments in recent reports.

Divorces as Related to Marriage and Society.

It has been the habit of this Board at each quinquennial period to make statement as to the number of divorces in each county of the State, together with a few other facts relating thereto.

In the report for 1883 and in that for 1888 we have accompanied these tables with notes as to the bearing of these on marriage and on civil conditions, which may be referred to in this connection.

While the Christian church recognizes marriage as a sacred institution, and essential to Christian life and morals, the State not the less recognizes it as a civil and social act which has largely to do with the peace and welfare of society. A sustained and prosperous nation which has no ordinance of marriage and no marriage laws is inconceivable. The family is not only the social but the national unit, and its protection and maintenance a great public policy essential to the public welfare.

It is a difficult and delicate question how to regulate it so as to conserve both law and morals and give to the family the stability and protection which are necessary. A comparison of the laws of the various States shows confusion of view, lack of judicious ordering and variety of protections and limitations which ill comport with the fundamental principles which should govern so important a transaction. Recently a case came under our notice in which a man who had been divorced in an adjacent State because of marital infidelity, and could not be married in his own State, was quickly wedded here. Such like cases occur in several of the States, and furnish important reasons for a national law which shall regulate marriage and define the conditions of divorce.

It is the pride and honor of this State that it has not multiplied the grounds for divorce, as have many other States, and that the

practice of the courts has been such as to seek full evidence and hold applying parties to the strict conditions of the law.

Since our last quinquennial the shortening of the time in which desertion justifies application for divorce, from three years to two years (see Chapter XXI, Laws of 1890), increases the facility with which this convenient plea is presented.

We have to note some increase in the number of divorces in proportion to the population and to the number of marriages. Population by the census of 1885 was 1,278,033, and that by the census of 1890 was 1,441,017.

The number of divorces for the five years ending July 1st, 1883, was 788, and for the five years ending July 1st, 1888, was 1,173. The whole number for the past five years is 1,371.

It is also to be remembered that, by reason of strict church limitations, divorces do not occur at an equal pro rata among all classes, and that the average is therefore higher than the percentage seems to express.

We still urge that this whole subject receive the careful attention of all those who from Christian and patriotic considerations consider the welfare of society, and that both the people and their representatives see to it that only such laws are passed and such facilities given as are demanded by the most flagrant breaches of contract. As a rule the welfare of society, the preservation of the State and the most solemn considerations of the public good outweigh what might otherwise be sympathy for the individual and require strict laws and close scrutiny in their applications.

NUMBER OF DIVORCES GRANTED IN THE STATE OF NEW JERSEY FOR A PERIOD OF FIVE YEARS, FROM JULY 1ST, 1888, TO JULY 1ST, 1893.

YEAR.	Number granted.	APPLICANTS.		CAUSES.					
		Husband.	Wife.	Adultery.	Desertion.	Extreme cruelty.	Bigamy.	Impotence.	Near relation.
1888-89,	258	90	168	74	176	3	3	2	...
1889-90,	232	82	150	90	130	7	5	...	...
1890-91,	311	98	213	90	201	16	4	...	...
1891-92,	278	108	170	80	189	5	3	1	...
1892-93,	292	105	187	89	198	4	1	...	...
Totals,	1,371	483	888	423	894	35	16	3	...

The total resident marriages for five years ending July 1st, 1893, were 62,118; the total divorces for the same period, 1,371, making a divorce rate of 22.07 per 1,000 marriages of 2,000 persons, or one divorce to every 45 $\frac{1}{2}$ marriages.

NUMBER OF DIVORCES GRANTED BY COUNTIES.

COUNTIES.	1888-89.	1889-90.	1890-91.	1891-92.	1892-93.	Totals.	Population, Census of 1890.
Atlantic,	7	5	7	6	7	32	28,836
Bergen,	2	6	10	9	7	34	47,226
Burlington,	9	7	6	12	8	42	58,528
Camden,	30	20	31	24	24	129	87,687
Cape May,	2	3	3	...	...	8	11,268
Cumberland,	12	5	5	2	12	36	45,438
Essex,	43	46	68	47	45	246	256,098
Gloucester,	4	2	1	8	4	19	28,649
Hudson,	46	36	57	60	65	264	275,126
Hunterdon,	5	7	6	6	5	29	35,355
Mercer,	14	23	28	20	24	109	79,978
Middlesex,	8	5	11	8	6	38	61,754
Monmouth,	14	6	14	14	11	59	69,128
Morris,	9	7	6	6	8	36	54,101
Ocean,	1	2	2	2	1	8	15,974
Passaic,	25	23	35	16	28	127	105,046
Salem, . . . . .	...	...	2	3	2	7	25,151
Somerset,	6	1	1	5	9	22	28,311
Sussex,	1	2	1	...	3	7	22,259
Union,	15	20	10	17	18	74	72,477
Warren,	5	5	6	8	8	32	36,553
Out of State, . . . . .	...	1	4	5	3	13	...
Totals,	258	232	311	278	292	1,371	1,444,933

SUMMARY OF MARRIAGES FOR FIVE YEARS, FROM JULY 1ST, 1888, TO JULY 1ST, 1893.

	Marriages.	Supplement of each year.
1888-89.....	15,726	390
1889-90.....	15,564	542
1890-91.....	15,305	490
1891-92.....	16,082	449
1892-93.....	17,178	.....
	<u>79,855</u>	1,871
	1,871	
Total.....	81,726	

NUMBER OF NON-RESIDENT MARRIAGES IN NEW JERSEY IN GROUPS OF FIVE YEARS EACH, BEGINNING JULY 1ST, 1878.

July 1st, 1878, to July 1st, 1883.....	None.
July 1st, 1883, to July 1st, 1888.....	11,151
July 1st, 1888, to July 1st, 1893.....	19,510
Total.....	<u>30,661</u>

MARRIAGES FOR FIFTEEN YEARS, FROM JULY 1ST, 1878, TO JULY 1ST, 1893, NOT INCLUDING NON-RESIDENTS.

1878-79.....	7,359
1879-80.....	8,162
1880-81.....	8,366
1881-82.....	9,582
1882-83.....	9,116
1883-84.....	9,329
1884-85.....	9,348
1885-86.....	7,779
1886-87.....	7,458
1887-88.....	7,937
1888-89.....	11,944
1889-90.....	11,921
1890-91.....	12,384
1891-92.....	12,764
1892-93.....	13,105
Total.....	<u>146,554</u>

The total divorce-rate for fifteen years is 22.73 per 1,000 marriages or 2,000 persons, or one divorce to every $43\frac{1}{3}$ marriages.

NOTE.—The number of marriages is somewhat changed from those in former tables, as supplements have been added.

Synopsis of Vital and Mortuary Statistics.

BY THE MEDICAL SUPERINTENDENT OF VITAL STATISTICS.

The following outline presents the comparative number of marriages, births and deaths, as follows:

Average for five years ending June 30th, 1883:

Marriages.....	8,539
Births.....	24,281
Deaths.....	21,981

Average for five years ending June 30th, 1888:

Marriages.....	10,067
Births.....	26,050
Deaths.....	23,952

Average for five years ending June 30th, 1893:

Marriages.....	12,069
Births.....	30,199
Deaths.....	29,439

The marriages occurring in Camden and other places, as a result of the Pennsylvania law, so far as known, are not counted in our reckoning, although necessarily recorded. The excess, as we have it, is as follows:

1886.....	2,527
1887.....	4,332
1888.....	4,557
1889.....	4,187
1890.....	3,411
1891.....	3,767
1892.....	4,073

The following is the record for the year, from July 1st, 1888, to June 30th, 1889:

Marriages (including 4,072 non-residents).....	15,726
Marriages of non-residents.....	4,072
Births.....	29,099
Still-births.....	1,817
Deaths.....	26,543

The record from July 1st, 1889, to July 1st, 1890, is as follows:

Marriages (including 4,187 non-residents).....	15,564
Marriages of non-residents.....	4,187
Births.....	30,103
Still-births.....	1,799
Deaths.....	28,530

The population of the State in 1880 was 1,131,116; in 1885, 1,278,133, and in 1890, 1,444,933.

The following is the record for the year ending July 1st, 1891:

Marriages (including 3,411 non-residents).....	15,305
Marriages of non-residents.....	3,411
Births.....	28,882
Still-births.....	1,795
Deaths.....	28,840

The following is the record for the year ending July 1st, 1892:

Marriages (including 3,767 non-residents.....)	16,082
Marriages of non-residents.....	3,767
Births.....	30,627
Still-births.....	1,826
Deaths.....	32,685

The following is the record for the year ending July 1st, 1893:

Marriages (including 4,073 non-residents).....	17,178
Marriages of non-residents.....	4,073
Births.....	32,285
Still-births.....	1,877
Deaths.....	30,596

SYNOPSIS OF STATISTICS.

MARRIAGES.

It will be seen that the variations in marriage rates from year to year are not large. The number for last year, deducting those of non-residents, is a little larger than usual, being 13,105. The statistics of marriages from the national census do not yet furnish

us the marriage rates, and fuller comparisons will be made next year.

It is to be remembered that the marriage rates give the average number of persons marrying, and not the number of marriages to every 1,000 of the population. The marriage rates in 1886 were, for some of our States which are considered the most accurate, as follows:

Vermont.....	15.6
Massachusetts.....	18.0
Rhode Island.....	17.6
Connecticut.....	15.8
Ohio.....	16.4

The most recent comparison we have seen for countries abroad is that for 1876, which was as follows:

German Empire.....	17.0
England and Wales.....	16.6
Austria.....	16.2
Italy.....	16.2
France.....	15.8
Scotland.....	15.0
Ireland.....	10.0

In general the number of marriages in proportion to the population is an index of some social conditions, although there needs also to be a comparison with divorces, which vary much both as to law and custom in different countries. Dr. Farr, of the registrar-general's office of England and Wales, in comparisons through series of years found the number of marriages to be much governed by the prices of grain, so that these are in no small degree an index of the prosperity of the people.

In our own State the returns of marriages are now quite satisfactory.

BIRTHS.

It is the case in this State, as in all American cities and States, that the birth returns are not as complete as those of marriage or death, but as to these there is increase of record. For purposes of statistics we are able in two or three ways in addition to arrive at a nearer approximate, and hope in our next State census to

follow the course of the national census, which has a separate column for the living population under one year of age. Under date of November 4th we have the following statement as to births for the State of New Jersey during the year ending May 31st, 1890: Births per 1,000 of population (excluding stillborn), 25.16.

The number of births during the census year on which the above rates are based was obtained by adding to the living population under one year of age on June 1st, 1890, the number who were born and died during the census year.

This is a progressive decrease from former records.

The same seems to have occurred in foreign countries. The rates as given abroad are: For Austria, 37 per 1,000; for Germany, 35.7; for England and Scotland, 30.5; for Ireland, 22.5; and for France, 21.9

Dr. John S. Billings, Medical Superintendent of the Eleventh Census, says: "The birth rate per thousand of population in the United States was 30.95 in 1880 and 26.68 in 1890; that is, it has diminished a little over four per thousand."

While recognizing the influence of intoxicating liquors and luxurious living, he gives special prominence to those limitations upon fecundity which are accomplished by limiting the natural law of production. It is not so much celibacy as the objection that married persons have to the care and rearing of families. It is a subject for inquiry by sociologists. (See article in *The Forum*, June, 1893, and *Review of Reviews* for July, page 100.)

The statistics of the average size of families in the various countries of Europe, as given in the *New York Independent*, July 7th, 1891, are as follows:

France.....	3.03	members.
Denmark.....	3.61	"
Hungary.....	3.70	"
Switzerland.....	3.94	"
Austria and Belgium.....	4.05	"
England.....	4.08	"
Germany.....	4.10	"
Sweden.....	4.12	"
Holland.....	4.22	"
Scotland.....	4.46	"
Italy.....	4.56	"
Spain.....	4.65	"
Russia.....	4.83	"
Ireland.....	5.20	"

We have not thought it important to base any conclusions on the returns of still-births, although these serve as guides as to vigor of population, and are also to be studied in some populations in their social aspects. We cannot, as yet, make numerical deductions therefrom.

There is need of proper social views as to those cases in which premature birth is not an accident or a disease. While cases of interference with unborn life do not directly fall under our duties in the record of vital facts, it is well to bear in mind the serious view which law takes of these cases. We here simply quote as follows a recent note (July, 1893,) from the London *Lancet*:

"The Parliamentary return asked for by Viscount Grimston and already alluded to in *The Lancet*, contains answers to the following question (No. 7): What are the penalties for criminally causing a child to be stillborn? The replies will be read with interest, since from various causes and reasons this crime of procuring, or attempting to procure, abortion has of late years become unhappily frequent. As is well known, in England and in Ireland the punishment is penal servitude for life, or for any less term, or imprisonment; whilst, if the mother of the child should die in consequence of this unlawful act, the crime becomes constructive or legal murder. In 1875, Alfred Thomas Heap, a Manchester abortionist, was convicted of the murder of a woman. He had used a Manchester spindle, with which he had transfixed the gravid uterus. He was found guilty, but was recommended to mercy by the jury. As, however, they were unaware that he had already served five years' penal servitude for procuring abortion the recommendation was disregarded and he was executed. Since then there have been many convictions and heavy sentences, but still the crime goes on. In Scotland the punishment is arbitrary; in France, Spain, the German Empire, Austria, Hungary, Italy, Russia, Norway, Sweden and Denmark, in short, throughout the whole of Europe—the crime is punished with imprisonment for from six months to twenty years or for life. In Sweden the penalty is death if the mother dies, and in Russia the mother, if a consenting party, may be exiled to Siberia; in the Dominion of Canada the penalty is imprisonment for life; in Nova Scotia, Quebec, Ontario, British Columbia and in Prince Edward Island it varies from imprisonment for two years to for life; in New Brunswick the penalty is death; in Australia and New Zealand the punishment is very severe, ranging from two years' imprisonment to penal servitude for life; in the United States it is punished with fines ranging from \$100 to \$5,000, with imprisonment for long periods and with death; so that in all parts of the civilized world this crime is regarded as a grave one and is punished with more or less severity. Every medical practitioner, who may have the opportunity of doing so, should aid in bringing to justice the miscreants, both male and female, who live and thrive on this abominable trade, too often at the risk of the lives of the unhappy women who resort to them."

The population of the State in 1880 was 1,131,116; in 1885, 1,278,133, and in 1890, 1,444,933.

The following table shows the average number of deaths from each of the principal causes, from July 1st, 1878, to July 1st, 1888:

YEARLY AVERAGE OF DEATHS FROM PRINCIPAL DISEASES FOR TEN YEARS ENDING
JULY 1st, 1888.

Remittent	289
Enteric or Typhoid	579
Small-Pox	71
Scarlatina.....	610
Measles.....	135
Whooping-Cough.....	161
Diphtheria and Croup.....	1,280
Erysipelas.....	101
Diarrhœal Diseases of Children.....	2,592
Consumption	3,182
Acute Lung	2,438
Brain and Nervous Diseases of Children	1,762
Diseases of Heart and Circulation.....	1,313
Renal and Cystic Diseases	753
Adult Brain and Spinal Diseases	1,405
Adult Digestive and Intestinal Diseases.....	1,093
Cancer.....	482
Acute Rheumatism.....	75
Puerperal	245

DEATHS FROM VARIOUS CAUSES FROM JULY 1st, 1888, TO JULY 1st, 1889.

Remittent Fever.....	203
Enteric or Typhoid Fever.....	724
Small-Pox.....	3
Scarlet Fever	533
Measles	118
Whooping-Cough	278
Diphtheria and Croup.....	1,574
Erysipelas.....	114
Diarrhœal Diseases of Children.....	3,377
Consumption	3,449
Acute Lung.....	2,862
Brain and Nervous Diseases of Children	1,923
Diseases of Heart and Circulation.....	1,786
Renal and Cystic Diseases.....	1,056
Adult Brain and Spinal Diseases.....	1,791
Adult Digestive and Intestinal Diseases.....	1,450
Cancer	579
Acute Rheumatism.....	117
Puerperal.....	254

DEATHS FROM VARIOUS CAUSES FROM JULY 1st, 1889, TO JULY 1st, 1890.

Remittent Fever.....	195
Enteric or Typhoid Fever.....	782
Small-Pox	0
Scarlatina	209
Measles	174
Whooping-Cough	371
Diphtheria and Croup.....	1,575
Erysipelas.....	81
Diarrhœal Diseases of Children	3,527
Consumption	3,669
Acute Lung	3,804
Brain and Nervous Diseases of Children	2,032
Diseases of Heart and Circulation.....	1,945
Renal and Cystic Diseases.....	1,149
Adult Brain and Spinal Diseases.....	2,308
Adult Digestive and Intestinal Diseases.....	1,521
Cancer	640
Acute Rheumatism.....	106
Puerperal.....	250

DEATHS FROM VARIOUS CAUSES FROM JULY 1st, 1890, TO JULY 1st, 1891.

Remittent Fever.....	180
Enteric or Typhoid Fever	695
Small-Pox.....	0
Scarlatina.....	288
Measles.....	250
Whooping-Cough	299
Diphtheria and Croup.....	1,737
Erysipelas.....	85
Diarrhœal Diseases of Children	3,191
Consumption	3,456
Acute Lung.....	4,101
Brain and Nervous Diseases of Children	2,029
Diseases of Heart and Circulation.....	1,960
Renal and Cystic Diseases.....	1,200
Adult Brain and Spinal Diseases	2,333
Adult Digestive and Intestinal Diseases.....	1,573
Cancer	642
Acute Rheumatism.....	76
Puerperal.....	296

DEATHS FROM VARIOUS CAUSES FROM JULY 1st, 1891, TO JULY 1st, 1892.

Remittent Fever.....	198
Enteric or Typhoid Fever.....	628
Small-Pox.....	38
Scarlatina.....	1,008

Measles.....	197
Whooping Cough.....	163
Diphtheria and Croup.....	1,776
Erysipelas.....	94
Diarrhœal Diseases of Children.....	4,043
Consumption.....	3,575
Acute Lung.....	5,184
Brain and Nervous Diseases of Children.....	2,242
Diseases of Heart and Circulation.....	2,183
Renal and Cystic Diseases.....	1,444
Adult Brain and Spinal Diseases.....	2,457
Adult Digestive and Intestinal Diseases.....	1,625
Cancer.....	688
Acute Rheumatism.....	100
Puerperal.....	282

The population of the State, census of 1880, was 1,131,116; in 1885, 1,278,133, and in 1890, 1,444,933.

(For comparison, reckon the first quinquennial on the population of 1880, the second on that of 1885. For 1890 we have the national census, and for each year since the population as estimated thereupon.)

A comparison of death rates is one of the legitimate uses to be made of vital statistics, if only all the conditions which make such comparisons informatory as to the relations of health, disease and death are complied with. Approximations are of value if only they are recognized at their true worth.

DEATHS FROM VARIOUS CAUSES FROM JULY 1ST, 1892, TO JULY 1ST, 1893.

Remittent Fever.....	148
Enteric or Typhoid Fever.....	506
Small-pox.....	43
Scarlatina.....	445
Measles.....	73
Whooping-Cough.....	237
Diphtheria and Croup.....	1,677
Erysipelas.....	74
Diarrhœal Diseases of Children.....	3,981
Consumption.....	3,429
Acute Lung.....	3,974
Brain and Nervous Diseases of Children.....	2,072
Diseases of Heart and Circulation.....	2,179
Renal and Cystic Diseases.....	1,441
Adult Brain and Spinal Diseases.....	2,611
Adult Digestive and Intestinal Diseases.....	1,753
Cancer.....	723
Acute Rheumatism.....	102
Puerperal.....	282

YEARLY AVERAGE OF DEATHS FROM PRINCIPAL DISEASES FOR FIVE YEARS, BEGINNING JULY 1ST, 1888.

Remittent Fever.....	185
Enteric or Typhoid Fever.....	667
Small-pox.....	17
Scarlatina.....	497
Measles.....	162
Whooping-Cough.....	270
Diphtheria and Croup.....	1,668
Erysipelas.....	90
Diarrhœal Diseases.....	2,624
Consumption.....	3,516
Acute Lung.....	3,986
Brain and Nervous Diseases of Children.....	2,060
Diseases of Heart and Circulation.....	2,010
Renal and Cystic Diseases.....	1,258
Adult Brain and Spinal Diseases.....	2,340
Adult Digestive and Intestinal Diseases.....	1,585
Cancer.....	654
Acute Rheumatism.....	100
Puerperal.....	273

In order to give some estimate of usual death rates, we insert herewith the following table, for the year 1890, of a number of cities in various localities :

CITIES AND BOROUGHES.	Population.	RATE PER 1,000.	
		Births.	Deaths.
London,	4,221,452	29.7	19.2
Brighton,	115,606	23.9	17.1
Portsmouth,	160,128	34.3	18.9
Norwich,	101,306	33.8	19.4
Plymouth,	84,464	31.5	23.7
Bristol,	222,049	28.8	18.6
Wolverhampton,	82,799	32.9	21.9
Birmingham,	429,906	30.5	20.2
Leicester,	142,581	31.7	17.4
Nottinham,	212,662	25.8	16.0
Derby,	94,496	27.9	21.2
Birkenhead,	99,567	32.0	17.5
Liverpool,	517,116	29.3	23.0
Bolton,	115,253	32.3	24.8
Manchester,	56,459	35.5	29.2
Salford,	198,717	29.1	21.3
Oldham,	132,010	27.2	20.2
Blackburn,	120,496	32.3	23.1
Preston,	107,864	36.0	26.1
Huddersfield,	95,656	23.8	19.1
Halifax,	83,109	28.4	21.8
Bradford,	216,938	26.2	20.6
Leeds,	369,039	33.5	22.8
Sheffield,	325,304	32.4	24.0
Hull,	200,934	32.8	20.3
Sunderland,	131,302	35.8	23.2
Newcastle,	187,502	39.6	26.2
Cardiff,	130,283	39.3	18.9
Edinburgh,	261,970	26.8	20.4
Glasgow,	507,143	36.5	25.6
Dublin,	347,312	27.5	26.7
Calcutta,	466,459	. .	28.9
Bombay,	773,196	20.1	27.0
Madras,	398,777	43.5	42.7
Paris,	2,260,945	26.2	25.2
Brussels,	482,158	27.0	20.6
Amsterdam,	417,539	34.8	22.1
Rotterdam,	209,136	36.7	21.7
The Hague,	160,531	34.0	20.0
Copenhagen,	320,000	33.8	21.0
Stockholm,	245,317	31.5	20.4
Christiania,	150,400	21.4	22.2
St. Petersburg,	956,226	. .	28.5
Berlin,	1,609,536	30.7	22.7
Hamburg,	622,530	37.3	22.0
Dresden,	276,523	31.2	22.5
Breslau,	339,318	36.3	28.0
Munich,	349,000	39.8	30.0
Vienna,	1,378,530	32.7	25.2
Prague,	310,485	. .	28.0
Buda Pest,	513,010	37.4	31.2
Rome,	427,684	29.3	23.8
Venice,	159,100	27.2	28.2
Cairo,	374,838	53.1	47.4
Alexandria,	231,306	45.6	40.8
New York,	1,681,216	. .	25.0
Philadelphia,	1,069,264	. .	20.6

For comparison we give also the death rate of Philadelphia, New York City and Boston for 1893. Philadelphia 21.20, estimated on a population of 1,115,562. New York City 23.46, reckoned on a population of 1,924,300. Boston 24.02, reckoned on a population of 487,397.

According to Dr. Billings in the census of 1890, the number of deaths reported as due to consumption in the United States during the census year was 101,645, giving a death rate from this cause of a little over *1.6 per 1000* of living population. If we take the States in which the registration of deaths is most complete and accurate, we have the following death rates per thousand from consumption for the census year ending June 1st, 1890, viz.: Connecticut, 2.34; District of Columbia, 3.59; Massachusetts, 2.67; New Jersey, 2.34; New York, 2.48; Rhode Island, 2.66. From these data it is quite safe to assume that the number of deaths due to pulmonary phthisis in the whole country during the census year was over 125,000.

In the large cities the death rate from this cause was greater. Taking the six years ending May 31st, 1890, the average annual death rate from consumption in New York City was 3.92; in Brooklyn, 2.98; in Boston, 3.86; in Philadelphia, 2.98.

Number of Marriages, Births and Deaths,

BY COUNTIES, CITIES AND TOWNSHIPS, AND TOTALS FOR THE STATE,
FOR THE YEAR ENDING JUNE 30TH, 1893.

ATLANTIC COUNTY.

	M.	B.	D.
Absecon.....	3	13	12
Atlantic City.....	212	302	259
Buena Vista.....	7	21	16
Egg Harbor City.....	22	44	41
Egg Harbor Township.....	20	68	49
Galloway.....	9	42	30
Hamilton.....	10	42	32
Hammonton.....	27	87	77
Mullica.....	5	16	13
Weymouth.....	.....	6	1
	315	640	530

BERGEN COUNTY.

	M.	B.	D.
Boiling Spring.....	6	28	25
Englewood.....	30	81	83
Franklin.....	30	51	33
Hackensack.....	52	172	129
Harrington.....	23	46	48
Hohokus.....	21	50	29
Lodi.....	37	189	111
Midland.....	6	28	40
Orvil.....	7	28	27
Palisade.....	22	57	43
Ridgefield.....	21	57	127
Ridgewood.....	13	58	38
Saddle River.....	19	66	40
Union.....	30	72	72
Washington.....	19	70	60
	336	1053	905

BURLINGTON COUNTY.

	M.	B.	D.
Bass River.....	4	20	18
Beverly.....	21	30	62
Bordentown.....	39	83	88
Burlington.....	88	137	160
Chester.....	34	86	72
Chesterfield.....	2	16	18
Cinnaminson.....	36	86	62
Delran.....	23	65	37
Eastampton.....	1	7	7
Evesham.....	4	16	21
Florence.....	8	45	25
Lumberton.....	7	9	37
Mansfield.....	7	38	19
Medford.....	13	26	28
Mount Laurel.....	3	26	24
New Hanover.....	17	16	35
Northampton.....	62	102	113
Pemberton.....	17	2	45
Randolph.....	2	4	6
Shamong.....	2	4	11
Southampton.....	13	18	14
Springfield.....	5	14	19
Washington.....		13	15
Westampton.....		8	4
Willingboro.....		11	11
Woodland.....			5
	408	882	915

CAMDEN COUNTY.

	M.	B.	D.
Camden City.....	*4,570	1,347	1,357
Centre.....	5	42	28
Delaware.....	1	17	24
Gloucester City.....	52	104	118
Gloucester.....	19	78	96
Haddon.....	38	89	61
Pensauken.....	8	41	36
Stockton.....	67	153	158
Waterford.....	19	55	39
Winslow.....	11	33	40
	4,790	1,959	2,007

* Marriages of non-residents, 3,662.

CAPE MAY COUNTY.

	M.	B.	D.
Cape May City.....	22	55	43
Dennis.....	17	43	40
Lower.....	20	54	33
Middle.....	21	44	41
Upper.....	13	40	21
	93	236	178

CUMBERLAND COUNTY.

	M.	B.	D.
Bridgeton.....	116	325	217
Commercial.....	9	23	17
Deerfield.....	4	62	22
Downe.....	15	9	9
Fairfield.....	10	31	16
Greenwich.....	10	21	21
Hopewell.....	10	25	29
Landis.....	56	158	151
Lawrence.....	14	40	30
Maurice River.....	9	35	36
Millville.....	110	293	162
Stow Creek.....	4	12	9
	367	1,034	719

ESSEX COUNTY.

	M.	B.	D.
Belleville.....	32	69	85
Bloomfield.....	45	188	126
Caldwell.....	15	39	38
Clinton.....	21	70	64
East Orange.....	96	226	204
Franklin.....	5	53	22
Livingston.....	4	19	14
Millburn.....	7	60	29
Montclair.....	76	249	135
Newark.....	1,956	5,410	4,900
Orange.....	197	539	426
South Orange.....	20	94	47
Verona.....	8	18	12
West Orange.....	18	108	68
	2,500	7,142	6,170

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton.....	11	13	44
Deptford.....	2	43	37
East Greenwich.....	13	18	23
Elk.....	1	7	5
Franklin.....	9	46	24
Glassboro.....	18	81	42
Greenwich.....	14	29	35
Harrison.....	4	18	21
Logan.....	7	15	22
Mantua.....	15	28	33
Monroe.....	22	12	41
South Harrison.....	2	14	3
Washington.....	8	26	23
West Deptford.....	3	33	17
Woodbury.....	55	84	49
Woolwich.....	28	30	23
	212	497	442

HUDSON COUNTY.

	M.	B.	D.
Bayonne	120	553	445
Guttenberg	9	106	79
Harrison	27	253	248
Hoboken	613	1,661	1,248
Jersey City	1,401	3,690	4,541
Kearny	40	227	262
North Bergen	35	140	272
Town of Union	139	331	244
Union	6	89	88
Weehawken	4	44	61
West Hoboken	121	438	317
	2,515	7,532	7,805

HUNTERDON COUNTY.

	M.	B.	D.
Alexandria	2	18	13
Bethlehem	22	46	36
Clinton	27	45	23
Delaware	16	49	29
East Amwell	18	16	23
Franklin	14	25	21
Frenchtown	20	15	19
High Bridge	18	25	21
Holland	28	24	18
Kingwood	3	17	17
Lambertville	50	63	96
Lebanon	16	48	32
Raritan	29	52	79
Readington	25	29	23
Tewksbury	17	32	9
Union	9	1	11
West Amwell	1	6	15
	315	511	485

MERCER COUNTY.

	M.	B.	D.
East Windsor	21	49	34
Ewing	8	19	97
Hamilton	15	21	122
Hopewell	28	54	59
Lawrence	6	14	28
Princeton	32	85	85
Trenton	*662	669	1,096
Washington	11	11	20
West Windsor	7	21	22
	779	943	1,563

* Marriages of non-residents, 121.

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury	12	25	32
East Brunswick	28	49	76
Madison	9	9	17
Monroe	18	22	38
New Brunswick	150	434	303
North Brunswick	2	17	13
Perth Amboy	146	245	224
Piscataway	22	45	45
Raritan	36	44	50
Sayreville	11	85	30
South Amboy	16	136	129
South Brunswick	17	30	41
Woodbridge	30	109	94
	488	1,250	1,092

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic	6	3	26
Eatontown	12	22	50
Freehold	44	104	109
Holmdel	11	10	33
Howell	35	50	49
Long Branch	81	95	92
Manalapan	11	33	30
Marlboro	3	8	29
Matawan	18	53	39
Midletown	56	101	82
Millstone	11	26	21
Neptune	94	145	188
Ocean	9	12	16
Raritan	40	113	87
Shrewsbury	59	98	160
Upper Freehold	33	44	41
Wall	46	96	78
	569	1,013	1,130

MORRIS COUNTY.

	M.	B.	D.
Berlinton	36	32	47
Chatham	37	72	96
Chester	8	15	12
Hanover	14	55	132
Jefferson	6	13	20
Mendham	9	25	19
Montville	13	10	13
Morristown	45	223	166
Mount Olive	14	32	37
Passaic	8	11	29
Penquannock	16	61	42
Randolph	33	116	107
Rockaway	14	122	89
Roxbury	21	66	37
Washington	15	30	17
	289	883	863

OCEAN COUNTY.

	M.	B.	D.
Berkeley.....		9	9
Brick.....		13	26
Dover.....	9	13	9
Eagleswood.....	24	51	40
Jackson.....	5	16	19
Lacey.....	11	25	15
Lakewood.....	5	11	13
Little Egg Harbor.....	32	40	50
Manchester.....	18	48	28
Ocean.....	6	15	19
Plumsted.....		5	2
Stafford.....	10	34	17
Union.....	13	13	22
	13	22	12
	146	302	272

PASSAIC COUNTY.

	M.	B.	D.
Acquackanonk.....			
Little Falls.....	11	44	31
Manchester.....	13	67	37
Passaic.....	8	81	50
Paterson.....	154	438	343
Pompton.....	957	2,083	1,836
Wayne.....	15	34	22
West Milford.....	9	33	23
	18	25	24
	1,185	2,805	2,371

SALEM COUNTY.

	M.	B.	D.
Alloway.....	8	16	22
Eisnboro.....	1	1	4
Lower Alloways Creek.....	6	20	14
Lower Penns Neck.....	12	17	17
Mannington.....	9	18	38
Oldmans.....	15	29	18
Pilesgrove.....	28	35	60
Pittsgrove.....	13	79	32
Quinton.....	6	22	17
Salem.....	51	86	96
Upper Penns Neck.....	19	47	33
Upper Pittsgrove.....	8	27	15
	176	397	366

SOMERSET COUNTY.

	M.	B.	D.
Bedminster.....	10	35	17
Bernards.....	11	37	37
Brandsburg.....		14	10
Bridgewater.....	104	227	207
Franklin.....	19	58	56
Hillsborough.....	10	30	32
Montgomery.....	11	15	24
North Plainfield.....	22	82	59
Warren.....	2	8	10
	193	506	452

SUSSEX COUNTY.

	M.	B.	D.
Andover.....	6	11	14
Byram.....	10	16	12
Frankford.....	13	9	29
Green.....	6	13	3
Hampton.....	4	3	11
Hardyston.....	15	6	25
Lafayette.....	7	11	8
Montague.....			6
Newton.....	23	33	36
Sandyston.....	6	5	10
Sparta.....	14	12	32
Stillwater.....	5	14	11
Vernon.....	9	9	17
Walpack.....		4	6
Wantage.....	28	22	50
	146	168	270

UNION COUNTY.

	M.	B.	D.
Clark.....	1	3	2
Cranford.....	15	33	31
Elizabeth.....	353	1,142	829
Fanwood.....	9	29	25
Linden.....	6	14	50
New Providence.....	3	15	17
Plainfield.....	116	258	243
Rahway.....	67	86	171
Springfield.....	7	16	11
Summit.....	23	82	59
Union.....	3	21	27
Westfield.....	25	72	48
	628	1,771	1,513

WARREN COUNTY.

	M.	B.	D.
Allamuchy.....	3	11	8
Belvidere.....	36	43	29
Blairstown.....	16	18	16
Franklin.....	5	15	14
Frelinghuysen.....	2	15	10
Greenwich.....	14	7	12
Hackettstown.....	21	43	42
Hardwick.....	2	10	4
Harmony.....	5	26	18
Hope.....	8	32	21
Independence.....	22	10	9
Knowlton.....	95	33	22
Lopatcong.....	2	37	20
Mansfield.....	5	20	16
Oxford.....	21	121	64
Pahaquarry.....	2	6	4
Phillipsburg.....	*384	190	128
Pohatcong.....	19	35	15
Washington.....	63	89	66
	728	761	518

*Marriages of non-residents, 290.

COUNTIES.

	M.	B.	D.
Atlantic.....	315	640	530
Bergen.....	336	1,053	905
Burlington.....	408	882	945
Camden.....	4,790	1,959	2,007
Cape May.....	93	236	178
Cumberland.....	367	1,034	719
Essex.....	2,500	7,142	6,170
Gloucester.....	212	497	442
Hudson.....	2,515	7,532	7,805
Hunterdon.....	315	611	485
Mercer.....	779	943	1,563
Middlesex.....	488	1,250	1,092
Monmouth.....	*569	1,013	1,130
Morris.....	289	883	863
Ocean.....	146	302	272
Passaic.....	1,185	2,805	2,371
Salem.....	176	397	366
Somerset.....	193	506	452
Sussex.....	146	168	270
Union.....	623	1,771	1,513
Warren.....	728	761	518
	17,178	32,285	30,596

Combined Quinquennial Tables of Deaths

AND THEIR PRINCIPAL CAUSES FOR FIVE YEARS, ENDING JUNE 30th,
1893, WITH ACCOMPANYING EXPLANATIONS.

The present system of Vital Statistics in the State of New Jersey went into operation in 1878. All previous records had reference chiefly to legal proof of life, marriage, parentage and death, and even for these purposes it was impossible, under the method of collection in vogue, to secure uniform returns. The study of these statistics for any vital or social purpose, or for their bearing on the incidents of disease or death, was scarcely thought of.

The State Board of Health, after its organization in 1877, gave to the subject careful and earnest attention. The result was the formulation of a law passed in 1878, under which the State began a system of collection and record of return more in accord with modern methods of collecting, tabulating and utilizing such statistics. Their importance is fully set forth in Circular 72 of this Board and in its various reports. Indeed the significance of such statistics has now come so to be recognized as that the chief questions are those relating to the methods of compilation and the deductions to be made therefrom.

The statistical year was made to begin July 1st, 1878, both because this was the more convenient date in relation to the law and the usual census returns, and also because it enabled the report to be made at the annual meeting of the Legislature following. On some accounts it would have been desirable to follow the civil year, but it would have made the report more tardy. The law and compilations and records under it were not up to the conceptions of those of the Board who had studied the subject, but were necessarily modified by the possibilities of secur-

ing any legislation on a subject so little understood, and by consideration of appropriations therefor.

The first aim has been correct methods of return, the collection of all needed data, and such a record as would, at any time in the future, render these available. To accomplish this it was necessary to sacrifice something as to tabulation of deductions therefrom. This was all the more indicated, because hasty generalizations are the great failure of statistics. Some facts, it is true, become apparent from year to year. But it is only large numbers and records for series of years that can be depended upon to eliminate errors or to bring the science of probabilities and reasoning founded thereon in the full range of practical knowledge.

Time, experience and the judgment of statistical workers has more fully satisfied us of the general correctness of this method, although suggesting some improvements. There has often been the temptation to multiply tables and to be assertive as to deductions, since these are far more impressive than the mere systematic and adequate collection of facts for future use. While each township, county and city has had its individual record ready for use when time and numbers justify, we have dealt chiefly with mortality statistics of counties and cities of over 5,000 inhabitants.

These have, from time to time, been gathered into quinquennial statements, and one decennial has been recorded without positive deductions therefrom. It has been felt that no very extended use could be made in a broad and assertive way until at least two decades had been recorded. Yet all along our yearly and quinquennial tables have furnished local hints or general information of present value and of greater prospective significance.

This year brings us to another quinquennial, which will be compiled and stated on the same basis as heretofore.

We also give in addition in this report the only decennial table we, thus far, have, namely that relating to the statistical period from July 1st, 1878, to July 1st, 1888, the same being in two condensed tables, the one including all the counties of the state, and the other all cities of over 5,000 inhabitants.

By graphic method and diagrammatic forms such tables are made more impressive to the ordinary student or reader than

bare numerical statements can be. We do this all the more hopefully because we believe the time will come when the general government will be able from its own resources to utilize and to extend their study for the benefit of the whole nation and incidentally for the special benefit of the State.

We first give for general reference the census of 1875, 1880, 1885 and 1890 for counties and for cities of over 5,000 inhabitants.

We then reproduce the Decennial Tables of Counties and Cities as found in the Twelfth Report, arranging the cities in the order of their counties instead of alphabetically.

Population of the Counties of New Jersey for the Years 1875, 1880, 1885 and 1890.

	1875.	1880.	1885.	1890.
Atlantic.....	13 967	18,704	22,356	28,836
Bergen.....	35,516	36,786	39,880	47,226
Burlington.....	53,155	55,403	57,558	58 528
Camden.....	52,994	62,942	76,685	87,687
Cape May.....	8,190	9,765	10,744	11,268
Cumberland.....	35,311	37,687	41,982	45,438
Essex.....	168 812	189,929	213,764	256 098
Gloucester.....	24 486	25,886	27,603	28 649
Hudson.....	163 000	187,944	240,342	275,126
Hunterdon.....	37,473	38,670	37,420	35,355
Mercer.....	49,884	58,061	66,785	79,978
Middlesex.....	48,313	52,286	56,180	61,754
Monmouth.....	48 500	55,538	62,324	69,128
Morris.....	49,019	50,861	50,675	54,101
Ocean.....	13 707	14,455	15,586	16,974
Passaic.....	53,775	68,860	83,374	105,046
Salem.....	22,701	24,579	25,373	25,151
Somerset.....	27,453	27,162	27,425	28,311
Sussex.....	24 010	23,539	22,401	22,259
Union.....	51,758	55,571	61,839	72,467
Warren.....	37,389	36,589	37,737	36,553

Population of the Cities of New Jersey of over 5,000 Inhabitants, for the Years 1875, 1880, 1885 and 1890.

	1875.	1880.	1885.	1890.
Atlantic County—				
Atlantic City.....		5,477	7,942	13,055
Burlington County—				
Bordertown.....	5,110	5,334	5,857	*5,090
Burlington.....	7,297	7,237	7,690	7,264
Camden County—				
Camden City.....	33,825	41,659	52,884	58,313
Gloucester City.....	5,105	5,347	5,966	6,564
Cumberland County—				
Bridgeton.....	7,953	8,722	10,065	11,424
Millville.....	6,775	7,660	8,824	10,002
Essex County—				
Newark.....	123,310	136,508	152,988	181,830
Orange.....	10,813	13,207	15,231	18,844
Hudson County—				
Bayonne.....	5,836	9,372	13,080	19,033
Harrison.....		6,898	6,806	8,358
Hoboken.....		30,989	37,721	43,648
Jersey City.....	109,227	120,722	153,513	163,003
Town of Union.....		5,849	8,398	10,643
Mercer County—				
Chambersburg.....		5,437	8,542	
Trenton.....	25,031	29,910	34,386	37,458
Middlesex County—				
New Brunswick.....	16,660	17,166	18,258	18,603
Perth Amboy.....				9,512
Monmouth County—				
Long Branch.....			5,140	7,231
Morris County—				
Morristown.....		6,837	8,760	8,156
Passaic County—				
Passaic City.....		6,532		13,028
Paterson.....	38,814	51,031	8,326	78,347
Salem County—				
Salem City.....		5,056	5,516	5,516
Union County—				
Elizabeth.....	25,923	23,229	32,119	37,764
Plainfield.....	7,216	8,125	8,913	11,267
Rahway.....	6,947	6,455	6,861	7,105
Warren County—				
Phillipsburg.....	7,240	7,181	8,058	8,644

*Bordertown includes the township.

Decennial Tables.

The following are the tables of ten years, from 1878-1888, so combined as to give the means and other averages for the various years and then the totals. In some cases the data were not complete for all the years, but only for five years, and so those have been given.

Summary of Vital Facts from New Jersey Death Record, by Counties, for Ten Years ending June 30th, 1888.

Table with columns for Counties, Statistical Divisions, and various death categories: Under one year, One to five, Five to twenty, Twenty to sixty, Over sixty, Total, including under-fined, Population, census of 1885, Death-rate per 1,000, and Principal Causes of Death (Remittent fever, etc., Small-pox, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, etc.).

Total deaths in the State (including supplements), was 23,709, and the average death-rate 19.16.

Rates for short periods, or which deal with small numbers, are only approximate and sometimes misleading, since temporary causes may have been in operation, and small numbers do not eliminate or balance errors which practically disappear in large aggregates.

DEATHS AT ALL AGES. CITIES HAVING OVER 5,000 POPULATION. Statistical Divisions.

Table showing deaths at all ages for cities with over 5,000 population. Columns include Under one year, One to five, Five to twenty, Twenty to sixty, Over sixty, Total, including under-fined, Estimated Population, and Death-rate per 1,000. Cities listed include Atlantic City, Camden, Gloucester, Newark, Jersey City, etc.

Cities are generally more unhealthy than their death-rates indicate, since the population is in many of them greatly decreased for four months in the year, and thousands remove themselves instead of removing the evils which distress and sicken those who remain.

PRINCIPAL CAUSES OF DEATH.

PRINCIPAL CAUSES OF DEATH.

Diarrhoeal diseases, Erysipelas, Diphtheria and croup, Whooping-cough, Measles, Scarlet fever, Small-pox, Exanthic or typhoid fever, Remittent fever, etc., Diphtheria and croup, Erysipelas, Diarrhoeal diseases, Under twenty, Consumption, Active lung diseases, Brain and nervous diseases of children, Diseases of heart and circulation, Renal and cystic diseases, Adult brain and spinal diseases, Diabetic and intestinal diseases, Cancer, Acute rheumatism, Puerperal.

Summary of Vital Facts from New Jersey Death Record, in Cities of over 5,000 Population, for Ten Years ending June 30th, 1888.

Table showing Population of Counties for 1875, 1880, 1885, 1890; also, the Death-rate for each Year, and also the Average Death rate for Last Five Years.

COUNTIES.	Population, 1875.	Population, 1880.	Death rate per 1,000, 1875.	Death rate per 1,000, 1879.	Death rate per 1,000, 1880.	Death rate per 1,000, 1891.	Death rate per 1,000, 1892.	Population, 1893.	Death rate per 1,000, 1883.	Death rate per 1,000, 1884.	Death rate per 1,000, 1885.	Death rate per 1,000, 1886.	Death rate per 1,000, 1887.	Population, 1890.	See page 546.	Death rate per 1,000, 1888.	Death rate per 1,000, 1889.	Death rate per 1,000, 1890.	Death rate per 1,000, 1891.	Death rate per 1,000, 1892.	Average death-rate for five years, 1888 to 1893.	
Atlantic County.....	13,967	18,704	16.78	16.78	16.44	21.71	19.30	23,366	30.89	19.46	16.60	16.30	17.97	.....	21.06	17.67	17.43	17.33	17.44	17.33	18.41	18.41
Bergen.....	25,516	36,786	17.50	18.06	18.07	17.61	17.46	59,680	14.64	15.05	15.05	14.93	15.93	.....	14.23	14.81	14.76	14.76	14.95	14.95	16.77	16.77
Burlington.....	55,186	60,403	14.33	14.43	16.19	17.11	14.89	67,085	14.60	16.24	14.92	15.29	17.26	.....	14.23	14.81	14.76	14.76	14.95	14.95	16.77	16.77
Camden.....	62,994	68,943	19.98	18.81	22.49	23.30	20.51	76,685	30.51	17.57	18.44	20.19	21.53	.....	19.39	21.60	21.84	23.57	21.32	21.32	19.72	19.72
Cape May.....	8,190	37,687	14.06	14.06	13.72	13.72	13.41	10,744	14.75	14.99	15.96	19.20	13.63	.....	16.23	16.47	14.95	17.69	16.42	16.42	16.38	16.38
Cumberland.....	85,811	97,687	17.60	16.20	17.03	18.31	14.59	41,983	16.16	16.23	13.74	14.08	13.78	.....	14.11	16.06	16.09	15.70	16.18	16.18	16.38	16.38
Essex.....	168,819	189,034	17.98	17.98	19.97	23.85	23.15	213,764	32.17	21.81	21.19	21.69	15.83	.....	14.33	23.89	21.13	23.71	21.10	21.10	23.10	23.10
Hudson.....	163,000	187,944	24.27	21.41	23.65	31.07	23.68	240,343	34.56	16.70	16.70	23.61	18.01	.....	23.65	35.72	36.05	26.69	26.44	26.44	26.69	26.69
Hunterdon.....	37,463	38,570	14.06	12.31	13.71	14.77	14.23	37,430	11.12	12.46	13.89	13.95	13.20	.....	11.69	14.78	14.57	13.72	13.72	14.70	14.70	14.70
Mercer.....	49,684	53,386	22.23	18.05	17.30	20.93	20.46	66,795	18.36	17.41	16.64	15.19	19.71	.....	17.69	18.88	16.77	20.07	17.76	17.76	17.53	17.53
Middlesex.....	46,315	53,386	17.32	14.46	16.25	20.18	20.75	60,180	18.70	16.84	16.39	16.82	14.74	.....	17.69	18.88	16.77	20.07	17.76	17.76	17.53	17.53
Morristown.....	48,000	55,635	19.09	13.64	16.93	20.76	18.69	62,334	16.45	17.09	14.49	16.45	14.44	.....	14.54	16.86	15.63	16.44	16.44	16.58	16.58	16.58
Monmouth.....	49,019	60,887	16.91	13.36	16.59	19.34	19.21	50,575	14.71	16.94	14.64	16.10	18.49	.....	17.71	16.33	15.63	17.27	15.39	15.39	16.26	16.26
Morris.....	13,707	14,455	15.83	11.30	13.69	16.15	14.04	18,586	16.63	17.19	14.13	13.54	14.44	.....	13.40	14.97	16.07	17.18	16.81	16.81	16.29	16.29
Ocean.....	53,775	69,590	27.58	21.96	21.96	24.92	24.92	83,374	34.06	19.17	18.90	13.75	15.29	.....	21.93	20.04	21.80	21.84	20.09	20.09	21.08	21.08
Passaic.....	72,463	81,623	22.62	18.62	14.91	16.61	15.92	92,373	15.81	13.75	15.37	16.30	15.81	.....	14.38	16.37	14.87	14.43	14.85	14.85	16.92	16.92
Salmon River.....	34,012	40,000	13.74	12.06	13.69	19.33	19.38	23,401	12.44	14.46	13.19	13.21	11.65	.....	12.64	10.48	13.48	14.98	13.14	13.14	13.60	13.60
Union.....	51,758	58,971	13.66	16.11	17.83	21.18	21.37	61,899	18.37	13.84	16.68	19.24	15.81	.....	13.07	17.86	17.51	15.16	19.25	19.25	14.71	14.71
Warren.....	37,869	36,989	13.96	14.54	14.51	23.24	16.15	36,689	13.36	14.31	13.96	14.31	16.00	.....	14.16	14.75	14.75	16.65	14.16	14.16	14.71	14.71
Total	1,019,418	1,131,117	20.08	16.77	18.29	23.90	20.60	1,273,653	19.30	18.63	17.80	19.04	17.01	.....	18.99	19.80	19.60	21.62	19.60	21.62	19.88	19.88

Table showing Population of Cities of over 5,000 Inhabitants for 1875, 1880, 1885, 1890; also, the Death-rate for each Year and Average Death-rate for the Last Five Years.

CITIES.	Population, 1875.	Population, 1880.	Death rate per 1,000, 1875.	Death rate per 1,000, 1878.	Death rate per 1,000, 1879.	Death rate per 1,000, 1880.	Death rate per 1,000, 1881.	Death rate per 1,000, 1882.	Population, 1885.	Death rate per 1,000, 1883.	Death rate per 1,000, 1884.	Death rate per 1,000, 1885.	Death rate per 1,000, 1886.	Death rate per 1,000, 1887.	Population, 1890.	See page 546.	Death rate per 1,000, 1888.	Death rate per 1,000, 1889.	Death rate per 1,000, 1890.	Death rate per 1,000, 1891.	Death rate per 1,000, 1892.	Average death-rate for five years, 1888-93.
Atlantic City.....	5,477	5,477	16.82	16.82	16.82	16.82	16.82	16.82	7,943	35.50	25.54	31.05	27.20	32.84	26.93	20.01	20.46	30.19	16.47	21.81	21.81
Burlington.....	5,110	5,357	16.82	16.82	16.82	16.82	16.82	16.82	5,957	19.05	16.86	15.98	16.33	16.55	15.03	18.43	20.70	30.73	17.44	20.48	20.48
Camden.....	33,835	41,689	19.88	14.10	23.90	24.55	20.81	52,894	32.37	19.30	19.37	20.40	23.70	22.60	18.73	21.15	23.69	25.37	22.09	22.60	22.60
Cumberland.....	7,963	7,660	16.75	17.75	19.72	22.95	15.45	10,085	18.69	17.78	11.92	15.19	17.69	.....	14.81	17.70	19.61	16.55	17.63	17.24	17.24
Essex.....	123,310	136,508	25.96	18.71	21.12	28.66	25.49	163,988	24.70	24.38	23.94	24.40	27.09	.....	26.69	27.26	23.69	25.17	24.67	26.05	26.05
Hudson.....	10,818	13,207	19.88	16.35	18.02	25.44	21.80	16,231	22.03	19.70	19.96	21.14	24.49	.....	23.85	24.50	20.39	23.51	20.36	22.37	22.37
Monmouth.....	5,896	9,872	26.78	16.04	16.43	25.89	25.81	13,080	33.19	15.58	20.78	23.16	26.28	.....	24.94	20.97	20.37	31.11	19.74	21.17	21.17
Passaic.....	37,775	40,356	17.11	23.71	23.71	23.71	23.71	47,721	33.13	23.35	23.62	24.33	23.50	.....	23.65	27.67	21.70	26.97	26.60	26.61	26.61
Union.....	109,221	120,221	23.04	20.68	23.61	25.74	25.74	153,613	25.15	23.23	23.03	24.01	25.68	.....	23.66	26.27	26.60	27.78	26.67	25.93	25.93
Warren.....	7,240	7,181	14.08	17.54	15.87	23.53	20.46	8,068	18.10	18.27	14.40	19.24	19.28	.....	15.98	14.96	16.75	14.77	14.39	15.16	15.16
Total	467,846	570,390	20.08	18.61	19.37	23.71	21.30	689,977	23.69	21.25	20.83	23.24	24.76	23.04	23.13	23.37	24.81	23.37	24.81	23.39	23.39

* As to special causes of high and varying death-rate in Atlantic City because of successive influx of changing populations, see notes to former table.

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.

COUNTIES. Statistical Divisions.	DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.														
	Under one year.					Five to sixty.					Over sixty.					Total, including unclassified.									
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.
Atlantic, 1889	144	133	55	121	143	10	8	19	1	68	27	27	185	149	49	38	49	98	37	44	63	10	3	7	30
Atlantic, 1890	133	55	121	143	143	9	8	19	1	82	37	28	164	164	46	35	47	98	49	53	63	14	3	4	21
Atlantic, 1891	130	63	40	140	178	9	6	9	1	83	37	28	164	178	46	35	47	98	49	53	63	14	3	4	21
Atlantic, 1892	138	49	48	164	178	11	9	11	1	96	36	33	164	178	46	35	47	98	49	53	63	14	3	4	21
Atlantic, 1893	146	57	15	144	137	12	9	11	1	86	29	27	197	163	46	35	47	98	49	53	63	14	3	4	21
Total	681	270	232	768	718	47	24	99	4	390	166	144	907	898	337	146	231	186	280	177	71	20	26	133	41
Bergen, 1889	169	78	67	193	156	10	4	7	4	68	32	37	233	211	83	91	40	95	49	59	16	5	4	80	4
Bergen, 1890	169	67	59	231	201	10	4	7	4	70	41	40	233	211	83	91	40	95	49	59	16	5	4	80	4
Bergen, 1891	166	60	66	232	228	10	4	7	4	83	40	48	233	211	83	91	40	95	49	59	16	5	4	80	4
Bergen, 1892	183	83	68	246	210	11	4	10	2	93	40	48	247	209	124	55	59	87	83	83	19	4	19	44	19
Bergen, 1893	219	91	76	264	260	11	4	7	6	131	47	41	284	209	124	55	59	87	83	83	19	4	19	44	19
Total	886	379	335	1174	1093	34	21	36	17	444	219	192	1236	1078	589	284	266	188	323	229	99	21	41	244	29
Burlington, 1889	204	67	79	241	263	7	27	14	13	26	6	96	35	71	294	95	79	81	85	70	15	5	19	87	8
Burlington, 1890	124	68	62	243	259	8	26	14	10	20	10	66	269	266	93	46	50	57	107	60	23	8	8	37	8
Burlington, 1891	165	89	87	260	270	11	26	14	14	24	2	60	46	297	256	110	40	63	41	76	27	30	8	10	40
Burlington, 1892	170	128	148	267	274	11	26	14	14	24	2	60	46	439	388	166	57	87	68	86	60	24	8	21	64
Burlington, 1893	179	99	105	289	297	4	31	2	6	140	110	66	61	326	310	96	40	95	48	86	48	30	5	7	54
Total	946	438	432	1369	1433	24	143	66	13	47	806	11	463	257	1605	1484	638	263	414	210	482	286	127	24	29

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

COUNTIES. Statistical Divisions.	DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.														
	Under one year.					Five to sixty.					Over sixty.					Total, including unclassified.									
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.
Camden, 1889	486	189	170	628	314	17	108	1	15	2	31	51	6	260	118	184	728	681	190	188	23	3	17	72	8
Camden, 1890	519	260	168	689	369	10	98	9	11	16	97	17	7	345	117	194	728	681	190	188	23	3	17	72	8
Camden, 1891	528	282	223	674	470	11	43	3	3	216	14	26	108	264	108	188	681	728	190	188	23	3	17	72	8
Camden, 1892	535	282	223	674	470	11	43	3	3	216	14	26	108	264	108	188	681	728	190	188	23	3	17	72	8
Camden, 1893	541	247	189	631	337	9	50	1	15	4	14	131	10	232	138	168	749	704	208	186	23	3	17	72	8
Total	2694	1204	991	2901	1899	57	342	2	92	22	103	673	25	1347	552	683	3798	3487	1056	799	646	323	159	20	79
Cape May, 1889	24	13	20	46	63	6	6	3	2	10	3	10	1	12	18	18	59	54	17	11	26	6	1	1	4
Cape May, 1890	24	9	16	49	69	1	3	1	1	16	1	10	8	10	10	8	56	49	6	6	8	2	1	1	4
Cape May, 1891	34	9	16	63	80	1	3	1	1	16	1	10	8	10	10	8	56	49	6	6	8	2	1	1	4
Cape May, 1892	48	11	13	63	80	1	3	1	1	16	1	10	8	10	10	8	56	49	6	6	8	2	1	1	4
Cape May, 1893	48	18	19	38	56	4	4	3	3	1	13	1	27	6	9	64	64	59	14	8	16	6	3	3	6
Total	106	70	70	294	358	2	16	3	9	38	4	96	48	52	290	280	83	60	36	128	81	32	3	8	26
Cumberland, 1889	150	70	46	217	175	5	14	2	4	25	6	48	62	948	324	48	56	284	264	87	87	41	26	3	6
Cumberland, 1890	188	98	64	276	188	1	19	2	6	23	55	6	106	55	56	500	269	78	46	26	70	46	18	8	28
Cumberland, 1891	141	96	93	174	209	3	23	5	1	78	2	64	51	431	374	268	68	45	66	28	64	41	30	1	8
Cumberland, 1892	153	48	84	218	231	2	23	18	5	7	4	62	32	298	58	36	59	38	59	36	59	34	3	4	26
Cumberland, 1893	239	55	66	316	287	3	10	9	9	17	2	89	89	40	217	196	69	54	54	46	79	49	32	3	7
Total	681	364	339	993	1046	11	68	35	14	176	11	416	289	285	1386	1174	674	218	266	161	641	212	109	12	29

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

Table with columns: COUNTIES, Statistical Divisions, DEATHS AT ALL AGES (Under one year, One to five, Five to twenty, Twenty to sixty, Over sixty, Total, including unclassified), Death rate per 1,000, and various diseases (Remittent fever, etc., Enteric fever, Small-pox, Scarlet fever, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, Diarrheal diseases of children, Consumption, M., Consumption, F., Number of deaths from first 10 diseases, consumption, diphtheria, enteric fever, diphtheria, acute lung diseases, Brain and nervous diseases of children, Diseases of heart and circulation, Renal and cystic diseases, Adult brain and spinal diseases, Digestive and intestinal diseases, Cancer, Acute rheumatism, Puerperal, Accident).

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

Table with columns: COUNTIES, Statistical Divisions, DEATHS AT ALL AGES (Under one year, One to five, Five to twenty, Twenty to sixty, Over sixty, Total, including unclassified), Death rate per 1,000, and various diseases (Remittent fever, etc., Enteric fever, Small-pox, Scarlet fever, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, Diarrheal diseases of children, Consumption, M., Consumption, F., Number of deaths from first 10 diseases, consumption, diphtheria, enteric fever, diphtheria, acute lung diseases, Brain and nervous diseases of children, Diseases of heart and circulation, Renal and cystic diseases, Adult brain and spinal diseases, Digestive and intestinal diseases, Cancer, Acute rheumatism, Puerperal, Accident).

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

COUNTIES. Statistical Divisions.	DEATHS AT ALL AGES.										Death-rate per 1,000.	Population, census of —																			
	PRINCIPAL CAUSES OF DEATH.																														
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including unclassified.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.			Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Number of deaths from 10 diseases, consumption, male and female, being combined.	Number of deaths from enteric fever, diphtheria, diarrheal diseases of children and consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Monmouth, 1889.....	214	85	88	275	812	.....	11	39	.....	13	2	24	4	123	74	59	337	308	82	44	74	53	84	73	94	73	35	.....	10	44
..... 1890.....	238	114	98	309	834	.....	7	31	.....	3	18	38	3	133	69	71	357	323	135	57	109	63	100	63	100	63	39	.....	7	53
..... 1891.....	220	98	77	809	840	.....	6	22	.....	2	4	10	2	153	64	71	366	342	144	68	92	40	116	73	36	.....	8	8	66	
..... 1892.....	240	95	106	311	883	.....	3	10	.....	3	5	8	3	168	55	73	378	348	207	47	103	67	103	75	31	.....	8	9	49	
..... 1893.....	241	95	103	311	883	.....	3	10	.....	3	5	8	3	168	55	71	396	365	106	52	107	67	103	75	31	.....	11	56	.....	
Total.....	1203	435	476	1543	4734	.....	28	97	.....	43	17	46	219	30	321	344	1349	1685	675	283	484	275	384	365	442	15	45	284	.....	284
Morris, 1889.....	109	69	101	248	373	9	14	18	16	7	6	84	49	55	395	277	92	41	97	88	101	52	19	7	6	40	8
..... 1890.....	128	69	49	276	418	.....	4	13	.....	4	.....	7	4	5	56	57	68	266	235	94	44	77	123	61	20	6	8	47	.....	8
..... 1891.....	148	69	49	276	418	.....	8	13	.....	4	.....	7	4	5	56	57	68	266	235	94	44	77	123	61	20	6	8	47	.....	8
..... 1892.....	160	101	92	305	454	.....	8	13	.....	4	.....	7	4	5	56	57	68	266	235	94	44	77	123	61	20	6	8	47	.....	8
..... 1893.....	160	101	92	305	454	.....	8	13	.....	4	.....	7	4	5	56	57	68	266	235	94	44	77	123	61	20	6	8	47	.....	8
Total.....	793	396	396	1338	4235	34	55	52	18	46	219	14	359	231	304	1332	1163	533	211	333	190	645	250	117	31	38	217	317
Ocean, 1889.....	43	15	15	67	80	.....	1	1	.....	.....	.....	1	4	2	19	10	25	72	69	7	13	29	7	26	13	9	8	8	.....	8
..... 1890.....	48	20	19	71	80	1	6	1	4	2	19	10	25	69	69	20	17	26	6	24	6	1	11	11
..... 1891.....	34	26	21	69	90	3	8	4	1	6	7	1	33	23	29	119	111	46	12	29	17	34	24	9	2	3	16	16
..... 1892.....	63	25	29	90	135	3	8	4	1	6	7	1	33	23	29	119	111	46	12	29	17	34	24	9	2	3	16	16
..... 1893.....	62	17	19	82	98	3	12	1	2	6	6	26	17	26	90	85	30	11	23	13	34	20	8	2	3	11	11
Total.....	238	103	103	379	481	.....	4	37	.....	13	3	9	46	4	133	81	111	441	408	124	59	126	61	134	102	39	12	8	.....	8

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

COUNTIES. Statistical Divisions.	DEATHS AT ALL AGES.										Death-rate per 1,000.	Population, census of —																			
	PRINCIPAL CAUSES OF DEATH.																														
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including unclassified.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.			Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Number of deaths from 10 diseases, consumption, male and female, being combined.	Number of deaths from enteric fever, diphtheria, diarrheal diseases of children and consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.	Accident.
Passaic, 1889.....	641	301	183	699	937	.....	14	34	.....	68	18	17	106	8	818	123	130	819	701	247	178	134	437	664	666	235	24	93	514	.....	514
..... 1890.....	677	285	247	709	918	.....	4	16	.....	3	11	28	1	2	33	21	31	135	129	29	18	29	10	32	18	10	3	14	20	.....	20
..... 1891.....	677	285	247	709	918	.....	4	16	.....	3	11	28	1	2	33	21	31	135	129	29	18	29	10	32	18	10	3	14	20	.....	20
..... 1892.....	715	329	220	733	956	.....	1	5	.....	2	4	9	2	4	47	23	37	171	80	110	34	12	12	15	13	19	2	9	16	.....	16
..... 1893.....	696	277	188	819	956	.....	8	40	.....	1	16	11	118	4	946	119	138	832	781	318	184	100	21	31	45	117	63	6	26	.....	26
Total.....	3353	1570	1006	3511	4563	.....	49	158	.....	114	74	103	696	84	1633	361	686	4383	3334	1639	865	737	437	664	666	235	24	93	514	.....	514
Salem, 1889.....	67	36	45	97	124	.....	4	10	.....	3	.....	3	13	2	41	21	31	135	129	29	18	29	10	32	18	10	3	14	20	.....	20
..... 1890.....	87	33	24	90	139	.....	1	6	.....	2	.....	4	9	2	47	23	37	171	80	110	34	12	12	15	13	19	2	9	16	.....	16
..... 1891.....	90	33	31	90	128	.....	1	5	.....	2	.....	4	9	2	48	20	30	138	111	39	12	12	15	13	19	2	9	16	.....	16	
..... 1892.....	87	33	45	78	118	.....	13	45	.....	36	5	16	68	6	238	10	132	665	579	193	66	154	85	214	132	60	10	18	73	.....	73
..... 1893.....	86	36	45	405	633	.....	6	13	.....	3	.....	3	13	2	41	40	53	151	139	47	26	44	38	48	31	10	3	5	17	.....	17
Total.....	413	166	167	405	633	.....	23	40	.....	27	14	11	61	4	317	141	138	676	697	307	83	286	130	239	168	72	9	32	107	.....	107

Return of Deaths from all Causes and Certain Specified Diseases, in the Counties of the State of New Jersey, for each year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrhoeal Diseases and Consumption, combined.—Continued.

Table with columns: COUNTIES, Statistical Divisions, DEATHS AT ALL AGES, and PRINCIPAL CAUSES OF DEATH. Rows include Sussex, Union, Warren, and Total for various years from 1889 to 1893.

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey of over 5,000 Inhabitants, for each Year from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrhoeal Diseases and Consumption, combined.

Table with columns: CITIES, Statistical Divisions, DEATHS AT ALL AGES, and PRINCIPAL CAUSES OF DEATH. Rows include Atlantic City, Hackensack, and Bordentown for various years from 1889 to 1893.

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey of over 5,000 Inhabitants, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrhæal Diseases and Consumption, combined.—Continued.

CITIES. Statistical Divisions.	DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																								
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including unclassified.	Population, census of —	Death-rate per 1,000.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrhæal diseases of children.	Consumption, M.	Consumption, F.	Number of deaths from first 10 diseases, consumption, male and female, being combined.	Number of deaths from enteric fever, diphtheria, diarrhæal diseases of children and consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Cystic and urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.				
	83	14	17	41	25	11																										1	1	1	1
Burlington, 1889.....	36	9	30	51	45	171	8,460	20.1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Burlington, 1890.....	26	9	30	51	45	171	8,460	20.1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Burlington, 1891.....	21	17	19	53	41	151	8,460	17.8	1	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Burlington, 1892.....	44	16	19	68	48	205	8,460	24.2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Burlington, 1893.....	38	16	30	42	53	181	8,460	21.4	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total.....	151	71	96	243	221	982	84,000	23.6	5	21	6	7	5	47	6	63	69	47	390	387	84	66	72	50	68	44	19	4	4	43	4	43	4		
Camden City, 1889.....	531	126	125	388	198	1,678	8,460	19.8	17	19	13	3	11	33	2	169	79	91	489	390	84	67	69	87	71	15	8	18	47	13	8	18	47		
Camden City, 1890.....	367	123	128	487	223	1,336	8,460	15.8	10	82	8	7	13	76	7	188	78	85	546	501	163	126	83	49	49	32	60	30	3	18	40	18	40		
Camden City, 1891.....	369	159	175	369	239	1,511	8,460	17.7	9	33	19	24	192	8	197	67	67	69	631	576	118	131	79	48	81	60	35	8	14	51	16	51	16		
Camden City, 1892.....	372	141	141	408	258	1,520	8,460	18.0	1	38	27	4	7	160	2	230	61	72	682	541	214	136	111	48	108	69	33	6	6	56	6	56	6		
Camden City, 1893.....	357	179	124	410	255	1,525	8,460	18.4	5	38	11	2	89	2	312	72	77	614	488	142	118	53	61	97	81	19	4	10	50	10	50	10	50		
Total.....	1850	994	725	2083	1180	11,862	84,000	22.0	40	210	78	15	63	639	20	976	357	412	2712	2495	721	529	431	239	459	331	131	18	60	264	60	264	60		
Gloucester City, 1889.....	45	19	17	40	20	141	8,460	16.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Gloucester City, 1890.....	32	25	12	59	15	143	8,460	16.9	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Gloucester City, 1891.....	30	16	7	45	20	118	8,460	14.0	1	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Gloucester City, 1892.....	33	17	17	53	20	140	8,460	16.5	1	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gloucester City, 1893.....	38	20	8	68	33	167	8,460	19.7	1	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	188	97	68	251	131	805	84,000	19.6	6	14	1	4	1	8	39	1	36	58	47	272	351	81	66	89	24	67	28	19	.....	6	69	6	69	

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey of over 5,000 Inhabitants, for each Year from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrhæal Diseases and Consumption, combined.—Continued.

CITIES. Statistical Divisions.	DEATHS AT ALL AGES.										PRINCIPAL CAUSES OF DEATH.																								
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including unclassified.	Population, census of —	Death-rate per 1,000.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrhæal diseases of children.	Consumption, M.	Consumption, F.	Number of deaths from first 10 diseases, consumption, male and female, being combined.	Number of deaths from enteric fever, diphtheria, diarrhæal diseases of children and consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Cystic and urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.				
	45	18	14	33	23	123																										1	1	1	1
Bridgeton, 1889.....	70	32	13	46	43	204	8,460	24.1	4	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Bridgeton, 1890.....	51	35	44	41	63	234	8,460	27.7	2	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Bridgeton, 1891.....	42	14	22	63	55	196	8,460	23.1	1	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bridgeton, 1892.....	55	19	19	60	55	208	8,460	24.5	1	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bridgeton, 1893.....	36	13	9	41	43	142	8,460	16.8	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total.....	281	119	108	280	253	1,243	84,000	24.8	3	26	22	4	6	60	2	118	62	71	865	337	119	67	76	49	91	55	32	1	5	30	1	5	30		
Millville, 1889.....	41	17	14	33	23	128	8,460	15.1	3	25	2	2	10	58	2	137	59	67	365	346	70	68	65	23	60	46	16	8	6	18	6	18	6		
Millville, 1890.....	1187	541	364	1394	676	5962	8,460	70.4	32	131	48	16	60	345	14	652	359	258	1825	1078	408	293	168	239	168	880	133	91	18	36	140	18	36	140	
Millville, 1891.....	1156	545	338	1586	737	5362	8,460	63.4	33	134	47	13	53	334	12	633	386	238	1614	1487	567	375	204	205	255	233	98	18	21	146	21	146	21		
Millville, 1892.....	1520	775	507	1723	905	6430	8,460	76.1	39	163	14	802	88	20	219	18	759	853	261	2336	1756	876	434	818	383	243	233	17	16	49	20	49	20		
Millville, 1893.....	1150	713	459	1656	877	5855	8,460	69.3	17	177	9	133	7	31	275	17	691	351	268	1776	1546	731	358	337	250	268	101	8	41	210	8	41	210		
Total.....	6510	3240	2190	9037	4066	35,243	84,000	82.1	146	675	19	618	190	280	1347	78	9079	1817	1336	9497	9254	3563	1984	1296	1068	1709	1135	492	60	207	60	207	60		

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of New Jersey of over 5,000 Inhabitants, for each Year from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

Table with 28 columns: CITIES. Statistical Divisions, DEATHS AT ALL AGES (Under one Year, Five to twenty, Twenty to sixty, Over sixty, Total, including unclassified), Death-rate per 1,000, and various causes of death (Remittent fever, etc., Enteric fever, Small-pox, Scarlet fever, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, Diarrheal diseases of children, Consumption, M., Consumption, F., Number of deaths from first 10 diseases, consumption, male and female, being combined, Number of deaths from enteric fever, diphtheria, diarrheal diseases of children and consumption, Acute lung diseases, Brain and nervous diseases, Diseases of heart and circulation, Cystic and urinary diseases, Adult brain and spinal diseases, Digestive and intestinal diseases, Cancer, Acute rheumatism, Puerperal, Accident).

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of New Jersey of over 5,000 Inhabitants, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrheal Diseases and Consumption, combined.—Continued.

Table with 28 columns: CITIES. Statistical Divisions, DEATHS AT ALL AGES (Under one Year, Five to twenty, Twenty to sixty, Over sixty, Total, including unclassified), Death-rate per 1,000, and various causes of death (Remittent fever, etc., Enteric fever, Small-pox, Scarlet fever, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, Diarrheal diseases of children, Consumption, M., Consumption, F., Number of deaths from first 10 diseases, consumption, male and female, being combined, Number of deaths from enteric fever, diphtheria, diarrheal diseases of children and consumption, Acute lung diseases, Brain and nervous diseases, Diseases of heart and circulation, Cystic and urinary diseases, Adult brain and spinal diseases, Digestive and intestinal diseases, Cancer, Acute rheumatism, Puerperal, Accident).

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey of over 5,000 Inhabitants, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever Diphtheria, Diarrhæal Diseases and Consumption, combined.—Continued.

Table for Paterson, Salem City, Elizabeth, and Totals. Columns include: Under one year, One to five, Five to twenty, Twenty to sixty, Over sixty, Total, including unclassified, Population, census of, Death-rate per 1,000, Remittent fever, etc., Enteric fever, Small-pox, Scarlet fever, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, Diarrhæal diseases of children, Consumption, M., Consumption, F., Number of deaths from first 10 diseases, consumption, male and female, being combined, Number of deaths from enteric fever, diphtheria, diarrhæal diseases of children and consumption, Acute lung diseases, Brain and nervous diseases of children, Diseases of heart and circulation, Cystic and urinary diseases, Adult brain and spinal diseases, Digestive and intestinal diseases, Cancer, Acute rheumatism, Puerperal, and Accident.

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey of over 5,000 Inhabitants, for each Year, from July 1st, 1888, to June 30th, 1893, with Totals, and also Columns showing Number of Deaths from First Ten Diseases and from Enteric Fever, Diphtheria, Diarrhæal Diseases and Consumption, combined.—Continued.

Table for Plainfield, Rahway, and Totals. Columns include: Under one year, One to five, Five to twenty, Twenty to sixty, Over sixty, Total, including unclassified, Population, census of, Death-rate per 1,000, Remittent fever, etc., Enteric fever, Small-pox, Scarlet fever, Measles, Whooping-cough, Diphtheria and croup, Erysipelas, Diarrhæal diseases of children, Consumption, M., Consumption, F., Number of deaths from first 10 diseases, consumption, male and female, being combined, Number of deaths from enteric fever, diphtheria, diarrhæal diseases of children and consumption, Acute lung diseases, Brain and nervous diseases of children, Diseases of heart and circulation, Cystic and urinary diseases, Adult brain and spinal diseases, Digestive and intestinal diseases, Cancer, Acute rheumatism, Puerperal, and Accident.

Notes.—Total deaths from ten principal diseases for the five years ending June 30th, 1893, including consumption, male and female, 85,860. Total deaths for the same period from diphtheria, enteric fever, diarrhæal diseases of children and consumption, 49,382.

REPORT ON VITAL STATISTICS.

Table with columns: COUNTIES, Statistical Divisions, DEATHS AT ALL AGES, PRINCIPAL CAUSES OF DEATH, and various death categories like Under one year, One to five, etc.

The average death-rate for five years was 19.96.

Rates for short periods, or which do not include small numbers, are only approximate, and sometimes misleading, since temporary causes may have been in operation, and small numbers do not eliminate or balance errors which might otherwise appear in large aggregates.

Summary of Vital Facts from New Jersey Death Record, in Cities of over 5,000 Inhabitants, for Five Years Ending June 30th, 1893.

Table with columns: CITIES, Statistical Divisions, DEATHS AT ALL AGES, PRINCIPAL CAUSES OF DEATH, and various death categories like Under one year, One to five, etc.

Summary of Vital Facts from New Jersey Death Record, in Cities of over 5,000 Inhabitants, for Five Years Ending June 30th, 1893.—Continued.

CITIES. Statistical Divisions.	DEATHS AT ALL AGES.					Total, including unclassified.	Population, census of —	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.				Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diphtheria and croup.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Fuerepial.	Accident.
Monmouth County—	117	31	40	155	112	.....	.....	.....	4	2	1	25	.....	62	31	22	49	19	59	11	37	31	11	1	4	39
Long Branch.....	147	108	90	248	248	.....	.....	.....	24	3	8	53	1	86	63	83	91	47	62	25	81	55	26	9	4	33
Morris County—	489	243	128	407	187	.....	.....	.....	6	17	15	114	2	285	79	57	186	103	72	58	84	70	24	8	16	57
Passaic County—	2594	1233	802	2556	1506	.....	.....	.....	116	55	78	545	32	1254	554	556	1852	703	678	345	499	436	191	18	65	401
Paterson.....	106	49	38	434	173	.....	.....	.....	8	2	2	21	1	60	34	35	51	22	35	22	59	37	16	3	7	18
Salem County—	1079	575	290	1344	680	.....	.....	.....	27	24	27	198	11	495	212	198	691	315	248	167	344	191	74	15	39	234
Elizabeth.....	208	90	94	317	287	.....	.....	.....	5	12	17	10	57	103	54	65	138	48	108	43	113	52	25	4	16	44
Plainfield.....	185	63	75	244	230	.....	.....	.....	16	2	9	32	1	68	58	55	110	47	53	33	69	49	21	3	5	46
Rahway.....	179	85	62	183	154	.....	.....	.....	11	4	7	40	.....	96	29	41	69	49	55	27	38	42	23	2	10	32
Warren County—	26014	14811	8751	31753	16810	519	2320	55	1883	628	877	6157	308	12684	6225	5549	13870	7761	5516	3982	6219	4798	1941	280	909	4280
Phillipsburg.....	Totals																												

Cities are generally more unhealthy than their death-rates indicate, since the population is, in many of them, much decreased for four months in the year, and thousands remove themselves instead of removing the evils which distress and sicken those who remain. Hence, in many of our cities, the death-rate for June, July, August and September, reckoned for the remaining population, is a fair criterion of the health of the locality, or at least should be considered for the purpose of correction. So health laws are a great defense to all, but especially to the working classes of cities. It is a question of labor and social science and art, as well as of comfort and hygiene.

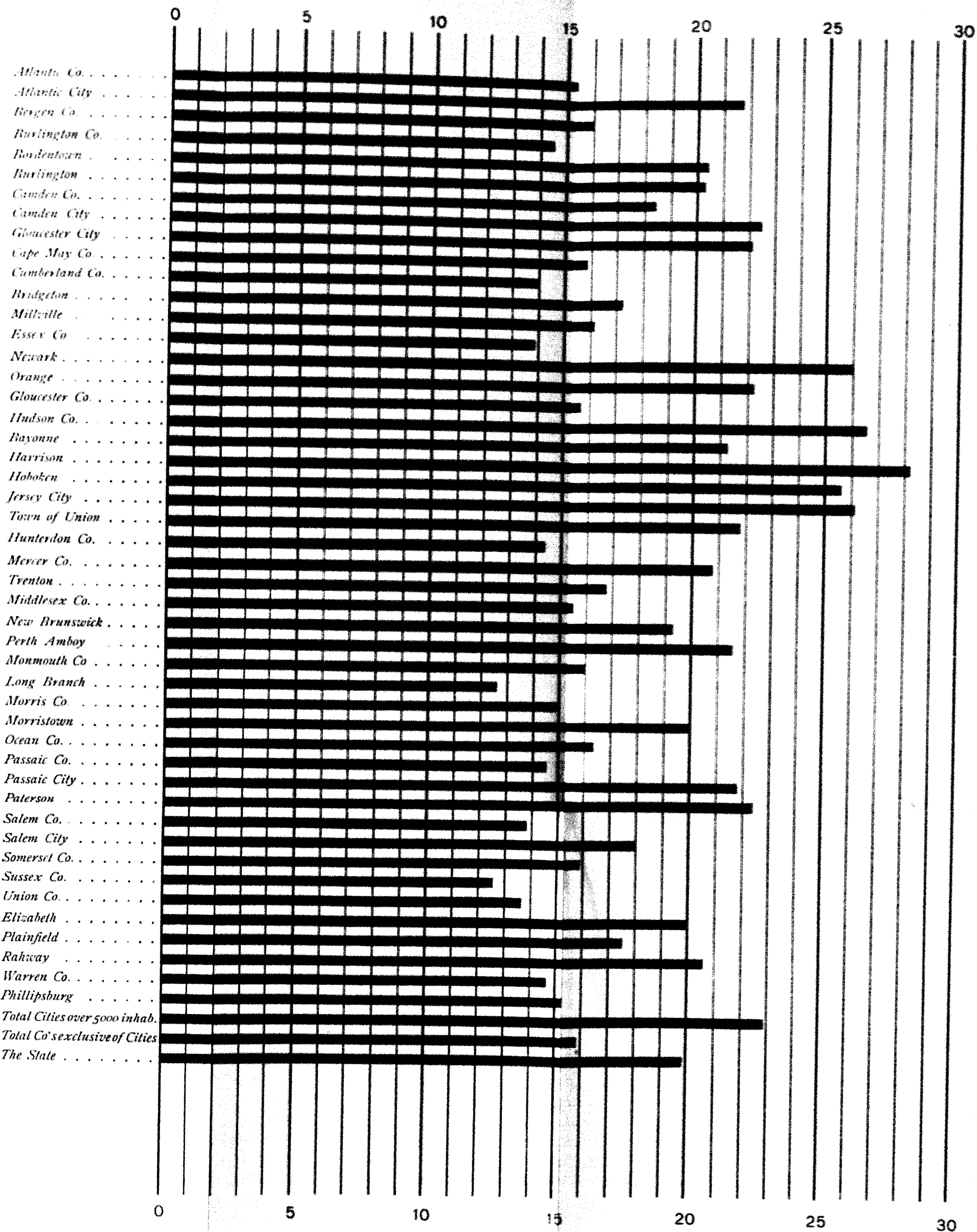


Diagram showing the Average Death Rate per 1000, in each City of 5000 Inhabitants and over, and in each County, exclusive of Cities, in the State of New Jersey, for the 5 years ending July 1st, 1893.

The State.

Cities over 5000 inhab.

Counties Exclusive of Cities.



Diagram showing the proportionate mortality from each cause for the State of New Jersey, for the Cities of 5000 inhabitants and over, and for the Counties, exclusive of Cities, for the five years ending July 1st, 1893.

Having now given from page 547, under the general heading of decennial tables, various tables relating to counties and cities for the first decennial period, as also quinquennial tables showing the average death rate for each year for the past five years, and several tables for counties and cities showing the deaths each year from ten diseases and from four of these diseases combined, we now call special attention to this additional

NOTE AS TO TABLES.

Our statistics would be more perfect if they gave the number dying at each year of age, of each disease, and the whole number of each age living in this or that particular city or district. Various other suggestions could be made, some impracticable, others very practicable, where time and money would permit. Both the calculations of probabilities and the experiences of statisticians show that the weekly and yearly returns, and still more the decennial and large returns for populations of various sizes, have each approximate value, and that each are valuable and informative, if used for their worth, in the sphere in which they are capable of imparting information.

While restricted in our ability to tabulate and illustrate our vital statistics, it is a satisfaction to know that the records of marriages, births and deaths since July 1st, 1878, are so kept as that any subsequent statistician will at any time find all these tables as available for study as they are to-day, and with the advance of statistical knowledge and pecuniary ability will be able fully to utilize them.

By common consent this work is generally consolidated by decades, so that in 1898 or 1899 the second decennial will be furnished and the two combined.

But as there is intermediate information that is desirable our method, in addition to the local tables of cities and townships, furnishes yearly tables and a quinquennial table which utilizes much of the material of each of the previous five years.

In the reckoning for the first ten years, instead of estimated populations we relied upon the national and State census of 1880 and 1885. As these came intermediately between the two first

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

ATLANTIC COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.					Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.			Undefined.	Total, including unclassified.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Dysentheric diseases of children.	Consumption, M.	Consumption, F.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Asbecon.....						18																						
Atlantic City.....	6	18	4	8	5	583	16.47																					
Beuna Vista.....	2	12	4	4	4	16																						
Egg Harbor City.....	7	3	5	7	17	41																						
Egg Harbor Township.....	11	8	4	16	18	49																						
Gallopway.....	0	6	4	6	12	30																						
Hamilton.....	1	0	3	9	7	32																						
Hammon.....	30	6	6	25	10	77																						
Mullica.....	2	4	1	1	4	13																						
Weymouth.....						1																						
Totals.....	146	57	55	144	127	1 630	16.31	2	12	5	8	24	8	28	86	29	37	43	25	88	34	43	30	19	4	4	27	

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

BERGEN COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.					Estimated population.	Death rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.			Undefined.	Total, including unclassified.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Dysentheric diseases of children.	Consumption, M.	Consumption, F.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Rolling Spring.....	7	12	4	10	2	35																						
Englewood.....	17	4	2	28	22	88																						
Franklin.....	10	4	2	10	6	33																						
Hackensack.....	21	10	7	17	15	129	20.71	3	5	2	1	2	3	1	1	2	3	4	5	6	7	8	9	10	11	12	13	
Hoboken.....	4	2	2	9	13	26																						
Lodi.....	43	10	12	22	25	111																						
Midland.....	6	2	1	10	16	40																						
Orvil.....	8	3	3	11	8	27																						
Parsippany.....	18	4	7	11	5	48																						
Ridgefield.....	33	16	11	39	31	136																						
Ridgewood.....	2	4	3	13	14	36																						
Saddle River.....	17	4	3	13	3	40																						
Union.....	19	10	6	28	15	72																						
Washington.....	15	4	1	13	26	60																						
Totals.....	218	91	76	264	260	906	17.53	6	11	3	4	2	7	26	6	12	17	21	25	31	38	47	30	5	5	69		

REPORT ON VITAL STATISTICS.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

Table for Burlington County showing deaths at all ages and principal causes of death. Columns include age groups (Under one year to Over sixty), population, death rate, and various disease categories like Measles, Small-pox, and Consumption.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

Table for Camden County showing deaths at all ages and principal causes of death. Columns include age groups, population, death rate, and various disease categories similar to the Burlington County table.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

CAPE MAY COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.							PRINCIPAL CAUSES OF DEATH.																						
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undeclared.	Total, including unclassified.	Death-rate per 1,000.	Estimated population.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Cape May City	10	6	5	8	14	43	17.43	1,814	1	2	1	1	1	1	5	2	5	1	1	1	3	4	1	6	4	2	1	3	1	1
Dennis	11	8	8	6	12	36	16.43	1,814	1	1	1	1	1	1	3	2	3	1	1	1	4	2	4	4	4	1	1	1	1	1
Lower	7	2	5	12	14	41	16.43	1,814	2	1	1	1	1	1	2	1	1	1	1	1	6	3	7	4	4	1	1	1	1	1
Middle	4	2	2	6	8	21	16.43	1,814	1	1	1	1	1	1	1	1	1	1	1	1	6	3	7	4	4	1	1	1	1	1
Upper	7	2	5	12	14	41	16.43	1,814	2	1	1	1	1	1	2	1	1	1	1	1	6	3	7	4	4	1	1	1	1	1
Totals	43	18	19	38	66	178	16.43	11,546	4	4	4	3	3	1	18	1	1	1	1	1	14	8	16	9	18	3	3	2	6	6

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

CUMBERLAND COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.							PRINCIPAL CAUSES OF DEATH.																						
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undeclared.	Total, including unclassified.	Death-rate per 1,000.	Estimated population.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Bridgeton	5	1	1	4	10	17	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	3	4	1	6	4	2	1	1	1	1
Commerston	8	3	3	6	11	31	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	6	3	4	4	4	1	1	1	1	1
Deerfield	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Downs	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Fairfield	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Greenwich	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Hopewell	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Landis	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Lawrence	8	2	2	4	12	28	17.63	1,814	1	1	1	1	1	1	1	1	1	1	1	1	7	3	4	4	4	1	1	1	1	1
Maurice River	14	5	5	10	10	36	15.33	1,814	1	1	1	1	1	1	1	1	1	1	1	1	4	5	7	7	10	2	1	1	1	1
Milville	6	1	1	6	10	24	15.33	1,814	1	1	1	1	1	1	1	1	1	1	1	1	4	5	7	7	10	2	1	1	1	1
Stow Creek	2	1	1	2	4	10	15.33	1,814	1	1	1	1	1	1	1	1	1	1	1	1	4	5	7	7	10	2	1	1	1	1
Totals	189	65	66	176	287	719	16.18	47,883	21	10	10	9	9	9	17	2	2	2	2	2	40	54	54	45	79	49	23	3	7	20

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

HUDSON COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.							PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	Five to twenty.	Twenty to sixty.	Over sixty.	Undeclared.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Principal Causes of Death																			
									Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Malaria.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Bayonne.....	148	67	81	154	44	1	445,285	19.74	1	4	2	18	5	76	24	12	78	44	16	19	22	27	3	2	9	37		
Guilford.....	21	30	6	19	14	0	79,000	26.50	2	16	1	3	4	1	1	11	4	83	6	1	18	1	1	1	1	7		
Harrison.....	75	37	80	79	27	0	345,000	22.61	3	16	1	18	4	29	14	11	40	56	6	19	16	1	1	1	1	13		
Hoboken.....	541	180	95	469	171	2	1248,500	23.97	3	10	1	14	77	4	188	81	176	131	78	58	73	39	3	14	81			
Jersey City.....	1207	671	956	1768	692	9	4631,000	26.67	31	116	9	59	23	11	672	279	216	710	413	266	194	333	235	68	16	55		
Kearney.....	71	22	21	92	56	0	282,000	32.62	5	4	1	8	13	1	41	20	8	24	11	9	24	20	9	4	21			
North Bergen.....	63	36	24	91	68	0	273,000	33.33	1	18	1	6	9	1	80	32	10	21	13	10	22	46	14	4	1	3		
Town of Union.....	90	29	16	87	48	2	244,000	20.31	1	1	2	1	7	1	45	19	10	23	13	10	22	46	14	4	1	3		
Union.....	84	23	4	36	2	0	98,000	34.69	1	1	2	1	6	1	18	3	4	15	6	5	10	10	3	2	4			
West Hoboken.....	19	7	17	19	4	0	61,000	31.16	1	1	1	3	1	1	11	5	1	8	8	6	1	2	8	1	13			
West Hudson.....	56	55	17	36	51	0	317,000	20.82	1	4	1	10	16	1	55	15	22	55	22	11	16	14	4	3	1	13		
Totals.....	2165	1146	610	2810	1072	13	7809,295	25.44	35	148	22	101	38	106	387	24	1077	476	316	1191	709	428	546	418	136	29	68	416

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

HUNTERDON COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.							PRINCIPAL CAUSES OF DEATH.																		
	Under one year.	Five to twenty.	Twenty to sixty.	Over sixty.	Undeclared.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Principal Causes of Death																	
									Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Malaria.	Whooping cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Alexandria.....	7	1	2	8	18	0	13,000	61.54	1	1	1	1	1	4	1	2	2	2	2	4	6	1	1	1	1	1
Bethlehem.....	1	1	1	1	1	0	86,000	11.63	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Clinton.....	2	2	3	6	9	2	33,000	18.18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Delaware.....	1	5	8	16	2	0	99,000	16.16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
East Amwell.....	4	3	3	9	1	0	23,000	13.04	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Franklin.....	4	3	2	9	1	0	21,000	17.14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Frenchtown.....	3	1	1	5	10	19	19,000	26.32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
High Bridge.....	4	1	1	7	13	31	15,000	46.67	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Loham.....	4	1	1	2	13	15	15,000	26.67	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Kingwood.....	2	1	1	11	32	17	17,000	39.41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lambertville.....	20	11	11	23	32	96	96,000	23.96	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lebanon.....	9	2	3	4	14	33	33,000	27.27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lyons.....	2	1	1	3	1	0	11,000	18.18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mantua.....	6	16	16	37	2	79	79,000	22.91	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Readington.....	2	4	2	8	6	9	9,000	88.89	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tewksbury.....	2	4	2	8	6	9	9,000	88.89	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Union.....	1	1	1	3	6	11	11,000	27.27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
West Amwell.....	4	3	3	6	6	16	16,000	37.50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals.....	72	36	49	104	280	6	463,932	18.78	1	6	3	21	31	36	119	32	19	46	32	57	20	27	21	8	4	24

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1899.

Table for Mercer County, New Jersey, showing principal causes of death across various age groups (One to five, Five to twenty, etc.) and estimated population. Causes include Under one year, Enteric fever, Measles, Whooping cough, etc.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1899.

Table for Middlesex County, New Jersey, showing principal causes of death across various age groups and estimated population. Causes include Under one year, Enteric fever, Measles, Whooping cough, etc.

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

MONMOUTH COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.					Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																											
	DEATHS AT ALL AGES.								Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Diseases and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.																												Undefined.			
Atlantic.....	7	1	4	18	9	38																														
Batontown.....	9	4	14	17	27	67																														
Freehold.....	18	9	12	27	46	109																														
Holmdel.....	5	2	4	11	11	33																														
Howell.....	16	3	6	16	17	58																														
Long Branch.....	18	6	9	22	28	93																														
Manalapan.....	7	2	9	10	10	38																														
Marlboro.....	8	2	4	12	19	39																														
Marlborough.....	2	1	6	11	11	31																														
Matawan.....	7	4	4	12	19	39																														
Middleton.....	21	5	6	28	32	92																														
Milstone.....	5	3	3	12	12	35																														
Milstone.....	57	18	16	46	50	183																														
Neptune.....	3	1	3	9	9	16																														
Ocean.....	17	12	17	18	23	87																														
Shrewsbury.....	34	16	16	47	46	160																														
Shrewsbury.....	10	3	1	1	1	16																														
Upper Freehold.....	4	1	13	21	31	70																														
Wall.....	23	1	6	17	20	67																														
Totals.....	241	96	109	311	393	1,130	73,013	16.46	8	10	3	9	8	3	73	5	169	52	71	105	52	107	51	123	81	22	4	11	84							

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

MORRIS COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.					Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																										
	DEATHS AT ALL AGES.								Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarrheal diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Diseases and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.			
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.																												Undefined.		
Bloomington.....	7	1	4	18	17	47																													
Chatham.....	26	6	6	36	24	96																													
Cherter.....	3	1	3	5	13	25																													
Hanover.....	4	2	3	64	59	133																													
Jefferson.....	6	1	3	4	7	20																													
Menham.....	6	1	2	4	13	10																													
Montville.....	8	2	3	8	6	13																													
Morrisown.....	22	19	18	54	48	168																													
Mount Olive.....	10	3	6	6	13	37																													
Passaic.....	4	3	4	7	11	29																													
Pequanook.....	10	7	4	10	11	42																													
Randolph.....	80	10	13	21	33	107																													
Rockaway.....	27	2	4	34	20	89																													
Rockway.....	10	1	2	11	8	32																													
Washington.....	10	1	2	11	8	32																													
Totals.....	168	59	68	278	291	963	60,071	15.89	7	8	4	1	6	38	1	80	37	71	115	96	61	83	141	83	69	39	1	8	46						

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1899.

	DEATHS AT ALL AGES.						Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																						
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undeined.			Total, including unclassified.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	M measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diphtherial diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
OCEAN COUNTY.																															
Statistical Divisions.																															
Beckley.....	7	1	3	3	4	1	19	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brick.....	9	1	3	10	17	1	26	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dover.....	9	1	3	10	17	1	26	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pagleswood.....	8	2	4	8	1	1	19	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jackson.....	8	2	4	8	1	1	19	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacey.....	1	1	1	6	6	9	19	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lakewood.....	7	4	7	15	19	1	50	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Egg Harbor.....	8	3	3	5	10	1	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manchester.....	8	2	1	9	6	6	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Conestoga.....	3	1	1	5	6	1	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pumstead.....	3	2	1	5	6	1	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stafford.....	2	1	1	9	10	4	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union.....	6	1	1	2	4	4	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	82	17	19	82	99	8	272	16,182	16.87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1899.

	DEATHS AT ALL AGES.						Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																							
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undeined.			Total, including unclassified.	Remittent fever, etc.	Enteric fever.	Small-pox.	Scarlet fever.	M measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diphtherial diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.		
PASSAIC COUNTY.																																
Statistical Divisions.																																
Acushnetonk.....	8	0	0	0	0	0	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Litchfield.....	8	0	0	0	0	0	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manchaeter.....	25	5	1	16	5	5	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Passaic.....	117	46	25	103	50	3	343	16,847	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paterson.....	519	210	153	653	301	1	1,898	87,409	21.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pompton.....	4	4	3	7	6	1	22
Wayne.....	6	4	2	7	9	28	68
West Milford.....	9	2	2	5	8	24	58
Total.....	696	277	188	813	386	1	2,871	118,081	30.09	8	40	1	16	11	118	4	846	119	168	818	148	148	160	121	145	117	53	5	26	125		

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

SALEM COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.						Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.			Total, including unclassified.	Remittent fever, etc.	Bacterial fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarthral diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and Intestinal diseases.	Cancer.	Acute rheumatism.	Fueral.	Accident.
Alloway.....	3	3	8	4	8	1	22	1	1	5	1	1	1	1	1	1	2	1	1	3	3	1	1	2	1	1	1	1	1
Barnborow.....	5	6	1	2	7	1	14	1	1	3	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
Lower Penns Neck.....	8	1	7	2	9	1	17	1	1	3	1	1	1	1	1	1	5	1	1	1	2	1	1	1	1	1	1	1	1
Mannington.....	6	1	4	10	18	1	38	1	1	3	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Oldmans.....	6	8	6	6	6	1	18	1	1	3	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Pittsgrove.....	16	4	5	13	18	1	57	1	1	5	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1
Pittsgrove Branch.....	1	1	1	2	4	1	10	1	1	3	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Quinton.....	4	1	6	2	4	1	17	1	1	3	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Salem City.....	27	8	9	18	33	1	96	17.43	8	3	18	5	6	5	4	6	17	6	3	3	1	1	1	1	1	1	1	1	1
Upper Penns Neck.....	6	4	4	8	11	1	33	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Upper Pittsgrove.....	1	1	4	3	6	1	16	1	1	3	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Totals.....	87	86	45	78	118	5	388	201.06	8	31	16	1	58	16	18	29	12	21	18	60	22	8	1	1	8	1	1	1	16

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30th, 1893.

SOMERSET COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.						Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																					
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.			Total, including unclassified.	Remittent fever, etc.	Bacterial fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Diarthral diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and Intestinal diseases.	Cancer.	Acute rheumatism.	Fueral.	Accident.
Bedminster.....	9	1	1	3	6	1	17	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Bernards.....	3	1	1	10	20	4	37	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Branchburg.....	6	1	2	2	4	1	10	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Bridgewater.....	53	20	17	57	61	1	207	2	1	8	1	8	1	8	1	8	27	15	8	21	5	31	10	18	9	5	2	3	15	1
Franklin.....	13	4	6	10	13	1	48	1	1	5	2	3	2	3	1	3	8	1	1	1	1	1	1	1	1	1	1	1	1	1
Hillsborough.....	2	3	3	3	21	1	33	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Montgomery.....	5	1	4	15	1	1	24	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
North Plainfield.....	11	2	5	20	31	1	69	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Warren.....	2	2	2	6	2	1	10	1	1	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Totals.....	98	31	94	132	164	3	462	28.809	16.09	3	11	1	1	1	1	1	49	26	19	60	10	65	19	48	34	14	3	3	80	

Return of Deaths from all Causes and Certain Specified Diseases, in the Statistical Divisions of the State of New Jersey, for the Year Ending June 30, 1893.

WARREN COUNTY. Statistical Divisions.	DEATHS AT ALL AGES.					Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH.																										
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.			Undefined.	Total, including unclassified.	Remittent fever, &c.	Enteric fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Diphtheria and croup.	Erysipelas.	Dartorial diseases of children.	Consumption, M.	Consumption, F.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Renal and cystic diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.				
Allamuchy	1	1	1	2	4	8																												
Bavaders	2	2	3	6	14	29																												
Blairstown	4	3	3	6	7	16																												
Franklin	1	1	1	3	6	14																												
Freelinghuyzen	1	2	3	3	8	12																												
Greenwich	1	1	2	3	8	12																												
Hackettstown	6	4	2	5	24	42																												
Hardwick	1	1	1	1	4	16																												
Harmony	3	1	1	4	10	16																												
Hopewell	5	1	2	5	8	21																												
Independence	2	1	1	6	12	22																												
Knowlton	2	1	1	5	12	22																												
Lopatcong	3	4	1	10	4	30																												
Manfield	14	7	7	22	14	64																												
Oxford	1	1	1	3	7	16																												
Pahaquarry	30	18	15	32	31	128																												
Phillipsburg	2	1	1	5	7	16																												
Pohatcong	9	6	7	28	16	65																												
Washington	9	6	7	28	16	65																												
Totals	31	49	48	143	194	518	36,659	14.16	3	5	14	16	16	16	41	19	24	45	33	47	37	40	38	32	8	6	39	6	2	4				

Climatology and Climatological Records.

As in former reports, we give data as to the climate of various localities in order to afford opportunity for comparison with diseases prevailing in the same localities at the different seasons of the year, or with such sudden outbreaks as seem to be influenced by changes of temperature, humidity, etc. It is well recognized that disease is greatly influenced by atmospheric and telluric conditions. While we may not know just why measles or influenza are quite different in their symptoms or severity in summer and winter, why intestinal fluxes take on a more acute character amid heat and humidity, or why yellow fever ceases as if by command under the stroke of a severe frost, we do know that the physician or the sanitarian has great occasion to study climate and disease side by side.

The study is a difficult one, because so long and so numerous observations are required in order to arrive at reliable deductions.

Yet of recent years these studies are proving of great value, and climatological associations are furnishing valuable results. We still have to regret that so much is furnished to us for truth which rests on insufficient data.

There are reasons, however, why each physician should study closely the climate of his locality and why each State should seek to secure accurate yearly data in its various localities in order that it may accumulate material reliable in quality and sufficient in quantity.

The indications as to New Jersey are especially important. In the midst of large populations to which it is readily accessible it has varieties of climate that are quite remarkable. It abounds in summer and in winter resorts, which need to be studied both in the interest of health and prosperity. While experience seems plainly to point to such places as Lakewood, Atlantic City, Cape May, Vineland and many others as having climatic

characteristics of their own, we are much in need of guiding data. We refer for many suggestions to our former reports.

Under the division Climatology in the Fifth Report, 1881, and in the article on "Comparative Facts in Climatology and Geology" in the Sixth Report, 1882, pp. 269-284, and that on "Humidity as Affecting Climate and Health" in the Thirteenth Report, 1889, important points are presented.

For our meteorological tables our guide to selection of localities for observation is founded on the geology of the State.

The azoic and paleozoic sections are represented in Sussex and Warren counties. The secondary or mesozoic has two divisions, namely, the triassic or red sandstone formation and the cretaceous. The red sandstone is almost the whole of Bergen, half of Passaic, all of Essex, Union, Hudson, a part of Morris, most of Somerset and Hunterdon and large portions of Middlesex and Mercer counties. Its southeast border is nearly in a straight line between Jersey City and Trenton.

The cretaceous formation is found immediately southeast of the red sandstone in a long, narrow strip that reaches from Raritan and Sandy Hook bays to the head of Delaware bay, near Salem. It is ninety miles long and from twelve to fifteen wide, and has an area of 1,491 square miles. It includes parts of Middlesex, Mercer, Monmouth, Ocean, Burlington, Camden, Gloucester and Salem counties. The white clays occupy the northwestern side of the belt, and the green sand marls the southeastern side.

The tertiary or cenozoic time is almost entirely limited to the southern portion of the State. These formations cover the counties of Atlantic, Cumberland and Cape May, and most of Ocean and Burlington; Camden, Gloucester and Salem are partly occupied by them, and also a small portion of Monmouth. They consist of sand and clay covered with a thin soil, not very productive. Some of the clay has shells enough to be called marl. Extensive beds of white sand for glass-makers' use are common.

Still more recent formations of the same general character are sometimes known as post-tertiary. The glacial drift hereafter to be noticed, which covers much of the northern third of the State; the banks of sand-gravel which, in the form of terraces or level-topped hills, occupy much space in valleys; the alluvial

deposits along the borders of streams, and the tide-marshes and the sand-beaches which border the State along the seaside, and on Delaware bay, are formations which belong to this division.

We represent these respectively by Newton, Paterson, Newark, New Brunswick, Vineland, Atlantic City and Cape May. As our records are not always perfect for each locality, we give, as also informative, when we can, records of Sandy Hook, New York City and Philadelphia.

We give, as heretofore, the tables for the various localities chosen. From these and the former tables for each year, the student of comparative facts, as to climate and disease, can find the material for study.

We do not, as in some former reports, give a meteorological summary for the State as presented by the New Jersey Weather Service. This gives fuller facts for each month as to temperature, precipitation, atmospheric pressure, miscellaneous phenomena, and notes of observers in various localities.

The weather service, under the skilled care of E. W. McGann, of the U. S. Signal Service, now publishes an annual report which contains all these data, and which can be had either by application to the chief of this service, stationed at New Brunswick, or to this Board. We first publish the temperature and rainfall of the different seasons, for the several localities, for the year 1892, which were omitted last year, and then the regular tables for 1893.

TEMPERATURE AND RAINFALL FOR THE DIFFERENT SEASONS.

Belvidere, 1892.

Temperature.		Rainfall.	
Spring,	45.9	Spring,	3.67
Summer,	70.1	Summer,	4.86
Autumn,	52.2	Autumn,	2.68
Winter,	31.5	Winter,	3.32

Newton, 1892.

Temperature.		Rainfall.	
Spring,	45.2	Spring,	3.14
Summer,	70.3	Summer,	4.76
Autumn,	51.8	Autumn,	2.11
Winter,	30.8	Winter,	2.55

Paterson, 1892.

Temperature.		Rainfall.	
Spring,	49.7	Spring,	4.51
Summer,	72.3	Summer,	3.41
Autumn,	55.2	Autumn,	2.49
Winter,	35.6	Winter,	4.08

New York City, 1892.

Temperature.		Rainfall.	
Spring,	48.3	Spring,	3.76
Summer,	72.3	Summer,	4.31
Autumn,	56.0	Autumn,	2.29
Winter,	35.0	Winter,	3.39

Newark, 1892.

Temperature.		Rainfall.	
Spring,	47.4	Spring,	3.88
Summer,	71.4	Summer,	5.39
Autumn,	55.2	Autumn,	2.50
Winter,	35.0	Winter,	3.78

New Brunswick, 1892.

Temperature.		Rainfall.	
Spring,	47.0	Spring,	3.77
Summer,	71.1	Summer,	4.33
Autumn,	54.5	Autumn,	2.43
Winter,	33.9	Winter,	3.87

Beverly, 1892.

Temperature.		Rainfall.	
Spring,	48.9	Spring,	4.43
Summer,	72.9	Summer,	4.39
Autumn,	55.0	Autumn,	2.37
Winter,	34.7	Winter,	3.94

Philadelphia, 1892.

Temperature.		Rainfall.	
Spring,	49.5	Spring,	3.82
Summer,	73.6	Summer,	3.62
Autumn,	53.6	Autumn,	2.06
Winter,	36.5	Winter,	3.08

Atlantic City, 1892.

Temperature.		Rainfall.	
Spring,	46.2	Spring,	4.13
Summer,	69.8	Summer,	4.79
Autumn,	55.8	Autumn,	2.81
Winter,	36.7	Winter,	3.55

Cape May, 1892.

Temperature.		Rainfall.	
Spring,	49.3	Spring,	5.06
Summer,	72.3	Summer,	4.50
Autumn,	56.3	Autumn,	3.30
Winter,	39.0	Winter,	2.61

STATION, BELVIDERE, N. J.

Latitude, 40° 49' N.; Longitude, 75° 04' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, SAMUEL J. HIXSON, STATE WEATHER SERVICE.

Table with columns: BAROMETER (Reduced to 32°), THERMOMETER (Max, Min, Mean, Mean humidity), Prevailing wind, Rain (inches)*, Snow (days of), Days when precipitation equaled 0.01, Cloudy days. Rows for 1892 and 1893 months and annual totals.

* Including melted snow.

STATION, NEWTON, N. J.

Latitude, 41° 03' N.; Longitude, 74° 45' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, D. L. FOSTER, STATE WEATHER SERVICE.

Table with columns: BAROMETER (Reduced to 32°), THERMOMETER (Max, Min, Mean, Mean humidity), Prevailing wind, Rain (inches)*, Snow (days of), Days when precipitation equaled 0.01, Cloudy days. Rows for 1892 and 1893 months and annual totals.

* Including melted snow.

STATION, PATERSON, N. J.

Latitude, 40° 55' N.; Longitude, 74° 11' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, J. T. PROBERT, STATE WEATHER SERVICE.

Table with columns: BAROMETER (Reduced to 32°), THERMOMETER (Max, Min, Mean, Mean humidity), Prevailing wind, Rain (inches)*, Snow (days of), Days when precipitation equaled 0.01, Cloudy days. Rows for 1892 and 1893 months and annual totals.

* Including melted snow.

STATION, NEW YORK CITY.

Latitude, 40° 43' N.; Longitude, 70° 0' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, E. B. DUNN, U. S. WEATHER BUREAU.

Table with columns: BAROMETER (Reduced to 32°), THERMOMETER (Max, Min, Mean, Mean humidity), Prevailing wind, Rain (inches)*, Snow (days of), Days when precipitation equaled 0.01, Cloudy days. Rows for 1892 and 1893 months and annual totals.

* Including melted snow.

STATION, NEWARK, N. J.

Latitude, 40° 29' N.; Longitude, 74° 27' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, F. W. RICORD, STATE WEATHER SERVICE.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.				Prevailing wind.	Rain (inches).*	Snow (days of).	Days when precipitation equaled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean humidity.					
1892.												
July.....	98	52	73.8	.....	S. W.	3.41	.....	10	7
August.....	93	59	72.9	.....	S. W.	3.87	.....	9	9
September.....	83	46	64.4	.....	S. W.	1.94	.....	6	4
October.....	75	35	53.9	.....	N. W.	0.64	.....	4	3
November.....	66	23	41.0	.....	N. W.	7.24	.....	1	13
December.....	50	6	30.0	.....	N. W.	1.69	.....	3	10
1893.												
January.....	50	-1	23.1	.....	N. W.	3.45	.....	9	13
February.....	52	5	23.2	.....	N. W.	6.20	.....	10	17
March.....	53	13	35.5	.....	N. W.	3.73	.....	3	9
April.....	72	32	47.0	.....	N. W.	5.75	.....	10	12
May.....	87	49	58.5	.....	S. W.	5.32	.....	13	10
June.....	97	52	68.4	.....	N. E.	3.55	.....	8	13
For the year.....	98	-1	49.6	.....	N. W.	46.79	.....	25	111

* Including melted snow.

STATION, NEW BRUNSWICK, N. J.

Latitude, 49° 29' N.; Longitude, 74° 10' W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER, CHARLES V. MEYERS, STATE WEATHER SERVICE.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.				Prevailing wind.	Rain (inches).*	Snow (days of).	Days when precipitation equaled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean humidity.					
1892.												
July.....	105	51	76.5	.....	S. W.	3.18	.....	10	3
August.....	91	59	72.6	.....	S. W.	3.49	.....	10	6
September.....	90	40	65.6	.....	S. E.	1.77	.....	6	6
October.....	81	28	55.0	.....	N. W.	0.54	.....	4	5
November.....	68	19	43.4	.....	N. W.	7.75	.....	1	11
December.....	64	5	29.9	.....	N. W.	1.79	.....	6	13
1893.												
January.....	58	-5	21.4	.....	N. W.	2.61	.....	6	14
February.....	65	4	29.0	.....	N. W.	5.73	.....	7	13
March.....	63	10	37.9	.....	N. W.	3.33	.....	2	13
April.....	78	30	50.5	.....	S. E.	5.61	.....	10	4
May.....	95	38	61.2	.....	S. W.	3.95	.....	9	13
June.....	100	49	71.4	.....	E.	3.22	.....	10	12
For the year.....	105	-8	51.1	.....	N. W.	42.86	.....	16	110

* Including melted snow.

STATION, BEVERLY, N. J.

Latitude, ———; Longitude, ———. Height of Barometer Cistern above Sea Level, 40 feet.

OBSERVER, C. F. RICHARDSON, STATE WEATHER BUREAU.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.				Prevailing wind.	Rain (inches).*	Snow (days of).	Days when precipitation equaled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean humidity.					
1892.												
July.....	100	51	75.4	76.6	S.	4.27	.....	8	5
August.....	97	56	74.4	85.0	N. E.	3.64	.....	7	7
September.....	89	36	65.6	82.1	N. W.	1.96	.....	7	7
October.....	84	26	51.1	75.9	N. W.	0.85	.....	4	2
November.....	71	18	42.7	82.6	W.	7.28	.....	2	11
December.....	68	7	31.0	80.2	W.	1.96	.....	6	9
1893.												
January.....	54	-3	22.2	.....	W.	2.97	.....	11	11
February.....	55	5	31.3	.....	N. E.	6.23	.....	11	12
March.....	65	12	38.4	.....	N. W.	2.60	.....	2	10
April.....	82	29	50.8	.....	W.	5.85	.....	13	12
May.....	93	37	61.0	.....	W.	3.96	.....	14	8
June.....	103	48	72.1	.....	.....	3.86	.....	7	13
For the year.....	103	-3	51.3	.....	W.	42.81	.....	29	115

* Including melted snow.

STATION, PHILADELPHIA, PA.

Latitude, 39° 57' N.; Longitude, 75° 9' W. Height of Barometer Cistern above Sea Level, 117 feet.

OBSERVER, L. M. DYE, U. S. WEATHER BUREAU.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.				Prevailing wind.	Rain (inches).*	Snow (days of).	Days when precipitation equaled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean humidity.					
1892.												
July.....	30.51	29.73	30.07	101	59	76.6	68.0	N. W.	2.97	.....	9	9
August.....	30.23	29.76	30.02	96	61	75.9	73.0	N. W.	2.74	.....	9	9
September.....	30.43	29.71	30.18	86	51	66.8	74.6	S. E.	2.06	.....	6	5
October.....	30.45	29.59	30.04	79	36	56.4	65.2	N. W.	0.30	.....	3	1
November.....	30.46	29.45	30.09	68	24	43.3	72.9	N. W.	5.71	.....	11	13
December.....	30.62	29.56	30.09	64	10	32.5	73.4	N. W.	2.09	.....	6	10
1893.												
January.....	30.47	29.26	30.00	63	Zero	24.1	79.0	N. W.	2.58	.....	13	11
February.....	30.81	29.30	30.16	56	9	32.0	73.1	N. W.	4.35	.....	14	14
March.....	30.62	29.40	30.08	60	13	39.1	68.5	N. W.	3.67	.....	9	12
April.....	30.51	29.57	30.06	75	34	50.8	70.1	N. E.	4.47	.....	15	14
May.....	30.28	29.36	29.91	89	43	61.0	65.0	S. W.	2.22	.....	8	13
June.....	30.81	29.56	30.01	98	55	72.0	70.0	N. E.	3.07	.....	7	18
For the year.....	30.81	29.26	30.06	101	Zero	52.6	71.2	N. W.	36.33	.....	37	118

* Including melted snow.

STATION, ATLANTIC CITY, N. J.

Latitude, 39° 22' N.; Longitude 74° 25' W. Height of Barometer Cistern above Sea Level, 53 feet.

OBSERVER, E. H. EMERY, U. S. WEATHER BUREAU.

	BAROMETER. Reduced to 32°.			THERMOMETER.				Prevailing wind.	Rain (inches).*	Snow (days of).	Days when precipitation equaled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean humidity.					
1892.												
July.....	30.50	29.78	30.08	90	57	70.4	84.0	S. W.	4.23		7	5
August.....	30.19	29.77	30.01	86	61	73.5	80.6	S. W.	3.26		13	5
September.....	30.41	29.69	30.19	80	48	65.4	76.8	E.	1.08		6	3
October.....	30.44	29.63	30.03	80	33	55.0	74.8	W.	0.50		13	2
November.....	30.45	29.70	30.08	68	19	44.0	81.0	N. W.	5.14		10	12
December.....	30.61	29.54	30.08	54	9	32.0	81.3	N.	2.12		10	12
1893.												
January.....	30.42	29.31	29.99	51	-4	22.7	85.4	N. W.	2.67		9	7
February.....	30.81	29.27	30.14	60	9	31.5	75.0	N. W.	3.43		14	13
March.....	30.53	29.31	30.07	60	25	35.0	81.3	N. E.	4.21		14	13
April.....	30.51	29.62	30.06	67	36	47.3	88.6	S. W.	4.92		15	10
May.....	30.39	29.34	29.92	78	44	55.4	84.0	S. W.	3.52		11	8
June.....	30.30	29.56	30.01	90	51	67.0	88.6	S. W.	1.57		10	6
For the year.....	30.81	29.27	30.06	90	-4	50.1	82.0	S. W.	36.45	22	124	97

* Including melted snow.

STATION, CAPE MAY C. H., N. J.

Latitude, 38° 56' N.; Longitude, 74° 58' W. Height of Barometer Cistern above Sea Level, --- feet.

OBSERVER, J. F. LEAMING, M. D., STATE WEATHER SERVICE.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.				Prevailing wind.	Rain (inches).*	Snow (days of).	Days when precipitation equaled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean humidity.					
1892.												
July.....				93	51	72.3		W.	4.77		6	7
August.....				90	56	73.7		N.	0.72		5	5
September.....				84	45	65.8		N.	1.50		5	4
October.....				80	31	56.0		N. W.	0.67		3	1
November.....				71	22	44.4		N. W.	5.85		11	13
December.....				55	10	33.1		N. W.	2.63		7	10
1893.												
January.....				48	-7	23.7		N. W.	3.57	7	8	13
February.....				62	9	34.8		W.	3.99		9	16
March.....				63	13	32.4		N. W.	4.28		9	10
April.....				75	34	50.2		S.	5.76		9	12
May.....				86	41	58.8		W.	3.76		10	10
June.....				92	48	69.0		W.	2.52		6	7
For the year.....				92	-7	51.7		N. W.	39.06	13	83	106

* Including melted snow.

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* Page 82, line one, for "topic" and "topical," read toxic and toxical; and line eleven, for "inhabited," read inhibited. On page 497, the heading "Humanized Lymph," should be after the 4th line below.

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