FIFTEENTH ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY,

AND REPORT OF THE

BUREAU OF VITAL STATISTICS.

1891.

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SECRETARY'S REPORT.

To His Excellency Leon Abbett:

GOVERNOR—We herein present to Your Excellency the associated reports of the State Board of Health and the Bureau of Vital Statistics. The field covered by the science of hygiene and the details of public health administration is constantly enlarging. It includes such widely-divergent subjects as law, engineering, architecture, statistics, chemistry, meteorology and geology, in addition to those which form part of the routine training for the profession of medicine.

The year 1891 has been to us one of great encouragement. Not only is the public attention more aroused to the importance of the subject, but more skilled attention is being given to the great questions of water-supply and sewerage. Boards of Health are realizing more the weighty obligations and the great possibilities of sanitary administration, and Inspectors are becoming more informed as to the details of their duties. We believe the Reports, the Book of Circulars and the Inspectors' Guide, as furnished by the Board, are doing much to bring our local authorities to a higher standard of duty and to a more thorough enforcement of the law.

If we compare our condition with that of ten years ago, we have reason to feel that the State is fairly started on the high road of sanitary progress. If, however, we compare our present status with that of most English cities and rural districts, or even with a few advanced cities in our country, we have reason to deplore the distance we still are from reaching the models before us, and to impress the need there is of more active and thorough administration and execution of sanitary laws. There is no subject which more concerns the whole people, or as to which the wage-classes especially are so dependent upon effective municipal regulation and enforcement. The contrast of effective and neglectful sanitary care is constantly demonstrating to us how many lives are sacrificed for the want of that enforced clean-

liness and of those precautions which have so much to do with the prevention and mitigation of disease. Even independent of the death record, the time that is lost and the extra expense incurred by avoidable sickness levy and collect a tax hard to be borne by the families thus burdened.

The large correspondence and frequent calls from Local Boards, and their response to all inquiries, show that we are co-workers in the great effort to advance the practical administration of sanitary affairs. While, from circumstances, we have not the same responsibility for Hudson county as for the rest of the State, we are not without hope that it, too, will in the fulness of time be brought up to the methods now prevailing in other parts of the State. It no doubt has its special complications, which cause its exceptional insanitary condition to be a menace to the entire State.

The State Board is more and more striving to make itself a bureau of information for each Local Sanitary Board. It seeks no local authority, but it does hold itself as the willing and accepted helper to all high standards of excellence, and, if need be, the critic of local neglects and failures. It has no desire for any local powers, and has no occasion for any personal strife, but it does protest against the forms of sanitary administration without the substance. On questions in which it cannot be expert it seeks and furnishes competent advice, and dispenses as best it can the knowledge it possesses or secures.

While depending less on extended reports, it hopes to be more and more aggressive in its examinations of institutions and localities, to earnestly persuade to right methods, and to specify and expose wrong methods where it cannot initiate reforms.

THE GROUND AS RELATED TO HEALTH.

Not enough consideration is given to the ground as it affects public and private health. A barren soil is generally healthy, because it is free from animal and vegetable matter, from bad gases, is porous, and unless from peculiar conditions the water-level is high, it is also dry. Much of the healthfulness of our sea-side resorts is as much due to the clean soil as to the pure ocean air. Sometimes ground that appears healthy is unhealthy, by reason of concealed deposits of organic material not changed to peat, or by some peculiarities of

geological structure. Some rocks even are porous, and some in their breaking down almost deserve the name of rotten stone, because of the debris mingled with them. Fortunately geology now determines for us, not only the health character of soils, but of the underlying structure. We can be told what ground is fit to be built upon, or how to make it fit. Fertile soils may be often suited for dwelling-places if only surrounding grounds are thoroughly cultivated so that the organic matter is disposed of from year to year.

Nature, too, has its conservative and healthy ways of disposing of organic matter, in field, forest and swamp, if unmolested by the art of man, or aided by it where indications are clear.

Strange to say, the most constant art of man is to pollute the ground. He throws upon it all sorts of foul matter. When this becomes unsightly to the eye, or unpleasant to the nose, he conducts it into a hole which he calls a cesspool. "Out of sight, out of mind," does not prevent the evils which come from the storage of filth, or from ground or air polluted thereby. It is true that in some porous soils, or with frequent changes of locality, nature will for a long time take care of bad deposits. But we must be sure that this is done if we rely on such methods.

Two of the most serious questions as to the condition of ground are the quality of the ground-air, and the height and quality of the ground-water. Nearly all soils are porous enough for us to be able to say that much of the ground for ten or fifteen feet beneath our tread is occupied by ground-air or ground-water. If the ground-air is foul, in the various changes made by frost and weather, it breaks through to foul the air above it, or, still more, is sucked into the basements of our houses to pollute the air we breathe in our homes. If the ground-water is impure, by evaporation it gives up its qualities to the ground-air, or finds its way into our springs or wells. Much of risk is added by the fact that the water-level in the ground is so frequently changed. Statistics and observations very definitely show that the risks of sickness in all cases, where ground is not thoroughly pure, are increased when the water-level falls lower than usual by reason of drought, and when long and severe rains succeeding bring to the surface stores of polluted air from material which had been held back from decay by its previous soakage in water.

Baldwin Latham, C.E., in a recent address before the Royal Meteorological Society, on "The Relation of Ground-Water to Disease," speaks as follows:

"As a rule, the years of high water are usually healthy, except that it often happens when high water follows immediately upon marked low water, that on the rise of the water an unhealthy period follows. Our tables show the very high death-rates in the first quarter of all years following marked low-water periods. * * * *

"Many epidemics, especially of cholera and typhoid fever, have been traced to particular rainfalls. The remarkable correspondence between rainfall and fever is shown by the diagrams of the outbreak of typhoid fever in Paris, in 1882. The majority of the zymotic diseases follow the period of percolation and are most rife in the year of lowest water.

"The year 1714 was a remarkably dry year, when only 11.19 inches of rain were recorded as falling in Upminster. In that year the burials in Croydon were more than double those of the preceding year, and in London the burials rose from 21,057 in the preceding year to 26,569 in this particular year. Another dry year was 1742, when 15.7 inches of rain were recorded at London. In that year the burials in Croydon was almost three times as numerous as in the following year, whilst the burials in London were 32,169, as against 27,483 in the following year.

"There have even been greater periods of drought recorded than in the years mentioned, and without exception they have exercised a baneful influence; so, in modern times, the periods of drought mark the periods of disease. On the other hand, wet summers are usually healthy. Those years in which there has been no low water are those in which health has been invariable good. In the year 1829 the records of the well at Hartlip Place show that there was no low water at the usual period in that year. The waters rose continuously through the year, up to June, 1830, and so, too, with other years in modern times, such as the years 1860 and 1879, when a similar state of things existed, and these are all healthy periods. We must also bear in mind, in studying these questions, that the rates of mortality are by no means so reliable as the rates of sickness."

While there are many things obscure in the relation of the ground to health, we regard this one as to air and water in the soil, as among the most significant and determinate. While, for instance, as to typhoid fever we are not able to adopt the view of Pettenkoffer, of Munich, in all its definiteness, yet it is largely desseminated by drinking-water, especially when the water-level is low, and when after unusual lowness the water is rising in the ground. The same is probably true as to malarial fevers, diphtheria, cholera and other zymotic diseases.

What control have we over these facts? They emphasize the importance of keeping all filth of every kind above and out of the ground, except where it is to be plowed for cultivation. This means that all slops are to be kept from around buildings, and either disposed of in the garden, or carried away from dwelling-places, or to be thrown upon the ground here and there to such small extent as that nature can easily care for them.

As to cities, it means the constant and complete removal of all things which tend to decay, whether it be in the form of soiled liquids, garbage or household offal of any kind. It means thoroughly clean streets, since street refuse is really a compost. If left, it is either carried directly into the ground by rains, or in the form of dry dust mingles with the air we breathe, until the rain washes it back again into the soil.

As to water in the ground, it means a low water-level, so that fluctuations in height cannot take place within several feet of the surface, or just below the bottom-level of all basements and cellars. This, in most cities, can only be accomplished by thorough and deep drainage, which must be distinct from all sewers or surface carriage of water. It also means for most country homes a much deeper drainage than is generally secured. Pure ground and pure water, with a low water-level, will thus provide a good foundation for health, and go far toward securing the prevention or diminution of disease.

WATER-SUPPLY, SEWERAGE AND SEWERS.

The past five years has witnessed a great change in public sentiment in most of our cities as to the necessity of a pure and assured water-supply, and of systems of sewerage to replace cesspools. It cannot be too soon realized that a city well is never safe against contamination, and that the retention of decayable matter in the soil of cities, whether by storage cesspools or by saturation of the soil from the surface, is never to be tolerated. Cities can very nearly approximate the health of good rural localities if only there are proper drainage of the ground, a good water-supply, well-kept sewers, proper house connections, and a sanitary administration in accord with what are now the well-understood rules of effective oversight. One after another, cities and towns are reported to us as seeking or arranging for sanitary improvements. The great misfortune is that many are willing, for present saving of taxes, to put themselves in the hands of companies. It is always best for a city or town to control its

water-supply and its sewer system. Where any contract is made with a company, there should be a stipulation as to all details of construction and keeping in order, and the city should have the right of purchase by arranged valuation based on real values.

It is wisdom on the part of even our smaller towns to perfect their sanitary administration, and to provide to a limited degree, but on a broad system, for such sewerage as is sure to be required. So long as the conditions of human life require disposal to be made of the various forms of debris which are the result of human and household life, and so long, especially as people live in close proximity in towns and cities, the question of sewage disposal will be one of direct concern in its bearing on health and disease. Sewage stands for waste, for decay, for organic matter in a state of change, and generally for it as tending to decay and as associated with water.

If it is at all self-evident that cleanliness is one of the conditions favorable to health, and that decaying or putrescent matter should not be stored amid homes, so as to permeate the ground and to defile its water or its air, it is equally evident that it will be found necessary to provide for its removal. The first idea was to collect it for the enrichment of soil, and so for the use of all vegetation. Experience in the most practical and economic of populations has shown this not to be feasible in large cities, however wise it may be in the country, if only the collection and removal are conducted on a plan consistent with the sustained health of the people. It has been conclusively shown, as a rule, that the compost value of these city products will not pay for the transportation to country lands, and that in the transportation some risks are involved. While this does not apply to all compost, such as that furnished by stables, &c., it is especially true of the materials which accumulate in the ordinary conduct of human life and households. For the removal of all such debris, water-carriage through pipes is now the accepted method. In other words, sewers have come to be regarded as indispensable for cities. We have heretofore discussed the connection of houses therewith by means of house-pipes, and the various devices for securing these house systems against their own possible evils, as well as from any evil that may arise from the connection with sewers. In this report, we also have an article on traps bearing on this protection. Our present design is briefly to submit the necessary conditions for the proper carriage and disposal of liquid sewage, after it reaches these pipes known as sewers.

We can speak of it as a liquid, notwithstanding some solid matter is carried, because water is so largely a constituent, and because it is so quickly seized upon by various low forms of life as to hasten its dissolution with liquid or into suspended particles. The first idea of a perfect sewer is that it be a pipe, tight and continuous, so that it will carry to the intended point all the material that flows into it. To this intent, it must be so constructed as not to admit of stoppage or leakage, and so as to carry away the contents with sufficient velocity, as well as to accomplish some scouring or cleansing. Thus it is stated that sand will be carried by a stream flowing at the rate of six inches per second, but be deposited if the velocity becomes less. Pebbles one inch in diameter are carried by a flow of about two feet per second (Hering). Sewers are not now made round, and even the egg-shaped can be improved upon, where the stream is small, by having a shape at the lower part which will still more constrict the flow.

Vitrified pipe has the advantage in that it is smoother than brick on the inner surface, so as not to retain particles. Yet we have as yet no device of smoothness or cleansing or flushing by which to keep the inner surfaces absolutely clear of any growth or deposit which causes a kind of slime. We greatly diminish it, however, and probably prevent any evil effects therefrom, when sewers are thorougly ventilated and flushed both by draught and water. Disinfectants also aid. The fumigation of sewers by sulphur has also been tried, and with apparent success, as in Detroit. If there is evidence, as there seems to be in some cities, that the contagium of typhoid fever or of diphtheria has become domiciled in some sewers, this method should be resorted to. As to ventilation, it is always to be remembered that mere vents or openings are not ventilation, unless a draught of air can be secured through them. As ventilation depends upon a sustained difference of temperature and to some degree of humidity, we are frequently to test the actual currents. Storm-water is much relied on for flushing. The trouble with this is that it is so irregular and is so often absent when it is most needed. It would be well if, from time to time at regular intervals, sewers could be made to run half full. The question which at present is most discussed is that relating to the disposition to be made of sewage. This depends so much upon locality and upon various conditions that it is an error to attempt any uniform rule as to it.

There are cases where the best use that can be made of a stream is to use it as a sewer, and let all material be hastened to the sea. There are other cases where the stream is of such use as a water-supply that it must be protected from sewage. Even where not needed as water-supply, the sluggish flow or the need of the stream for comfort or ornament, forbids its sewer use. There are cases where a regulated amount of sewage may be allowed to pass into a stream, or where objection can be met by a previous purification of sewage by some one of the various methods of separation, filtration or precipitation now well understood. We have before fully discussed the various systems of broad irrigation and of intermittent filtration by means of land, and plans of precipitation and compression which the use of various chemicals and of filter presses have rendered feasible for purification sufficient to pass the effluent into streams not used for drinking purposes. Preference of method depends largely upon questions of the relative cost and the degree of purity which has to be secured. Intermittent filtration, through properly-prepared land, no doubt affords the purest affluent. Since the experiments of Mr. Mills, of the Massachusetts Board, have placed the subject of filtration on a better understood basis, it is probable that we may be able to do much both in purifying water and sewage by means of artificial filter-beds. We have to study the conditions favorable to conservative bacterial work, since these micro-organisms are the chief factors, up to a certain point, in purification. Decomposition and gases have to be cared for in a way that will prevent their excessive absorption by water or mingling with the air so as to cause discomfort and disease. In order to outline more fully this real advance in our knowledge of filtration methods, we quote as follows from the Massachusetts report of 1888, and a condensed statement thereof by R. Hering, C.E.:

"The filtering grounds comprise about two-thirds of an acre. Upon them are ten tanks, circular in plan, about seventeen feet in diameter, and allowing for material to be filled in five feet deep. From the lowest point in the bottom of each tank a two-inch pipe conveys the drainage to a flume within a building whence the effluent is taken for analysis and examination.

"The tanks were filled with different materials, as follows: No. 1, very coarse, clean mortar-sand; No. 2, very fine, nearly white sand; No. 3, peat; No. 4, river silt; No. 5, brown garden soil, well manured; Nos. 6, 7 and 8, were filled with three feet eight inches of coarse and fine sand, ten inches of yellow sandy loam, and six inches

of brown soil; No. 9, very compact, sandy, hardpan of clay, sand and gravel, covered with nine inches of brown soil. No. 10 was used to measure the rainfall and evaporation. The sewage used in the experiments was taken from a main sewer draining a portion of the city. Apparatus was erected for measuring the sewage and the effluent, and biological and chemical analyses of both were made daily. The sewage was applied intermittently at intervals of one or more days, and disappeared from the surface in a few minutes or hours.

"From the last report of the Board we gather the following statements regarding the general results which were so far obtained:

"Sewage can be much more efficiently filtered through open sand than through sand covered with soil. Very fine material, like dust, in the upper layers of a filter, prevents free access of air, and when wet, may exclude air so completely as to render purification impossible. With soil or sand containing dust at the surface, periods of intermission in the application of sewage may be made so long that the surface, becoming dry, may allow air to enter, and a high degree of purification may result; but the quantity of sewage that can thus be purified is very much less than when the upper layers of the filter are composed of open sand, through which the sewage will rapidly disappear, and will leave room for air to enter and come in contact with the thin laminæ of liquid covering the particles of sand.

"Filtering areas of sand covered with soil, or areas of very fine sand, may be much increased in efficiency, in both summer and winter, by digging trenches in the direction of a slight incline, about two feet deep and one foot wide, and six feet apart, and filling them with coarse sand. The sewage should be applied to this coarse sand, and once in a month or two, a half inch in depth should be taken from its surface and replaced by clean sand.

"A very few vegetable organisms that can be identified by the microscope, have been found to occasionally pass through the coarser filters, but in general none come through.

"Of the still more minute organisms, the bacteria, we found that soon after sewage was first applied to the tanks they came through in great numbers, but became reduced in number, and during the later winter and spring months amounted to 2 per cent. and less of those of the applied sewage; but after nitrification commenced they decreased rapidly, and continued through the summer, in many cases, less than one hundred, and, in some, less than ten, while the number in the same quantity of applied sewage was about a million.

"The experiments made to the present time show that the number of bacteria in the sand decreases very rapidly from the surface downward. In the finer sands they nearly or quite disappear before the bottom is reached. Experiments are in progress to prove whether any live to come through the finer sands with the effluent; but they have already shown that through the very coarse sands they are

brought with the effluent in very small numbers, with the ordinary rate of flow from the sewage tanks, and that when the rapidity of flow is the highest, the number of bacteria in the effluent has reached as high as 2 per cent. of the number in the applied sewage.

"In some of the tanks it appears, that of the large number of species found in the sewage, a single species only lives to reach the outlet.

"We have reason to hope that the filters may be so made and managed that all disease germs may be, with certainty, removed, and think this important subject should be pursued to definite conclusions.

"The tanks, which were filled with clean, coarse mortar-sand, received sewage at the rate of thirty thousand, sixty thousand, and one hundred and twenty thousand gallons per day. Until nitrification commenced—after periods of forty-one, thirty-one and twenty-seven days, respectively—97, 94 and 80 per cent. of the impurities of the sewage were removed. When nitrification reached its height, the ammonias were reduced to 1 and 1½ per cent. of those of the sewage.

"The rapidity of purification, as shown by the decrease in ammonias, was greatest in the tanks which had received the most sewage and had the greatest amount of nitrogenous matter stored in them, the effluent from the sand which had received the least sewage being more than a month later in reaching its condition of greatest purification.

"The filter receiving sewage at the rate of one hundred and twenty thousand gallons per acre per day, gave an effluent (for three months after purification, resulting from nitrification, was established), in which the ammonias were less than 1½ per cent. of those of the sewage. Upon increasing the amount filtered to one hundred and eighty thousand gallons per acre per day, the ammonias increased, but for the next four months averaged less than 2 per cent. of those of the sewage.

"The filter receiving sewage at the rate of sixty thousand gallons per day for seven months after purification was established, gave an effluent of nearly constant quality, having one-half of 1 per cent. of the ammonias of the sewage, the free ammonia averaging 0.0012 parts, and the albuminoid ammonia 0.0015 parts in one hundred thousand parts, showing less organic matter than many of the drinking-waters of the State.

"Experiments were made to ascertain the different effects of continuous and intermittent filtration. 'In intermittent filtration the nitrification was active, and, as shown by the ammonias, 99 per cent. of the organic impurities were removed, while in continuous filtration the nitrification ceased, and the same sand, filtering the same quantity of sewage, stored the impurities for a time, but poured out an effluent quite as impure as the applied sewage.'

"Fine sand was found to make the best filter and could purify the sewage to a higher degree at a rate of twelve thousand gallons per acre per day, so that the number of bacteria in the cubic centimeter

was reduced from five hundred and ninety-one thousand to two, and the ammonias to one-fourth per cent. of that of the sewage."

"A sand having more than ten per cent. of very fine dust, and also containing nearly two per cent. of organic matter (making up what is known as river silt), gives its best results in December, after filtering in one year 45,000 gallons of sewage, the equivalent of 9,000,000 gallons on an acre, and while filtering at the rate of 12,000 gallons per acre per day. The organic matter of the effluent in the first half of December was reduced to one-quarter of what it was previously, and became but four per cent. of that of the sewage, and the nitrogenous matter, as expressed by the ammonias, became three and one-half per cent. of that of the sewage.

The loss on ignition was	1.0	parts per	100,000.
The free ammonia	0.0800	" "	100,000.
The albuminoid ammonia	0.0190	" "	100,000.

"The number of bacteria in a cubic centimeter of the sewage was 1,100,000, and the number in the effluent, 7.

"The ammonias of the effluent averaged, from March to August, twenty-seven per cent. of those of the sewage, and from September to November eleven per cent. of those of the sewage.

"This material has given poor results during ten months of the year, but has greatly improved during the past month, when sewage has been applied once in two or three days and rain has been excluded from the surface. Garden soil makes a very poor filter. Upon applying sewage intermittently to a body of garden soil five feet deep, after the first month the organic impurities increased continually for eight months, until the effluent became more impure than the applied sewage.

"There had been then applied 24,000 gallons, the equivalent of 4,800,000 gallons on an acre; and it was then being applied at the rate of 10,000 gallons per acre per day.

"The daily quantity passing through has since been reduced to 5,000 gallons per acre per day, and the quality of the effluent has somewhat improved, but still contains as much nitrogenous matter as crude sewage.

"The best results are the last, and are as follows:

Loss on ignition	12.2	parts per	100,000.
Free ammonia	2 9200	" "	100,000.
Albuminoid ammonia	0.2900	" "	100,000.
Nitrates	0.0250	" "	100,000.

"The bacteria number 109, while in the sewage they numbered 200,000."

The question of the discharge of sewage into streams depends upon the localities at which such streams are used for potable or drinking-water. The more or less rapid disposal of sewage emptied into a stream, depends upon the relative amount of sewage and flowing water, the purity of the stream itself, its sunlight, its vegetation, the rapidity and roughness of flow, the anlmal and vegetable life, &c.

This really means dilution, the ready supply of oxygen and the facilities for the absorption of the gases of decomposition. Here, again, bacteria of different kinds are chief actors. The bacterial activity depends much upon temperature, warmth being friendly to active change.

It has long been known that it is not well to pass sewage into salt water, unless, as in the ocean, the quantity is immense and the course of the waves such as to secure its speedy outgo. It will be deposited also by the action of the salt. The inlets all along our shores are especially to be guarded against the reception of sewage. For various other facts as to sewage we refer to former reports. Our effort is chiefly to allude to new information and experiments.

THE EXAMINATION OF DRINKING-WATERS.

The examination of potable waters is important as determining their fitness for use. Evidence is constantly accumulating that many diseases are conveyed to the system through drinking-water. Two divisions must be recognized, namely, those which arise from general or promiscuous filth, and those which arise from definite and specific and pathogenic forms of minute life. Thus, nausea, diarrhœa, &c., result from common befoulment of water, while typhoid fever, for instance, is claimed to result only from a specific contagium. Distrust of the evil effects of impure water often arises among the masses, from the fact that so much of common or ordinary filthy water may be imbibed by so many persons with impunity. Thus, Emmerich "daily, for two weeks, drank from one to two pints of very foul water taken from a hospital brook, which to the naked eye and to chemical tests was distinctly infected with sewage, and which showed a large amount of chlorides, ammonia and various organic substances. During the first three days he noticed slight gastritis, yet during the remainder of the fortnight no ill effects were recognized. A month later, having acquired a gastro-enteritis, he again

tested upon himself, in the same way, the effect of the same sort of water, but observed no detriment to his health."

There can be no doubt that some persons are more resistful of disease than others; that some stomachs better than others neutralize injurious substances, and that in the conservation of nature a kind of toleration of evils is sometimes established, but it would not do for all the children and invalids, or even all the well people, of a city to follow the example of Emmerich. There is abundant evidence that foul waters do disagree with many. What we know of the laws of life teach us that pure water and pure foods are favorable to health, and that impurities are a tax upon vital force—a tax indeed often borne without bankruptcy of health or life, but not in the interests of good health or long life. There is also abundant evidence that impure waters are the culture-places for disease, and invite those specific forms of contagion which too often become epidemic.

It is therefore important that we have means of estimating the comparative or actual purity of water used for drinking purposes. In Circular LIII. of this Board, most of the ordinary tests are given. Besides these,

CHEMICAL EXAMINATIONS

Are valuable, because they help to determine the quality of water by pointing out some of its special variations from the standard of purity. Some of these might possibly exist without injury, just as there may be carbonic oxide in the air without organic impurity; but, as a general fact, such is not the case, and it is a real measure as to its healthfulness.

We know that there are some real criticisms to be made upon chemical examinations as an index of the purity of water, and that they do not reveal the specific infectiveness of this or that germ. But we also know that the results are so uniform and approximate as to be very valuable in making up the evidence in a case, and that, therefore, these results should always be secured for comparison with other kinds of evidence, such as clinical, biological or that derived from the senses. Chemistry, too, is constantly perfecting and increasing its methods of tests.

Thus, the sulphuric acid process for estimating the organic nitrogen, first used by Kjeldahl, in 1883, for solid or semi-solid organic compounds, has been successfully applied by J. A. Blair, of Edinburgh,

and others to the analysis of the organic matters contained in potable waters, as well as the sulphuric acid and permanganate process for estimating the organic carbon. While recognizing the limitations of chemical analysis, we cannot dispense with it as a mode of test.

BIOLOGICAL EXAMINATIONS.

There has been much expectation that biological examinations would furnish us with very valuable evidence as to the purity or impurity of water. Thus it has been claimed that the number of bacteria, or other forms of minute life, found in water would be a test as to its purity. But it is also found that the aggregate number does not at all denote those which are of value as helping to purify, or keep pure, and that it is impossible as yet to classify the specific, the injurious, the harmless and the beneficial bacteria. As a rule it is found that there are fewer bacteria in very deep wells, or at the sources of most rivers, yet even here there are some unaccountable contradictions. Not to allude to the evidence of Percy Frankland and others noted in previous reports, Dr. G. C. Currier read, February, 1891, before the American Society of Civil Engineers, a biological study on the "Self-Purification of Flowing Water, and the Influence of Polluted Water in the Causation of Disease." While he found in the Passaic river at Paterson, after receiving sewage, 2,172 bacteria in one centimeter, and 4,000 in a Newark hydrant supplied from the lower Passaic, he found 20,340 in the Delaware near the Trenton water intake, yet he admits the general good character of the upper Delaware and attempts to account for the strange record by a three days' previous rain and by the fact that some forms were found which "are probably antagonistic to the germs of typhoid." This is but an example of the unsatisfactory condition of bacteriological evidence at present. Yet there is reason to hope that more experience and an immense collection of observations from competent observers will enable us to eliminate errors, to classify forms and to add this to other modes of testing.

Multitudes of examples teach us the hazard of general and specific disease from impure waters, especially such as receive sewage, or specific germs. Our safety is in pure water, or when there is suspicion of pollution, in thorough boiling before use until a better supply can be secured.

THE HOMES OF THE PEOPLE.

In the last report, in a paper on the "Homes of the People and Tenement-Houses," the facts in evidence as to the needs of legislation and of more sanitary attention thereto were plainly set forth. Sanitary reform must begin in the home. A large proportion of the population are there defenseless against unsanitary conditions unless the law interposes in their behalf. Many of the causes of sickness are concealed and unknown to tenants. Hence the necessity of skilled and thorough sanitary inspection. Not that of the Inspector who runs in, in order to be able to report how many houses he has inspected in a year, but of the one who makes a full office record in detail and puts it on file for reference in his office. It is easy to have activity without insight. Then the Board must examine these reports and see whether they are in their method up, for instance, to such a standard as is presented in our Inspectors' Guide. This is not all. The Inspector and the Board must know how to reach and remedy the evils found, as far as possible. Present law must be applied and more legislation sought if it is absolutely necessary. Would that all our people could realize that there is no more important part of public service than that which belongs to the Health Board of a village or city. On its efficiency depends, far more than is generally realized, the health, and that means the general prosperity of a people. How much the welfare of the mind, of the pocket, nay, more, of the entire moral nature, depends upon proper conditions in the home and on the public health, needs to be fully considered. We urge our Health Boards to more thorough work in their examination of house conditions and the condition of rear yards, of cesspools, &c. Public and street nuisance are more perceptible but not more serious. A good Health Board and good Inspectors can do as much for the welfare of the people as any other division of the public service. In addition to the legislation already had, we need a more stringent law as to tenements, similar to the laws now applied in such cities as New York and Boston.

FACTORY OR EFFLUVIUM NUISANCES.

Citizens by thousands in various parts of our State and especially in and near our larger cities, continue to be annoyed by various fumes and forms of stenches.

Our nearness to New York and Philadelphia, and laws more stringent than our own and a public sentiment more declared and persistent, is, in addition, leading too many of such odor-producing occupations to seek refuge in this State. It ought to be enough that under common law gases or odors being thus produced to the discomfort of the ordinary citizen, have always been adjudged as nuisances. Modern science and experience show us more and more that we cannot thus befoul the air with decaying and volatile organic products without lowering the standard of general health and causing direct or specific sickness to not a few. The extent of some such emanations is illustrated by the single fact that in a careful investigation and estimate as to the amount of sulphurous and sulphuric acid emitted in Manchester by an analysis on three successive days of fog, one and one-half cwt. of sulphuric acid per square mile was deposited in the center. At an outlying station one cwt. of sulphuric acid and thirteen cwt. of blacks (sooty material, &c.) was carried down during the same time. This exposure of the people to the deleterious gases and minute organic particles of foul matter is all the more trying because it can now be so largely prevented. At the recent Congress at London, so high an authority as Sir Henry Roscoe spoke thus: "Another source of pollution more easy to grapple with, lies in the escape of deleterious gases from chemical works and other manufactories. The removal of many causes of such pollution has been satisfactorily accomplished in this country under what is known as the Alkali acts, or more properly the Noxious Vapors acts. Thanks to the care with which these acts have been worked by the Government Inspectors and the manufacturers themselves, the serious complaints which arose of nuisance due to the escape of acid and other noxious vapors are no longer heard; and not only has the public been the gainer by the stoppage of the escapes which formerly occurred, but the manufacturers themselves have also benefited, inasmuch as they have had their attention directed to improvements in their processes which have proved remunerative." A. E. Fletcher (Chief Inspector under the Alkali act), in an outline of "The Present State of the British Law as to the Discharge of Noxious Gases from Manufacturing Processes," said: "The law makes no attempt to stop such operations on account of the noxious gases which are generated, but adopts means for regulating them and sets a limit to the amount of such noxious gases which may be discharged into the air. These noxious gases form but a short list, namely, chlorine and its acid compounds, the acid compounds of fluorine, nitrogen and sulphur, including sulphuretted hydrogen. To these may be added metallic fumes containing lead, antimony, arsenic and zinc." It is true that our range of noxious factories is greater, but there are also various forms of fume destructors and various methods of burning organic matter and gases adapted to these. It only needs the firm hand of the law to compel such factories to investigate methods and to adopt machinery to the accomplishment of the needed result. Besides the present power of Local Boards, it might be wise to compel them, on the application of twelve or more citizens, to ask for injunction and investigation through the Court of Chancery. The power of the court to abate such nuisances was well shown in the Elizabeth case, some time since. By means of fire and steam and by mechanical contrivances, it is claimed that every form of factory nuisance from smoke and organic particles can be overcome.

PHYSICAL EDUCATION AND SCHOOL HYGIENE.

This Board has endeavored for years past to give full recognition to the importance of hygienic care of school buildings and school children, and to physical education as a necessary part of public school training and instruction.

The frequent allusion to it in our reports, the facts adduced, the four circulars issued and the special inquiry made six years since, in co-operation with Hon. E. O. Chapman, State Superintendent of Public Instruction, have not been without their fruits. In addition, we were successful in establishing a definite department of hygienic instruction in the State Normal School, which is now being enlarged and extended. There is still need of far greater attention to this teaching in the public schools of the State. In the school systems of England and of several continental countries it is now accorded its proper place. We this year give especial attention to it in a series of valuable papers. It was also made prominent in the meeting of the New Jersey Sanitary Association. We have also been able to co-operate with the State Superintendent of Schools in his continuous efforts to improve the character of the school buildings and their adaptability to different grades of pupils. We this year also again, with his aid, send to each school district two circulars in book form,

one to be retained and one returned, by which we receive answers to the chief questions bearing on school buildings and their appointments, as also upon some points as to the children themselves. The time has come for a general advance in teaching and training as to health and its conditions, and as to the way in which this human mechanism we call the body is to be handled and used and utilized in the great work of life. It is needful also that we thus rear a class of men and women for the next generation who will appreciate the necessities of sanitary habits and administration, and will aid in securing much-needed reforms. We commend the subject to the attention not only of parents, teachers and physicians, but of all who study the best and most vital interests of the State. The school circulars of our Board are suppled to teachers on application through postal, and may wisely be distributed to the scholars in each school. They give many suggestions as to health and education.

PREVENTION OF EPIDEMICS BY NOTIFICATION OF INFECTIOUS DISEASES.

Among the means for preventing the spread of communicable diseases, the importance of notifying health authorities of each case, as soon as recognized, is more and more evident.

It is claimed that some cities owe their immunity from small-pox more to this enforced system than to vaccination. This secures the early and complete isolation of the patient, and proper rules for attendants. Most contagions are diffusable over large spaces, or quickly perish or are diffused in open air. We have had outbreaks of scarlet fever in a boarding-school, which have not spread beyond the first attacked because of due precautions. This isolation will not be secured, as a general thing, without notification. Our law is accurate, is reasonable; and because such notice is different from that as to the fact of the beginning or ending of a life, a small compensation is allowed. The facts are not communicated except to the health officer, and he generally consults the physicians as to the aid he can furnish. H. Littlejohn, in his "Ten Years' Notification of Infectious Diseases in Edinburgh," shows how fruitful it has been in results—how gradually it has led medical men to attend to the duty with almost unexceptional correctness and punctuality. Series of facts are given with statistical details, to show what it has done in checking typhoid fever, diphtheria, scarlet fever and typhus fever. (See Sanitary Record, June 16th, 1890.)

Last year, it will be remembered, we noticed the passage of a general law by the English Parliament, as to which there was much discussion and some opposition. Although in part voluntary, "unexpected success has followed its introduction." In a recent note as to it, Robert Farquharson, M.D., M.P., says: "A large number of localities have adopted it without difficulty. Great sanitary advantages have already resulted from the early detection of disease. We look in vain for proof or even assertion of the great evils of notification, of the shattered confidence, the strained professional relations, the inconvenience and expense, and even actual danger, that were so freely predicted during the early discussion of the bill."

The necessity of making it a requirement is now generally recognized. Our cities and rural villages cannot be too particular as to it. The constitutionality of laws requiring notification has been frequently affirmed.

PREVENTION OF DISEASE BY CARE OF THE MOUTH AND FAUCES.

Among the prominent revelations of the more recent studies of disease is the fact that so many ailments are derived from without, and are not the direct result of changes that are solely dependent upon primary lesions in organs. Most of the diseases spoken of as specific either originate entirely from without, or have their first declarative evidence when some microphyte from the air enters and settles upon the susceptible part. This generally means that the mouth and throat are the great conduits for the introduction of disease, the one class making their entrance into the digestive and the other into the pulmonary or breathing apparatus. Besides the recognized contagions of small-pox, scarlet fever, measles, diphtheria, &c., it is now claimed by good authorities that pneumonia and many ordinary catarrhs are distinctly communicated from the outer air. To these the mouth and fauces are related in two ways. If these are in an unhealthy condition they emit foulness which infects the air, and which is especially injurious to those who most directly breathe in the outcoming breath. Next, an unhealthy condition of the mouth makes it peculiarly susceptible to disease-bearing particles contained in the outside air, and thus invites the sedation and development of

disease. The mouth and throat are made up of a series of marvelous structures. Besides glands for lubrication, and for the furnishing of digestive juices, the mucous membranes of the tonsils are filled with crypts and thickly-located lymph follicles and abundant lymphatic and blood vessels so as to be prepared for an activity of service which almost entitles the tonsils to be called organs.

In addition to the chief tonsils the lymph tissue is so abundantly distributed in other parts of the buccal cavity as to have become designated by different names, such as the lingual, pharyngeal and discrete tonsil. Dr. Hingston Fox has called all these lymphoid tissues the "nurseries for young leucocytes." It is so abundant as to furnish a great outspread surface for absorption, so that we have not only the secretive function of the mucous glands, but an absorption apparatus in most intimate relation to the entire lymphatic and circulatory system.

There is more and more reason to believe that many diseases are local before they are constitutional, and that the implanting and development begin in the tonsils or other parts of the buccal cavity; in other words, that the disease is local in the mouth and throat before it is constitutional. This is now very fully recognized as to diphtheria and not unlikely is true of most of the contagious diseases. Nor is this beginning accidental. There is not only this local progress and distribution of disease, but the soil is more fully prepared by the condition of the mouth structures. It is, therefore, most important that minute attention be given to the mode of breathing and to the condition of the mouth and the breath. First of all remember that the nose and not the mouth is the chief organ for the inbreathing of air.

The nostrils are the avenues, the wind-pipes, for the lungs. By their moisture, their minute hairs or cilia and their tortuous course they are admirably fitted to warm and to help to purify the inbreathed air. It is no useless precaution to warn those exposed to concentrated contagion to keep the mouth closed and do all breathing through the nose. Next to this, cleanliness of the mouth is a most important consideration. The sweet, pure breath and the perfect condition of the mucous membranes, the follicles, the teeth and of the entire buccal cavity are not easy of attainment. In it lodge particles from our food, which easily become septic, and to it both from within and without is too often furnished an atmosphere which in its worst forms declares

itself as bad breath. The foulness of air and the need of ventilation are not so much because of the carbonic acid in the air as from the organic matter in a mobile or decaying state. Especially where there are assemblages as in school and public rooms, the bad breath of a dozen persons is more polluting than that of a hundred whose mouths are in a perfectly healthy and normal condition. Hence, we cannot too much insist upon mouth-rinsing and frequent cleansing of the breath as indispensable to young and old. Often there is need to add the use of some pleasant disinfectant, as thymol, borax, &c. The subject is a most important one, not only in relation to the health of the individual, but to the prevention of disease. It is now well understood by physicians that in those who are exposed to disease we are apparently able sometimes to prevent contagion by early and close attention to the mouth and its secretions. Topical applications to the throat and the frequent administration of such substances as the tincture ferri chloridi, quinine, potassium chlorate, &c., are for this purpose.

Thus not only are the exposed surfaces of the mouth and throat protected, but the liability of transmitting disease to others is greatly diminished. The care of the mouth and teeth should be an early subject of instruction in each school. Spitting on the floor or in handkerchiefs is to be avoided, and where there is the least disease all expectoration should be received in a disinfecting solution or burned.

In addition to this, the habit of breathing through the nose is to be insisted upon as well as the evils of mouth breathing and excessive talking in very cold or damp air. Now that so much is said as to the prevention of disease by isolation, we are also to study what can be done by systematic cleanliness and with especial reference to the mouth and its secretions.

HUMAN AND ANIMAL DISEASES.

The more thoroughly comparative physiology, pathology and biology are studied, the more evident is it that there are physical similarities in man and the lower animals that are to be studied in the interests of all, and that the comparative study of disease is of essential importance. This has lately been emphasized as never before in the fact that the recent International Congress of Hygiene devoted an important section to papers and discussions on this subject. Besides other allusions and the special attention given to the subject in various

reports and in Circular L. of the Board, in our twelfth report, 1888, pages 37–47, will be found a series of facts and references illustrative of this close relation. The Secretary of the Board also furnished to the State Board of Agriculture, report of 1890, a careful paper as to some of these diseases, but with special reference to Tuberculosis. Evidence accumulates as to the identity of several diseases and the similarity of others. What is still more important is, that some of these diseases are interchangeable in their communicability. Not only may animals be the vehicle of contagion, but certain diseases originating in the lower animals are infective. Besides what is well known as to anthrax, hydrophobia, vaccinia, &c., there are many who now add to the list influenza, scarlet fever, diphtheria, tuberculosis and some of the skin diseases. The cow, the horse, the dog, the cat and domestic fowls need special inquiry in reference to their relation both to the origination and extension of human diseases. These are engaging the attention of most of the biologists both in medical and veterinary science, and are being thoughtfully watched by leading practitioners.

Just now, special attention is being given to tuberculosis. Important papers and discussions as to it were had at the special conferences held in Paris in 1888 and in July, 1891, as also at the London Congress, 1891. The general view is that the bacillus of bovine and human tuberculosis is the same, but as to communicability there are various opinions. A Royal English Commission has for over a year past been taking testimony as to it, and is expected to report ere long. There are some that urge that both the meat and milk of cattle showing tuberculosis should be rejected. There are others that claim that there is little risk to muscle or even to milk, unless the udder shows signs of the disease. The subject was well presented by Drs. E. Holden, J. W. Sickler and others, at the last meeting of the New Jersey State Medical Society. We are still needing more facts and more experience. Yet, so real is the existence of the disease and so possible the peril, that we again urge on Boards of Health regulations as to cattle and inspection of all city dairies. This year the Board ordered the killing of nearly an entire herd, because of an outbreak of unusual severity in Sussex county. In connection with comments on some diseases will be found the results of some biological post-mortem examinations made by Prof. Formad, of Philadelphia. It is incumbent on all Boards of Health to seek to protect our domestic

animals from filth and other unhealthy conditions, for neglects are not only cruelty to animals, but hazardous to the health of the people. In the absence of public abattoirs and inspection of all meats thereat, the inspection of meat in markets is important. So rigorous is the method in most English cities that not only is all doubtful meat, game, poultry and fish seized, but heavy penalties are often inflicted. In order that any such meats may not get into the market or be manufactured into sausages or canned food, the English Inspectors have ready the following liquid, into which the meats are thrown:

Chloride of calcium	2 cwts.
Chloride of sodium	½ cwt.
Proto-sulphate of iron	1 cwt.
Carbazotic acid	2 lbs.
Water	300 gals.

This does not hinder its use for extraction of lubricating oils or any other legitimate disposal, but does prevent its consumption as food.

The Chicago plan is thoroughly to inject the meat or muscle with kerosene.

DUTIES OF HEALTH BOARDS UNDER SPECIAL ACTS.

In addition to the general system of health laws there are some special laws bearing on public health to which the attention of Local Boards needs to be directed. The law, for instance, as to petroleum and kerosene is such that there should be a watch over the safety of illuminating oils, and every accident should command the close inquiry of the Local Board, and if need be a specimen of the oil should be at once procured for examination. The law as to fire-escapes should be enforced.

The law as to milk and dairy products and oleomargarine is under the special care of Geo. W. McGuire, as Dairy Commissioner, who gives it thorough and efficient attention. He also aids in enforcing the law as to the adulteration of foods and drugs. Local Boards of Health are of essential service in guarding these laws and will be aided by the State authorities as occasion demands. Examination of water-supplies will be made by order of the State Board of Health where Local Boards suspect contamination and have no money at command for such inquiry. All Local Boards should look carefully after the keeping of animals, so as to prevent nuisance, and any cases

of contagious disease among them, or of such as may affect meat or milk-supply, should receive prompt attention. There is need of the inspection of all cattle and of all pens of animals kept in the cities, because of their liability to become sources of evil. If any such pen or mode of keeping is found to be a nuisance, it can be dealt with as any other nuisance, independent of the question whether the keeping of such animals in cities is in its very nature a nuisance. There are other laws, such as those as to sewers, as to accidents, as to cemeteries, &c., which need the occasional attention of Local Boards. While it is true that everything that annoys people is not a nuisance in a sanitary sense, yet the province of a Health Board is broad. It should realize the extent of its powers and know how to use them with persuasion, with discretion, and if need be with the force of the law.

INSPECTION SERVICE.

The board has given careful attention to the needs of Local Boards and to any local questions as to which they have needed the advisement of the Board. A Health Inspector has always been sent in cases of complaints in which the Local Board has doubted as to the need or mode of action. Where Boards have failed to avail themselves of ordinances or have made errors as to organization or interpretation of the laws, our Inspectors have been able to give efficient aid. Questions which can only be decided by personal inspection and advisement thus reached solution. A special committee assists the Secretary in directing this part of our work and we feel that it could be extended with great advantage. The sanitary inspection of institutions has also been of good service and aids much in administration and in the correction of structural defects. Written reports are rendered as to all inspections made, and, while not requiring yearly publication, are valuable in guiding the Board in its work. We hope by another year to complete a full inquiry into all State, county, city and township institutions of charity or reform, and to make full report of the same.

THE SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

BY MAJOR ALFRED A. WOODHULL, SURGEON, BREVET LIEUTENANT-COLONEL U. S. ARMY.

TOPICS.

Quarantine.
Cholera.
Diphtheria.
Alcohol and Public Health.
Antisepsis in Maternity Hospitals.
Prevention of the Spread of Epidemic Influenza.
Scarlet Fever, Disinfectant Inunction in.
Malaria.
Immunity from Disease.
Disinfection Within the Living Body.
Tuberculosis.
Tuberculin.
Actinomycosis.
Anthrax.
Rabies.
Infection of Meat, Milk and other Food.
Infectious Udder Disease of the Cow in Relation to Epidemic Disease in the Human Subject.
On the Relation between Variolous and Vaccine Disease in Animals.
The Etiology of Enteric Fever.
Regulation of Milk-Supply.
Infancy, Childhood and School Life.
Incipient Chorea.
The Working Curve of the Hour for School Children.
Neglected Children of Towns and Cities.
The Broad Irrigation Farms of Croydon.
Insanitary Arrangements in House-Building.
Block Dwellings.
Sewer Ventilation.
Water-Supply.
A Revolving Water Purifier.
Leaking Water Mains.
Housing the Poor.
Disposal of the Dead.
The Relation of Occupation to Disease and Mortality.

To attempt to render in a single paper an intelligible account of the proceedings of this body, would be as reasonable as to offer within the limits of a spelling-book the substance of an encyclopædia. The calibre of any man who should presume either feat would thereby be at once determined. But at the request of the Secretary of the State Board I report a few of the salient points connected with this London convocation, which in the best sense was a congress of nations. Demography is a new word, whose general application may be said

to be the science or study of peoples, but for our purposes we may accept Sir Douglas Galton's definition as "The science of statistics applied to questions concerning the social well-being of the people." Hygiene and Demography are, therefore, natural allies.

The attendance was very large, nearly 3,000 tickets having been taken out. The general interest outside of the congress itself was great. This was doubtless very favorably influenced by the conspicuous friendliness and encouragement extended toward the congress by the reigning sovereign and by the heir apparent, both of whom actively interested themselves in its welfare.

Exclusive of the time necessarily given to formal speeches at the opening and the close, there were four days for work; and the congress was broken up into ten sections for convenience of manipulation. There was no general daily address in science, as has been the custom in the medical congresses, but after a short welcome on the first working day by each Section President, in some but not all cases including a brief survey of the field, the reading of papers and their discussion proceeded steadily. From their great number the time for turning them over in debate was often limited, and, as a rule, fifteen minutes was all that could be assigned to a MS. and seven minutes to a speech. Exceptions were properly made in the case of matters of grave importance. On the other hand, printed abstracts of each paper were circulated in the section-rooms, and the most, but not all, of the papers were printed *in extenso* before reading, which facilitated comprehension. The discussion, however, was frequently polyglot. In the nature of the case one section would overlap upon another, for many of the border lines could not be well defined. As a consequence, papers on similar and in some cases on identical subjects, varying only in title, were discussed in different sections. In one sense this was a waste of force; in another, it was of advantage in securing consideration from somewhat different points of view.

QUARANTINE.

There was the usual divergence of views on the subject of quarantine. There was no advocacy of mere detention as such, but the English, as usual, regarded inspection and the isolation and detention of infected persons and enforced sanitation of the country itself as sufficient, while the continental delegates held that each country must suit its local conditions as to admission or exclusion.

CHOLERA.

Prof. Hueppe (Prague) announced that he had by slow instead of rapid changes through cultivation in egg albumen, developed comma bacilli so virulent that they were fatal to guinea pigs in a few hours. (It will be remembered that this has not heretofore been done with the cultivated bacillus.) Dr. Klein (London) still doubted that the comma is the cholera bacillus and questioned its uniform distribution. Dr. Cunningham, he said, in ten typical cases had failed to find it, while in others it was very abundant as nearly pure cultures. Dr. Cunningham had shown such morphological and other differences to exist in bacilli cultivated from cholera material as led him, Dr. Klein, to believe this could not be the same species. The comma bacillus might be found in mucoid material such as occurs in cholera, but it is not limited to cholera cases. Large quantities had been found in the mucous flakes of apes dying with severe diarrhœa, although the disease was not cholera. He had not succeeded in cultivating it, however, but he did believe certain states of the intestine favor the production of a species of organism that may have no connection with cholera. Specimens were shown by the lantern. Prof. Grüber (Vienna) held that these were new forms from one culture due to different conditions. Klein maintained that a different morphology was found in the different flakes, and that the difference was preserved under cultivation.

DIPHTHERIA.

Several carefully prepared papers, including one each by Dr. Abbott, of Massachusetts, and Dr. Hewitt, of Minnesota, opened the discussion on the distribution of diphtheria and its prevention, to which the Section of Preventive Medicine devoted an entire day. The drift of opinion, which was not unanimous, was that this eminently fatal disease does not depend upon bad ventilation, drainage, or water-supply in themselves, but that surface filth without excessive moisture favors Löffler's bacillus, just as subsoil pollution and damp favor Eberth's in enteric fever. Its greater comparative prevalence in rural districts was accounted for by the better care usually taken of urban ground-surface. It was the prevailing opinion that diphtheria depended upon individual infection (some thought through

mild and unrecognized cases), but spread through indirect media as well as directly from the sick; that the cause was very persistent, clinging for months or years to clothing and walls; that overcrowding and filth favor it, and that notification of the disease, isolation, and careful disinfection are the means of prevention.

ALCOHOL AND PUBLIC HEALTH.

Every one admitted that the evils following the abuse of alcohol were enormous, but the most direct indictment was that of Dr. Norman Kerr (London), who estimated that 40,000 premature deaths occurred annually from alcohol in the United Kingdom, and double that fatality indirectly from it through accident, violence, starvation, neglect and disease. The money loss to the nation from the premature deaths is 6,260,000 pounds, and the waste from alcoholic disease, above the deaths, is 2,880,000 pounds, in addition to the deaths and non-fatal maladies from indulgence not generally reckoned excessive. To these expenses are to be added those caused by pauperism, the administration of justice, the preservation of order and other causes. In addition are the mental unsoundness, moral disorder and social tumult that must increase with each succeeding generation from the mental impairment and degraded morale following inherited brain degeneration.

Sir Dyce Duckworth thought that, notwithstanding the admitted evils belonging to its train, alcohol is so bound up with our daily life that it cannot be done away with. He believed it desirable for adults, to be taken with food after the day's work is done, in quantities not to exceed an ounce and a half per diem. Children should have none, and chronic drunkards be made to abstain, the foolish and vicious by disgrace and cumulative punishment, and the victims of nervous disease by medical care. He did not trust to secular education or sanitary progress alone, but above all to the spread of the knowledge of God's law and of His fear in the heart.

Several continental speakers thought it impossible to prevent its use, and laid stress on the quality rather than the quantity doing harm.

Prof. Westergaard (Political Economy, Copenhagen) showed that the harm of alcohol did not depend upon its average consumption, but that it fell on those, generally a minority, who consume the bulk of it. One-seventh of the adult deaths in London depend, directly

or otherwise, upon alcoholic excess. The annual mortality from delirium tremens ranges from 330 in Belgium and 800 in England to 1,100 in Prussia, and the concomitant disease, poverty, and moral and physical degradation, are incalculable. Professor Westergaard pressed upon medical men the systematic collection of all the data connecting alcohol and disease, to supply complete and trustworthy public education. He laid stress upon stimulating the moral sense, and upon private societies for the suppression of intemperance, and doubted whether recommending pure drink would diminish the vice of drunkenness. He believed that the diminution of the number of bars was much more important than a high-license law, for the first did not necessarily depend upon the second. Where saloons are limited, the sale of drink in groceries should be forbidden. Except where popular opinion made prohibition practicable, he advocated the Gottenburg system as the most effectual for the suppression of intemperance. By it a monopoly of the sale of liquor is given to a company that is only allowed to pay a fixed interest to the shareholders, the surplus going directly to the charitable or municipal institutions. The managers, having permanent salaries, are not tempted to encourage drinking, and the hours are limited. The limitation of hours as well as of the number of bars is very important, and in Norway, where much drunkenness formerly prevailed, the sale of liquor is interdicted from Saturday afternoon to Monday morning, with the most beneficial effect upon the community.

The most of the speakers concurred in regarding repeated inebriety as a disease to be treated *nolens volens*, and ordinary drunkenness as a crime to be punished, and that the popular sense should be educated as to the perils of alcohol as a poison.

ANTISEPSIS IN MATERNITY HOSPITALS.

In European lying-in hospitals, antiseptic precautions have reduced the mortality from 34.21 to 4.96 per thousand; or, within the last ten years the lives of 3,011 mothers have been saved, as a result of experimental scientific research so much derided in certain quarters. (Dr. W. O. Priestley.)

PREVENTION OF THE SPREAD OF EPIDEMIC INFLUENZA.

Dr. Sisley said the disease is contagious, and follows lines of human intercourse. Bathing the eyes of exposed persons with boric acid solution has been followed by immunity; avoidance of infected localities is important; public institutions should be especially protected, and schools should be closed and health officers be notified in the presence of an epidemic.

SCARLET FEVER, DISINFECTANT INUNCTION IN.

Dr. Curgenven advised thymol with essential oils dissolved in oil of eucalyptus being used as an inunction in scarlet fever. Desquamation begins with the disappearance of the rash, and disinfection goes on step by step with it. The falling cuticle is not infectious, the patient may safely associate with others after the tenth day, and after-isolation, as now understood, is unnecessary. The bedding and the room are disinfected by the volatile oils simultaneously with the treatment of the patient. The special preparation thus vouched for is Tucker's Eucalyptus Disinfectant.

MALARIA.

Prof. Laveran (Paris) described the hæmatozoön of malaria including the spherical bodies, the flagellæ, the cruciform and the rosette-like bodies, and exhibited diagrams of them. They may be described thus: (1) Spherical, 1-10 mm. diameter. These adhere to the red blood corpuscles, which become paler as the parasites grow. They are pigmented and have amœboid movements. (2) Flagellæ, sometimes seen in variable numbers on the borders of the spherical bodies when completely developed. They move actively, finally become detached and lose themselves among the red blood corpuscles. (3) Cruciform bodies, cylindrical, with pointed extremities, 8-10 mm. diameter, deeply pigmented and without movement. (4) Rosette-shaped, regularly-segmented bodies, containing a little central pigment. After a time they become spherical and disintegrate. (5) Deeply-pigmented leucocytes, in persons suffering from malaria.

The flagellæ are only demonstrable in fresh blood; the others may

be preserved on slides. Paludal blood should be rapidly dried and the specimens fixed by heat, followed by staining with a concentrated solution of methyl-blue or gentian-violet. There may be double staining by successive immersion in concentrated aqueous solutions of eosin and of methyl-blue; the red cells becoming rosy and the leucocytes and parasites blue. Nuclei have been observed in both the spherical and the cruciform bodies. Several varieties of this hæmatozoön have been described, and similar ones have been found in frogs, lizards, marsh tortoises and birds. In the birds some observers have regarded them as identical with the paludal, but there is a distinction; the cruciform bodies are endo-globular and never become free, and the amœboid movements of the spherical bodies are much less marked in the organism found in birds' blood. The latter has been found in birds in non-marshy regions, and it frequently gives no inconvenience to its host. The inoculation of such blood has given only negative results, nevertheless its study may throw light on obscure points about the true hæmatozoön of paludism.

These bodies were illustrated by the lantern.

Prof. Celli (Rome) concurred with Prof. Laveran that malaria is of parasitic origin. Prof. Crookshank (London) believed that these bodies were not pathological products of the blood corpuscles, but were animal parasites, and while their relation as the cause of malaria was not proved, their presence in man is an invaluable diagnostic sign.

It is to be remembered, as another speaker observed, that this plasmodium has never yet been found outside of the human body.

Dr. Anderson made an interesting report of the complete freedom from malaria of the island of Mauritius until 1865, when some Chinese coolies arrived with intermittent fever. From that point it spread step by step, but rapidly, until in 1867 the whole island was infected and has since remained so.

This singular experience of Mauritius will be recognized as closely resembling the modern invasion of the Connecticut River valley in Massachusetts, about fifteen years ago.

IMMUNITY FROM DISEASE.

This subject, of the utmost theoretical and practical interest, was discussed through formal papers and orally by a dozen of the foremost bacteriologists of Europe, whose views it is attempted to sum-

marize as follows: Both the phagocytic action of the leucocytes and the bactericidal power of the blood-serum were defended. Until Pasteur introduced preventive inoculation by attenuated virus the only immunity against disease was a previous attack of the disease, vaccination excepted. Then Metchnikoff discovered that the amœboid cells, the leucocytes, inclose and digest foreign tissue including bacteria, thus becoming phagocytes; whereby the microbe perishes very differently from the manner in which it dies under cultivation. The rapidity with which the inoculated microbes, whether derived from the direct virus or by attenuation, are consumed by the leucocytes is a measure of the refractoriness of the animal. There are some diseases, or some animals, in which the microbes remain free where phagocytosis does not occur, and others, as tuberculosis and leprosy, where the bacilli are found in the cells but the most serious results follow. This indicates that there the cells are of insufficient power to accomplish the desired end, and these are susceptible animals.

It remains a question whether immunity is due to the power of the cells to include virulent microbes, or whether it depends on the absorption of virus by them. Sometimes the inclosed microbes enjoy full vitality, and virulent bacilli grow within and escape from the dead leucocytes. At others, where the microbes are beyond the reach of the leucocytes, as in the anterior chamber of a rabbit, they grow freely until the leucocytes migrating thither check them. Why are the cells attracted to the microbes, and why do the leucocytes in some, that is, in susceptible animals, fail to seize them? It is suggested that the leucocytes are attracted to the bacteria by a chemical quality or affinity, and it is believed that the products of the microbes do exert a very marked chemical action on the phagocytes. The more active the proliferation of the virus within the body the more energetic are the poisons it elaborates, and the cells which penetrate the toxic focus are paralyzed and become incapable of interfering with the microbes. Sometimes, as in chicken cholera, the toxine formed is still more virulent and actually repels the leucocytes, so that phagocytes are never found in this disease. But in animals immune by attenuated virus, by a suitable dose of bacterial products, this does not occur. A strong dose attracts phagocytes, already habituated to the products of the microbes, which take up the microbes themselves before they can elaborate any effective toxic material. The critical struggle is therefore at the commencement of the disease; for, if the

leucocytes cannot accomplish this at the beginning, later interference would be ineffective, because enough poison would have been produced to paralyze them. Hence, any condition that prevents access of the leucocytes facilitates infection. On the other hand, in such diseases as relapsing fever where crises occurred, the cells destroyed the spirilla in monkeys and there was no second attack; but in man the phagocytes were unable to completely overcome it and a new attack supervened. And in tubercle and leprosy, where the bacilli actually live within the leucocyte and finally destroy it, it would appear that the power of the cell is limited to swallowing the foreign body without digesting it.

On the contrary, it is held by some that the prophylactic substances reside in the animal tissue-juices. These bacteria-killing bodies are designated as (*αλεξειν*, to defend) defensive proteids, and it is a theory that "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 their pathogenic action depends."

This does not exclude other factors, and it is probable that in some animals immunity may depend upon other causes. In support of this, it appears that the blood-serum of a rabbit is a culture-medium for the bacillus pyocyaneus; but when a rabbit is made immune against the disease produced by this bacillus, its blood-serum has acquired the power of attenuating or destroying the microbe. Similar results have been attained in other diseases, and, especially in pig typhoid, not only have the microbes been killed by the blood-serum of immune rabbits, but such serum has destroyed the disease. It has also been found that the microbes of diphtheria and tetanus do not pass through the system, as in anthrax. They remain localized, and the deadly poisons they elaborate, absorbed into the system, produce their disastrous effects. For instance, an inoculated guinea pig may develop diphtheritic paralysis long after the last diphtheritic bacillus has disappeared; and practically the same clinical effect can be produced by injecting a minute dose of the poison made by the diphtheritic microbe as by the microbe itself. Scarcely any tolerance can be obtained by successive inoculations with minute doses of the poison generated by the diphtheritic microbe, and there is no prospect of producing immunity in that way; and, further, it would be useless

to attack the microbe if the poison already formed remained untouched. But it has been found that while the serum of a diphtheritic immune rabbit has no bactericidal action on the bacillus, it does destroy the poison produced by it, and in this way the disease has been cured in mice and guinea pigs. This has been confirmed in other diseases also.

In determining the nature of the substance upon which this bactericidal quality depends, it was suspected that it was a particular ferment-like proteid, known as cell-globulin B. In the serum of the rat an alkaline proteid having the power to destroy anthrax bacillus was found, and, when injected into mice along with fully-virulent anthrax spores, it prevented their development. Other experiments showed that, in the rat at least, these defensive proteids can be diminished or increased at pleasure by suitable diet, and that the blood-serum may fairly be believed to contain this valuable constituent. In corroboration of this, it may be, Emmerich reports that dysentery and croupous pneumonia in animals could be cured or prevented by subcutaneous or intravenous injections of immune blood, and he believes that, as Fraenkel's diplococcus causes croupous pneumonia, so men can be cured of that disease when proper quantities of chemically-pure blood-serum from immunized animals can be obtained.

In the same direction, Kitasato, of Japan, has shown with Behring that the blood of artificially-immune mice not only renders other mice refractory to tetanus, but cures the disease even after severe tetanic spasms have set in.

The defensive proteids or alexins, in which upon this theory these qualities reside, appear to be ferment-like albuminous bodies, which, in the absence of other physiological tests, Mr. Hankin proposes to divide into two provisional classes, sozins and phylaxins. A sozin (*σώζω*, to preserve) is a defensive proteid that occurs naturally in a normal animal. They have been found in all animals yet examined. A phylaxin (*φυλάξω*, to guard) is a defensive proteid only found in an animal artificially made immune, and which, so far as known, only acts on one kind of microbe or its products. Each may be subdivided into those that act on the microbe itself and those that act on the poison it generates, to be called myco- (*μύκης*, fungus) and toxo- (*τοξικός*, poison) sozins and phylaxins, As these may also be obtained from cells, they do not exclude the phagocyte theory. Metchnikoff, of Paris, and Hankin, of Cambridge, are the respective exponents of the phagocyte and defensive proteid doctrines.

It is probably the case, as Emmerich remarked, that no general theory of immunity can be formulated now. Phagocytosis can be demonstrated beyond a doubt under the microscope, and the experimental work with blood-serum seems to show that other factors than the amœboid operate to induce protection. It is reasonable to suppose that both the cell and the serum play important parts, and that the chemical element is not yet made out. Belonging to this last factor are Klein and Coxwell's experiments on the influence of chloroform upon immunity. Frogs and rats are ordinarily immune against anthrax; but when inoculated with it under chloroform or ether, both of these invariably die, although, so far as the microscope shows, the leucocytes continue to swallow the bacteria. This seems to show that chemical changes may be established in the blood, sufficient to neutralize the destructive power of the leucocytes.

DISINFECTION WITHIN THE LIVING BODY.

A cognate subject to the preceding received discussion by the same section (Bacteriological) on another day.

Behring (Berlin) said in view of Pasteur's and Koch's researches it is conceivable that the germs within the body may be rendered harmless by killing the germs, hindering their growth, counteracting their disease-producing properties, or by destroying their toxic products. And it is possible, although not proved, that increased power of resistance may be bestowed upon cells. A mouse will be killed by the injection of anthrax from another mouse, but chloro-bromate of soda and corrosive sublimate injected at the same place (and within two hours) delays or by its repetition averts death. It is not easy to explain the process. The bacilli are not killed, for they may be cultivated from the blood many hours later; nor weakened, for other mice inoculated with them die typically. A few may be killed by the œdema that occurs, but we have to assume that changes of a general character that hinder their growth have been brought about; otherwise it is difficult to understand why they are not taken up by the blood and lymph as usual. Similar results have been obtained in both tetanus and diphtheria by injecting trichloride of iodine, and in diphtheria by the double salt of gold and sodium and the zinc preparations.

But besides their cure these animals have acquired a certain degree

of immunity against the same infection (of disease), and with their blood new therapeutic results have been obtained. There is this difference in the curative effect of the chemicals and the blood, the former only act when injected near the seat of inoculation and within a short period of it; the blood acts when injected in other parts and at late stages of the disease, as for example after tetanic convulsions have set in.

Behring now thinks it possible to render the specific products of diseased organisms within the body harmless by chemical agents, and that a certain degree of immunity is conferred along with the curative effect. This action in immune blood is not dependent upon nor limited to the living elements; for it exists in the cell-free serum, and by it the special diphtherial poison is destroyed without the bacilli being destroyed. From this we may look for some disinfecting agent to destroy the bacteria toxine, and Ehrlich's experiments upon the immunity conferred upon mice and rabbits against the vegetable albumens of the castor-oil plant, confirm this. Tolerance thus seems to be the power of the serum to destroy the active poisons, and indicates a revival of humoral pathology.

To these generalizations, Roux, representing the phagocytic doctrine, objected as setting forth an unproved theory and to chemical action as incomprehensible. Sir Joseph Lister regarded phagocytes as endowed with life and requiring nourishment, while chemical action implied dead rather than living tissue.

Continuing the subject, Ruffer detailed experiments with the bacillus of quarter-evil (b. Chauvoei), and maintained that the fluids of non-immune and of immune animals alike have no power to destroy bacilli; that an extremely weak virus grown in immune fluids, if protected from wandering cells, becomes so intensified as to prove fatal on re-inoculation in the same animal, and that when the leucocytes are prevented reaching the virus in acute infectious diseases, the result is fatal.

In the discussion of *Antiseptics, with Special Reference to Surgery*, Prof. Crookshank strongly recommended carbolic acid 1 to 50 in preference to corrosive sublimate; Prof. Gruber regarded the best agents as carbolic acid, lysol and kresole, and Prof. Hueppe regarded kresole, or a mixture of soluble tar products with sodium salicylate, as very efficient. Each of these spoke, independently, of the ordinary methods of testing surgical disinfectants as untrustworthy.

It follows from all the preceding that, although great practical advances in medicine and surgery have been made and we seem on the threshold of still greater, the theories of immunity and disinfection, of disease and treatment, are by no means settled or agreed upon by the leading students.

TUBERCULOSIS.

A discussion upon tuberculosis, held in joint session of the Sections of Bacteriology and the Relation of the Diseases of Animals to those of Man, showed the sense of the assembly to be that, speaking generally, the infection of tuberculosis is communicated by man to man; that a comparatively small degree of infection follows the ingestion of solid food from tuberculous animals; that when tubercle is not diffused in animals there is a little danger from meat, and that that is minimized by careful cooking, but that milk, either in its natural state or as butter, cheese or buttermilk, from cows with tuberculous udders, is highly dangerous, and is only sterilized by thorough boiling. General confiscation of tuberculous cattle is not considered necessary nor as practicable, in the absence of qualified Inspectors; but the careful cooking of all meat is recommended, the careful examination and supervision of all milch cows and the rejection of all milk from diseased udders is insisted on, and it is thought that milk from several cows is safer than that from one, for children's diet.

(Compare with report on Actinomycosis.)

TUBERCULIN.

A discussion on tuberculin revealed a widespread fear that it might excite general tuberculosis from localized centers. But Prof. Ehrlich asserted that Koch's present results were extremely favorable, and depended on the local effects of very minute doses upon the specially-affected tissues. Large quantities do harm.

ACTINOMYCOSIS,

Which has been carefully studied in recent years, it is believed has frequently been confused with tuberculosis, and especially with a scrofulous condition. It invades not merely the skin and the mouth, but sometimes the respiratory and other internal organs of animals.

The best opinion seems to be that it is not directly communicable, but that the common cause for both animals and man is a fungus connected with cereals used as food. An animal infected with this disease, especially if the internal organs are free, it is believed might be eaten with impunity, and to slaughter infected beasts for the sake of others is not necessary.

It is important to distinguish it from tuberculosis, and in the early stage this can only be done microscopically. The fact that it prevails in Australia, where is has generally been confused with tuberculosis, may have given rise to the report that Australian cattle that have never been housed sometimes are tuberculous.

ANTHRAX.

As in man this disease always comes from animals, the line of defense is, first, protective inoculation of animals, and secondly, the disposal of carcasses and the disinfection or destruction of dangerous animal products.

RABIES.

Roux reported that Pasteur had treated 9,465 persons in 1886–90, of whom 90, or 0.95 per cent., died; or, excluding those where rabies in the animal was not proved, 7,925 cases, with 73, or 0.92 per cent., deaths, against 12 to 14 per cent. mortality of those bitten and not treated. The treatment, which was given in detail, is by using exact quantities of inoculated rabbits' spinal cord, of graduated but known strength, for specified periods. M. Pasteur believes that, beside the modified virus in the cords, special chemical bodies are formed by the rabic microbe, which probably takes part in producing immunity. Cases had been successfully treated long after the bite where hydrophobia was believed to be developing, and it is probable that rabies in dogs had been aborted by vaccination after inoculation. It was doubtful whether all mortality would be overcome, because most of the deaths occur in persons in whom the disease is developing before treatment is begun, and because the virus might remain latent for years and the immunity might disappear first.

Dr. Fleming (London) showed by statistics for many years and countries that rabies is suppressed as muzzling is enforced. (There has been no case in Berlin for eleven years.) This probably depends on the destruction of wandering dogs and the greater care taken of those that are muzzled.

INFECTION OF MEAT, MILK AND OTHER FOOD.

Dr. Ballard (London) cited and agreed with Dr. Buchanan that diseases following the eating of poisonous food are as truly infective and distinct diseases as scarlet fever and tuberculosis. Their symptoms are generally gastro-intestinal, but the causes are specific. It has been only within a comparatively few years that these could be studied except by inference, but now bacteriology opens the way to their investigation. The true cause is the chemical poison generated by some micro-organism that has gained access to the food, and this toxine may be formed either before or after it is eaten. The period of incubation is noteworthy to determine which of these has occurred. The infection reaches the food "accidentally"—that is, under conditions we are not yet able to recognize—but almost invariably in connection with want of cleanliness of vessels or surroundings. This especially is the case when it has been kept in a temperature favorable for germ life. The great preponderance of cases due to pork and veal appears to depend on the relative excess of gelatine, which is so favorite a nutrient for bacilli.

The efficient precautions are, obviously, great cleanliness of the materials and surroundings, abundant light and ventilation, and the avoidance of all contaminated air from the ground or elsewhere.

Dr. Vaughan (Michigan) cited Gartner's epidemic at Jena as illustrating disease due to a pathogenic state of animal food; enteric fever and diphtheria propagated by milk from extraneous conditions, and milk and custard-poisoning, as due to saprophytic, toxigenic bacteria. When disease is localized in the lungs tuberculous meat may convey tubercle, and when the disease is general it is dangerous as food. When the milk glands are affected, infection is probable. He believes much infantile diarrhœa to depend on saprophytic, toxigenic germs that develop chemical poisons, and thinks that the use of sterilized milk, which might be re-infected within the body, less advisable than abstention from all milk for a few days. Investigation should include search for bacterial as well as basic products of putrefaction.

Prof. Brown said it was evidently quite clear that there were

microbes having no special morphological structure, which might undergo various changes under cultivation and produce unanticipated effects. (This idea appears under different forms in several sections.)

Prof. Lehmann (Würtzburg) maintained in a paper on *The Hygienic Importance of Copper*, that there was no evidence that from copper vessels as much as 150 to 200 mg. copper had been taken into the system at one time, and that as at least that much was required to produce pathological effects, the true cause of the acute poisoning attributed to copper utensils was the toxalbumens and ptomaïnes. As much as 50 mg. copper daily will not cause chronic copper-poisoning in man, for it is stored in the liver in large quantities and excreted by the bile, the intestines and the kidneys. Too large amounts may cause chronic gastro-intestinal disturbance. Chronic copper-poisoning may be due to careless working in copper, but what is so called is generally to be attributed to other minerals. The addition of copper to bread or vegetables is unnecessary and may be dangerous and should be forbidden. In medical jurisprudence severe copper-poisoning should not be recognized possible unless 200 mg. are consumed, and the bacterial products should be looked for instead.

INFECTIOUS UDDER DISEASE OF THE COW IN RELATION TO EPIDEMIC DISEASE IN THE HUMAN SUBJECT.

Klein contended that scarlet fever, diphtheria and a yet unnamed disease resembling these but distinct from them, were caused by inflammatory diseases of the udder, and cited the Henden, Edinburgh, Yorktown and Croydon epidemics in corroboration. The weight of opinion, especially of the veterinarians, in an animated and prolonged debate, was that he had confused bovine diseases and that there was no ground for his deductions, nor is scarlet fever communicable to the cow.

The importance of udder disease in connection with milk was fully acknowledged, especially when the animal is tuberculous.

ON THE RELATION BETWEEN VARIOLOUS AND VACCINE DISEASE IN ANIMALS.

Prof. Chauveau (Paris) said that while he was now able invariably to communicate small-pox to bovine animals (in which he had formerly failed), he had never been able to transform that virus into vaccine.

THE ETIOLOGY OF ENTERIC FEVER.

A paper of much wider interest than its title implies was read in the Section of Military Hygiene, on *Enteric Fever in Campaigns, its Prevalence and Causation*, by Surg.-Capt. A. M. Davies, Assistant Professor of Hygiene at Netley. Prof. Davies first showed from the records that enteric fever is an almost universal accompaniment of an army in the field in all parts of the world, even in isolated spots not previously occupied, and that diarrhœa and other bowel affections prevail previously to and along with the enteric outbreaks. Then, repudiating the doctrine of spontaneous generation in the sense that anything may arise from nothing, he laid stress on evolution as a factor that may develop from a non-specific germ a disease-cause having special qualities. He quoted as a text the Report of the Principal Medical Officer in the Egyptian Campaign of 1882: "Looseness of the bowels, under the name of camp-diarrhœa, begins to be common almost as soon as any army takes the field. This is in a large number of cases compatible with apparently good health, and is doubtless attributable to the changed conditions of life. Some cases of fever occur, some of very brief duration, which are classified as heat fever, and some attended with diarrhœa, marking the commencement of enteric fever in the force. The development of this disease and the proportions it will assume, will be merely a question of time and circumstances." After citing examples in support, Dr. Davies says: "Now, in the above-quoted instances, either there was a connection between the preliminary diarrhœa prevalence and the subsequent enteric fever prevalence, or there was not. If we believe in the origin of enteric fever purely and simply by specific contagion from a pre-existing case, then no amount of diarrhœa prevalence is of any consequence one way or the other. But, assuming for the moment that there may be causal connection between the two," he traces it as far as possible in this way:

First. "The actual records seem to show a gradual development of definite enteric fever from ordinary diarrhœa, the intervening degrees of feverishness, *malaise, embarras gastrique*, anomalous and ill-defined fever with diarrhœa, apparently being separated from each other by no distinct demarcations."

Secondly. It is more reasonable to expect that the diarrhœa in weakly and exhausted individuals, with an increase of filth and decomposition, polluting soil, air and water, should lead to a development of filth-generated, pathogenic poison, capable of causing in such weakly persons a fever with diarrhœa, a poisoning of the organism, producing pyrexia and inflammation of certain glands of the alimentary tract—in fact, a specific fever. It supposes evolution of a disease-poison under increasing conditions of pollution of soil, air or water, either separately or together, and as such is not unreasonable or illogical. The conditions of camp pollution exist, and frequently tend to increase. Should they have no effect? Why should diarrhœa remain simply diarrhœa under such circumstances, and evolution have no part in it?

Thirdly. Analogy favors such a view. The independent production of the dysenteric poison is doubted by no one. And the dysentery that arises in early camp life will always become contagious and epidemic, unless special precautions are taken. And it is a common occurrence to note the prevalence of "sore throat" without any special diphtheritic character some time before the actual outbreak of diphtheria, which appears to point to the gradual evolution of the specific poison.

Now, accepting the modern belief that there is a specific parasite for each specific contagious disease, and that in enteric fever it is Eberth's bacillus, as is generally believed although not actually demonstrated, Dr. Davies asks, "Is it necessary to believe that each bacillus or group of bacilli that give rise to a case of enteric fever should originate immediately from a pre-existing bacillus or germ of the *same* species, and derived from a pre-existing case of the same disease, or is it conceivable that the bacillus should have developed its specific disease-producing properties from other varieties, or some one other variety of bacillus, by a process of evolution under favoring conditions?"

Probably Eberth's bacillus is causally connected with typhoid fever, but there is no doubt that it is not the only bacillus connected with the disease; but, in the present state of our knowledge, the relationship of the various bacilli met with in enteric patients, although important, is yet unsettled. For instance, MM. Rodet and Roux

believe the bacillus coli communis to be really another form of Eberth's bacillus. Notwithstanding differences in the morphological characteristics and in the character of the cultivations, these observers do not think they are such as differentiate them into two distinct species. "Considering, on the one hand, the tolerance which the organism has for the bacillus coli, as it commonly presents itself in the intestine, and, on the other hand, the injurious nature of water contaminated by it, they are led to the conclusion that, in the great majority of cases, it acquires outside the organism its 'typhigenic' character."* Von Babes† believes that, along with Eberth's and the b. coli com., there are many forms furnishing gradations between the typical typhoid bacillus and the common saprogenic bacilli. Dr. Cassedebat‡ has described pseudo-typhoid bacilli resembling, yet differing from typical Eberth's b. Vaughan§ has isolated two bacilli from suspected water which, although presenting cultivation characters different from Eberth's, produced identical lesions and more fatal effects in animals.

From all these, Professor Davies believes not that there is yet *proof* that typhoid bacilli may be developed from other organisms, but that it is a reasonable supposition that will afford a satisfactory account for those outbreaks in camp life hitherto so difficult to explain. As he says, this explanation will account for the great variety of types of enteric fever as dependent upon the degree of development; and that it is not illogical should be allowed, when we bear in mind the extreme rapidity of their propagation. As bacteria will pass through 100 to 1,000 generations, sometimes in a few days, there should be no difficulty in supposing the last may have different qualities from the first, should the environment so determine. Environment is all-important, and the co-existence of filth, decomposing organic matter or fæces, with favorable conditions of temperature and moisture, may reasonably be supposed to so change a micro-organism as to endow it with disease-producing properties, and thus cause the production of a specific poison *de novo*.

So much space has been given to this subject, because it is a matter of daily concern in civil life as well as important in camp. If it is true, it lays new stress on the necessity for sanitary care, and it is the

Comptes Rendus de la Soc. de Biologie, XI, 1890.
†*Zeitschrift für Hygiene*, 1890.
‡*Ann. de L'Institut Pasteur*, Oct., 1890.
§ Phila. Med. News, 1890.

latest and clearest exposition of a doctrine not altogether unique. Besides the authorities quoted by Professor Davies, as already seen, Professor Brown, in the Section on Diseases of Animals (pp. 43–4), suggested that microbes might by cultivation undergo changes that would produce unlooked-for effects, and Professor Arloing (Lyons), in a paper on the *Causation of Enteric Fever*, in the Section of Bacteriology, drew special attention to the etiological role that the b. com. coli might play in enteric epidemics. Rodet and Roux, by comparative study of it and b. Eberth, have not been able to establish decided specific differences between the two bacilli. Their pathogenic properties with regard to animals are apparently (*sensiblement*) the same, and morphologically they become *Eberthiform* in successive cultivations under slight modifying causes. These researches, Arloing remarks, give considerable support to Murchison's theory of pythogenic origin. They allow of the creation of a focus independent of the presence of an antecedent sick person and independent of contaminated water, although these latter cases must be rare. Vallet has proved the b. coli maintains itself in the liquid of fermented matters where b. Eberth cannot be cultivated, and the b. coli from cesspits is more pathogenic for guinea pigs than the b. Eberth from the spleen. Professor Hueppe (Prague) said the chief point of differentiation between the bacilli is the absence of cilia (?) (*cils*) in b. coli com., and he could not admit their identity (*similitude*), unless they take on this character. M. Arloing said these had not been looked for in Lyons.

These views have been foreshadowed in the United States at least by Dr. E. M. Hunt,* of New Jersey, and by the writer.

The writer, in a paper on yellow fever,† said, in 1879: "The germ theory, in its integrity, does not compel belief in an infinitely-extended ancestry of germs, each identical with its predecessor and its successor. We may imagine an infinite variety of self-propagating germs, each set of which gradually yield to adjacent influences, as is conspicuous in the cultivation of vegetables and is shadowed in animal life, and then suppose that with the metamorphoses induced by the surrounding conditions the yellow fever cause is gradually evolved. These presumed changes, although, perhaps, involving many generations of

*See Enteric Fever, Fourth Report N. J. State Board of Health, 1880; The Germ Theory of Health, Med. News, Phila., Oct. 24th, 1885; The Origin of Some Diseases, Trans. Am. Public Health Asso., 1887, Ezra M. Hunt, M.D.

†Am. Pub. Health Reports, V., pp. 104–5.

germ life, may easily be accomplished within the period of a single season, and would be developed with a rapidity proportionate to the propitiousness of the situation," &c.

In so interesting a matter as this, it has seemed worth while to go beyond the record of the congress itself for these references.

REGULATION OF MILK-SUPPLY.

Dr. Ostertag enumerated, with examples, many qualities of milk, including all abnormalities of color, taste and odor, as well as that from diseased animals or milk liable to be contaminated by emanations of any kind, that should be condemned. It was the general opinion that tuberculosis in cows should be a notifiable disease, and there were individual opinions not dissented from that children are better fed on condensed milk, or milk from several cows, than on that from one. The power to close dairies and milk shops supplying infected milk belongs to many English towns, and it was the general opinion that all such establishments should be licensed and inspected.

INFANCY, CHILDHOOD AND SCHOOL LIFE.

This section was chiefly taken up with the relation between children and schools.

The central idea, as indicated in the President's address, was that the exigencies of the day require State intervention in the interest of the community; that the appointments for teaching should be adapted to that end; that observation and independent reasoning should be cultivated along with learning from books; and too little care for the spiritual capacity of the child should not blunt its moral perception and retard its perfect physical development.

An examination of more than 50,000 school children showed more than 41,000 of them to be of normal development. The others were divided into groups, from those of natural appearance but slow to learn, to those deficient in some distinct particular or epileptic. The delicate, feeble-brained children, those with small heads, those nervous and with headache, with chorea, with occasional fits, those partly blind or deaf, conditions not tending to fatal results, are susceptible of modified education and should be provided for, without which

there is danger of mental and moral deterioration. In Germany and in Scandinavia such auxiliary classes under special teachers have long been established with the best results, and three such schools are about being opened by the London Board.

The advantages are two-fold; the normal children are not retarded by the incompetent, and those thus handicapped by nature are carried along under the best possible conditions and really attain a better position than if pressed with their superior fellows. The feeling of the section was unanimous that graded and special care of this kind should always be at the disposal of the weaker children, for their own sakes and for the sake of the State. Those positively imbecile or epileptic should also have special training. It was thought that care of this kind bestowed upon such children of the poorer classes would eventually lessen the number of those requiring admission to asylums as lunatics.

INCIPIENT CHOREA

Is generally unrecognized by teachers, and this form of nervous disturbance is frequently punished as inattention. A simple and effectual test is to require the suspected child to hold both arms straight over the shoulders. In commencing chorea the hands will quiver, or will fall backward or forward.

THE WORKING CURVE OF THE HOUR FOR SCHOOL CHILDREN

Was illustrated by Prof. Bergenstein (Vienna), showing how the brain-power fluctuates and manifests fatigue under exercise. The opinion prevailed that three-quarters of an hour is sufficiently long for lessons, and that it should be succeeded by a quarter of an hour's rest. Prof. Kuborn (Leipsic) reported that recent school legislation in Belgium had greatly improved the physique, vision and cerebral power of the children.

Mr. White (London School Board), pointing out the natural desire of children for change and for physical activity, recommended *physical education* as a part of school routine, to occur midway in the time for mental work. The use of apparatus was deprecated as involving too great muscular strain, and stress was laid upon swimming, which the London Board now looks upon as necessary. The paper

was illustrated by a band of children under one of the teachers of the London schools, showing exactly how the method is now carried out. It was the opinion of the section that out-of-school study should be minimized, the lessons should be of moderate length and be broken by rest, and that systematic physical exercise should always be introduced.

THE NEGLECTED CHILDREN OF TOWNS AND CITIES,

Especially the deplorable condition of those of drunken and otherwise criminal parents, had a day devoted to them. The moral as well as the physical strain of privation was recognized, and the improvement of children relieved from it was noted. There was a decided feeling that, at least to some degree, children should be removed from under charge of incompetent parents; that the parents themselves should be punished; and that, notwithstanding the risk of diminishing parental responsibility, proper food and clothing should be supplied by the State to the children, either at the school or elsewhere.

SEWAGE DISPOSAL.

The Chemical Section devoted a day to questions of sewage disposal.

Dr. Thresh, in a methodical and exhaustive paper, enumerated the nine or ten different methods by which the soluble and insoluble deleterious matters are sought to be disposed of, and was of the opinion that broad irrigation is the only single one that gives any prospect of success. The separate system reduces the handling to the minimum, but the real difficulties continue. Probably a combination of precipitation, subsidence and chemical filtration will form the best method. Electrolysis thus far is only a roundabout way to produce a soluble iron-salt. Sterilization is best accomplished by the Amines process of herring-brine and milk of lime. Filtration rapidly clogs the pores of the filters, and although the micro-organisms may be enormously reduced, they will increase with great rapidity, as the soluble constituents are not affected. Under no circumstances may the effluent pass into a stream furnishing water-supply lower down, until all specific organisms and suspected impurities are removed and the dissolved organic matters minimized.

BROAD IRRIGATION FARMS.

The Broad Irrigation Farms of Croydon were described by Dr. Carpenter, where for thirty years the sewage has been disposed of without injurious effects on the river into which it ultimately flows or to the health and comfort of the surrounding inhabitants. The farms are cultivated to advantage, the crops grown are satisfactory food for man and beast, and the animals so nourished are healthy. The excreta from patients with infectious and epidemic diseases are immediately rendered innocuous in broad irrigation, and sewage kept in motion and quickly brought into contact with soil and vegetable life is changed in a direction contrary to that required for the propagation of germs. The destruction of sewage is as opposed to the national interests as is the destruction of any other form of wealth. The working conditions for successful sewage-farming are that the sewage be kept near the surface, moving over the land rather than downward through it, and it must be kept within the influence of vegetable root-fibrils and of the humus, and underdrainage is not so necessary as some suppose.

English and continental speakers confirmed these statements and described the successful operation of the Paris and Berlin sewage-farms, confessedly modeled after those at Croydon. The expressed opinion of the section was that "the best yet known method of disposing of the sewage of towns is that of purification and utilization on the land."

(The writer visited these farms by the personal invitation of Dr. Carpenter, before the congress. Croydon is a town of nearly 100,000 inhabitants, and the two farms comprise a total of 776 acres. The crops under constant cultivation are rye-grass and mangold-wurtzels. The effluent is perfectly clear and odorless, and fish thrive in the stream that receives it. Dwellings line one border of the farm and a public foot-path traverses it.)

INSANITARY ARRANGEMENTS IN HOUSE-BUILDING.

A practical paper about Insanitary Arrangements in House-Building, by Mr. Statham, discussed the advantage to any house, especially to those in large towns where the air is laden with impurities, to have

the materials sufficiently impervious not to absorb, and the construction such as not to retain, dust and its pollutions. He condemned floors with spaces above the subjacent ceilings, dark spaces under the roof, skirtings about the floors, cornices and mouldings to rooms and furniture, windows with sash pulleys, curtains, inclosed tubs and water-closets. He advised impervious walls; if wall-paper is used it should be smooth and of close texture, but hard-finished walls are better; floors preferably of iron and concrete, covered with parquet or terra cotta, but if of timber, to be double, with felt between and the joists exposed below; pipes to be incased with hinged covers, and all dark spaces about the building to be abolished.

BLOCK DWELLINGS.

Mr. Sykes said that block dwellings, such as are required to replace crowded and demolished buildings in cities, are dwellings superimposed with a common stairway. They diminish crowding by giving more light and air with better supervision. There should be a space equal to their height between every two blocks, and the space required for each cube would be twice the length of the side squared ($2\ S^2$), and its capacity would be the length of the side cubed (S^3). A cube containing 64,000 cubic feet would require 16, not 64, times the area of square space required by a cube containing 1,000 cubic feet.

Ten feet is a good height for one story, and four or six stories sufficient for the height of the house. The depth of the block and the width of the open space on one side equal the depth of the total space occupied by one block, and this divided into the total depth of the area gives the number of blocks it will support.

The better block buildings are perfectly sanitary. In the Peabody blocks, notwithstanding the age-distribution is less favorable, the death-rate is 2 in 1,000 less, the birth-rate much higher and the infant mortality much lower than for the whole of London. But on account of ease of communication between families, the death-rate between one and five years from scarlet fever, diphtheria, whooping-cough and measles is much higher. The death-rate from enteric fever is one-half that of all London.

DISPOSAL OF SEWAGE.

In a discussion on the disposal of sewage in the Engineering Section, in emphasizing the necessity for continuous chemical and engineering observation of rivers, the course pursued by the State governments in America, where the Boards of Health are composed of experts, was warmly commended as an example to be universally followed.

SEWER VENTILATION.

Mr. Santo Crimp maintained that there is practically no movement of air in sewers due to the difference of temperature and that, as the wind was the only force concerned, the aërial contents of the sewers depended for their motion and direction upon this external agent. Ventilating-pipes should therefore be carried up tall buildings to discharge into the upper atmosphere, and street ventilators should be reduced to the minimum.

Mr. Read was of opinion that the gratings in the street are not ventilators but vents, and that for the production of local currents of air in sewers the inlets at the street-level should be small and at least one hundred yards apart, and the outlets should reach above the roof, and the sum of their sectional area in the distance between a pair of inlets should exceed the sectional area of the sewer. The air will then enter the inlet, flow down the sewer, escape at the outlet and prevent the formation of sewer-gas.

WATER-SUPPLY.

The opinion prevailed that where a double supply was necessary the potable water alone should be in the consumer's hands; that, as the most efficient way to introduce any substance into the body, disease-germs included, is in solution, more reliance should be placed on the original purity of the supply than on attempts at filtration or neutralization. Cases were cited where it was demonstrated that typhoid fever poison had been conveyed through unsuspected underground channels (in chalk) several miles. It was claimed that sand filtration is incomplete as against germs, and that it is possible for them to grow

and develop in such filters. In illustration of this last point Mr. Kummel said that Altona received filtered and Hamburg unfiltered water from the Elbe; that in February last Altona had an epidemic of typhoid fever and Hamburg escaped, and that several weeks before the fever appeared the enteric bacilli increased from 50 to 1,500 per cubic centimeter.

M. Maignen (Paris) suggested that the future of water purification is to be chemical.

Prof. Frankland believed there is no self-purification of rivers; that sedimentation takes place in relation to suspended matter; and that while bacilli (of anthrax) are rapidly destroyed by running water, their spores retain their vitality for an indefinite time.

A REVOLVING WATER PURIFIER

Used on a large scale in India, South America, France and England, was described by Mr. Anderson. It consists of a cylinder containing scrap-iron, kept in continuous slow rotation, through which water passes. From one-tenth to one-fifth grain of iron is taken up per gallon and deposited afterwards in sand. Long trial shows organic matter greatly reduced and potable water secured.

LEAKING WATER-MAINS.

Mr. Govesten (Berlin) called attention to the practical point that when there is a fracture or leak in a water-main under ground, the internal pressure may be relied on to keep out foreign matter if the fissure is at a right angle or an oblique angle to the contained flow; but that if it is at an acute angle the greater the speed the greater the suction. This has proved to be the case in practice, when sand has choked the smaller pipes.

DESTRUCTION OF REFUSE BY FIRE.

In the destruction of refuse by fire, Fryer's destructor with Jones' fume cremator was found to be efficient. Ordinarily the difficulty lies in gases being given off and dust escaping after the first burning. These now are destroyed by a second heating to 1,100° to 1,500°. The chimney should not be too narrow nor the current too rapid.

(The writer inspected one of these furnaces that successfully disposes of all the garbage and refuse of a very large London district, in the heart of the town. It does its work thoroughly and apparently without offense.)

HOUSING THE POOR.

The New York method of requiring every dwelling to be certified and registered was commended. Mr. Harvey held, in that connection, that the relation between insanitary dwellings, ill-health and bad morals is closer than between ignorance and crime, and that life and health should never be submitted to the claims of property.

DISPOSAL OF THE DEAD.

An almost unanimous vote in the Section of State Hygiene, after long discussion and ample argument, held that "the cremation of the dead is a rational and hygienic procedure, which is especially called for when death occurs from contagious disease."

It was the nearly unanimous opinion of the same section, when crowded, that a *notification of infectious disease* by both the medical attendant and the householder, as is now the case in England, is important and should be practiced.

RELATION OF OCCUPATION TO DISEASE AND MORTALITY.

Dr. Ogle showed, taking the deaths of clergymen between twenty-five and sixty-five years of age to be a standard of 100, those due to alcohol, as represented by inn-servants, were 397, and that as against a general mortality of men at 1,000, that of liquor dealers was 1,521. The inhalation of irritating dust by cutlers and filemakers carried their mortality to 383 and 396, or four times as great as fishermen's, exclusive of accident; and coal-mining is a curious exception to the rule that labor in heat and dust is dangerous, the miners and agricultural laborers having an almost identical rate from diseases.

As one of the speakers remarked, all the papers in the division of demography had this in common: The awaking that is taking place as to the obligation of one class toward another class.

PRINCETON, N. J., December, 1891.

PHYSICAL EDUCATION AND SCHOOL LIFE.

BY EZRA M. HUNT, M.D.

The relation of the public school and of all educational methods to hygiene and physical culture, is among the most important questions that can command the attention of those whose duty it is to conserve the best interests of the State. It is well recognized that it is the province of statesmanship and of government to foster and develop all material resources which are identified with prosperity, happiness and success. Of these the resource superior and paramount to all is the people. Well-trained men and women, and children who are being rightly trained, constitute the chief wealth—the commonwealth of every State. There is no question of good government and of essential progress more practical than how we are to secure the best physical, mental and moral development of all present or prospective citizens. This always means a primary study of how we are to train children.

In a system of government of which the school forms a radical part, it is a question demanding foremost consideration. What we would have in the life and power of the nation must be put into the schools.

For long, such training was practically regarded as relating to mental and moral discipline. But the sad contrast of lost or restricted physical powers, as manifested in sickness, invalidity and shortening of life, made it apparent that physical education must be given its place with the same precision as that accorded to other departments. It is this that justifies the remark of the Professor of Hygiene and Physical Education in Amherst College, when, as in his last report, he says: "It is increasingly evident that physical education has come here and in pedagogy everywhere, to claim a rightful place and to stay." Formerly the great error was the assumption that the care of the physical nature could safely be left to instinct, to parents and to the natural exercise which is necessarily obtained in life.

However indispensable and real all these are, and however much they avail in the natural conditions of country life, or of intelligent parentage, facts too palpable and oppressive for concealment have shown that disability, unfitness for labor and crippled or shortened lives are too numerous for us to trust to what we call natural vigor. Amid so much that is artificial there are so many embarrassments that our youth would need definite instruction, even if there were not a wide field in the training of the natural.

Every success of the athlete, every achievement of the gymnast, every success in well-developed or well-applied systems of physical education and in instruction in hygiene, have shown that bodies need education, discipline, training, just as much as any other part of our nature. Defects are prevented or remedied as readily as in our moral or mental structure. Development and capacity are secured as real and as essential. Results as declarative and as practically useful are attained. Children are trained into health, into power for use, their incapacities overcome, their capacities enlarged for the welfare of themselves and of the State, as much if not more than in any other educational process. Thus, we get not only better productive power in a material sense, but the best intellectual and moral condition is far more likely to be secured. A true physical education does more to secure self-reliance, mastery of self, behavior, or the having of one's self in possession, than any flights of intellect or mere lectures on morals.

At this stage of progress in educational and to some degree in public sentiment we are not disposed to waste words in inculcating the importance of this great work, but rather desire to present what is being already done in actual teaching and practice and what is feasible to be done in the near future. As examples are much better than precepts, we desire to outline the methods which are actually adopted and to illustrate them by some of their results.

We classify and briefly comment on these as follows:

1. Instruction in hygiene in our schools.

2. Practice in various forms of physical development.

3. Systems of record which serve to prove results or to indicate the choices of method which should be made.

4. Attention to school buildings and their appliances and surroundings.

1. INSTRUCTION IN HYGIENE IN OUR SCHOOLS.

Instruction in hygiene in our schools needs no other enforcement than to say that it should be early and thorough, since it has to do with the first experiences of life in general, and of school life in particular. Much of it is a kind of knowledge that is in very early demand in the formation of habits, and these constitute the earliest part of education. The pupil not only needs to be taught what his physical nature requires, but also to have as much as possible of that kind of discipline which enforces the lessons taught. We have an example of this in the Adelphi, of Brooklyn, where it has been found entirely feasible to provide the children with a simple meal at the noon recess, where not only is the art of eating learned, but the miserable habit of no meal between eight and two and a half o'clock, or after school, is overcome.

We take this as an extreme illustration of numbers of simpler and earlier-taught hygienic habits which should have their formative influence in direct teaching in school life.

While anatomy and physiology have their places, these are only accessory to parts of that higher teaching which has to do with hygiene in the habits, in the home, in the school-room, in the life.

This Board, by its reports and circulars, and its efforts with schools, gave early attention to this matter. The result was the establishment of a department of Hygiene in the State Normal School, conducted by the Secretary long enough to give it some formative character. It is now being developed into larger scope.

Both abroad and in this country this teaching has now taken such definite form as not to leave us without models, especially in the Boston schools, although various crude imitations are still being made. But the minds of teachers are engaged in this direction, and the old pedagogy is sure to give place to the new.

2. PRACTICE IN VARIOUS FORMS OF PHYSICAL DEVELOPMENT.

Practice in various forms of physical development has its great variety in posture, in calisthenics and gymnastics, athletics and almost numberless forms of exercise. The great value of the new ideas consists in the fact that there is a recognition that each organ and each

part of the human structure has its demand; that there are methods for giving attention to the weak so as to make it symmetrical with the strong; that the word "exercise" describes a varied and systematized division into parts, and that the scope of practice is far beyond what is conveyed by one single word. Thus we have a whole system based on the training for special kinds of disability or invalidity; adaptation of modes and of apparatus, not only to particular muscles and sets of muscles, but to different organs and bones and tissues, while in the more general application of methods consideration is given to the relation of physical development to the entire progress of the being in its entirety.

Then we have discussions as to the comparative value of military drill and other gymnastics in developing self-reliance and courageous mastery of self, while such choices of apparatus as those of the Sergeant gymnasiums are not arbitrary, but made on the basis of claimed needs and claimed results. We thus have the varied forms of exercise coming forth, not as mere exhibitions of skill or contest, but as systems elaborated for a definite purpose, that purpose having as its ultimate a preparation for the several duties and contests of human life, including all that prowess and usefulness mean as applied to man as a machine, intended as a potential factor in all his natures, in his symmetrical wholeness, and as a producer for himself, his family and the State.

This idea is well illustrated in the last report (June, 1891) of Professor Edward Hitchcock, of Amherst College, from which we quote as follows:

"In all the forms of exercise, both indoor and out-of-door, there is a continual disciplinary and scientific system to guide, advise, prescribe and, if necessary, to compel. The college has thus proved that compulsory physical exercise, as she endows and practices it, is no more an anomaly than is any required mental discipline; only, of course, it must be managed with more flexibility and variety of expression than some other departments of college training.

"The object of the department is not to produce an abnormal development of muscles and lungs. Its requirements are of the nature of simple bodily exercises and recreations, in such forms and movements as will keep the body in the best working condition. Thus the plan has been to carry on such a system of physical education as for the great majority may secure at once bodily activity and mental enjoyment; and for the few who need it, direction and opportunity to correct imperfect or belated physical development. This is in

accordance with the aim of the whole college, which is not to endow any department with the power of turning out monsters or prodigies, of body or intellect, but to develop, educate, enlarge and purify the whole man, to make him in the broadest sense holy.

"In accordance with this aim, a prominent thought running through the whole history of the department is, that its work and care belong to every man who comes to college. It has not been the desire to make prodigious athletic records, or to train remarkable gymnasts and athletes *per se;* it has rather been to give all the students the best opportunities for exercise, recreation and sound physical development. To be sure, we mean to make good records and to gain the championships as often as we can, but the department does not hold these out as inducements for all. These more brilliant attainments hold the same relation in our department that the exceptional attainments of other departments hold in their sphere. It is only the few who take prizes in Latin, Greek, mathematics or literature; nevertheless, the prize stimulus, the record, in the literary and scientific work, is, directly or indirectly, an incentive and inspiration to all the college. We do not expect, nor would we urge, every student to strive for these prizes. But the atmosphere, the impulse, the scholarly aroma, that attends the winning of intellectual honors, elevates the whole college constituency. In the same way the well-developed, handsome form of the all-round athlete, his physical powers of endurance and resistence, which will inevitably be imitated as well as admired, are a stimulus of incalculable value to young men.

"Athletic sports and exercise are in natural development of the call of the age for physical education, as well as a progressive attainment from our beginnings thirty years ago. Some evils and excrescences attached to them, of course, but these should be pruned and cut off by judicious treatment. We have no cause to cut the tree down to the roots."

3. SYSTEMS OF RECORD.

The adoption of systems of record is another important advance in physical education. It adopts much of the plan that has been usual in anthropometry and in other vital statistics, and illustrates results not merely by experience and general observation, but by accurate measurement of a sufficient number of persons, through sufficient intervals of time and with details of circumstances and surroundings, so as to furnish proof which partakes of the nature of mathematical certainty.

Here again we cannot do better than to pass by similar foreign records and avail ourselves of the illustration of Amherst College as

afforded in the remarks and records embodied in its last report. The report heretofore quoted says:

"The physique of students is altered very considerably from what it was in the sixties. This is evident not only to those of us who have numerical data of physical measurements to judge by, but to any casual observer of the two periods.

"The young man now in college has at his entrance less of the simple, flabby, weak appearance than had the young collegian of 1861. He can play foot-ball; he is more ready to stand his ground by his muscle; he is more alert and vigorous in movement. This may be owing in great part to the training he now gets in the preparatory school which he did not get then. But where did this better preparatory training come from? Did not the influence of a successful experiment reach down from the college? If our preparatory schools are doing good work, whence did they derive the idea of it except from the experience of those who have tried the methods? And is it not with the highest institutions that ideas of progress begin, and from them that they reach downward to be utilized by all that are below, even to the common school of the nation?

"There are two facts in our statistical history which illustrate this point. One is the test of actual strength. Almost from the first beginnings of the department we have possessed and used the two well-known and important strength tests known as the 'dip' and the 'pull-up.'

"These show in each individual, with relative certainty, the muscular power of the trunk and the arms. The record of tests with these instruments, applied to all the college, were averaged for the period from 1861–2, and including 1888, with the result that the 'dip' stood at six and the 'pull-up' at nine. For the sake of comparison we have averaged the same items for the past five college years, and find the 'dip' to be 7.1 and the 'pull-up' 9.9; that is, we register a gain of 9 and 8 per cent. respectively.

"Another fact which seems to show the value of physical education to students is found in our record of time lost on the account of sickness. Statistics taken from 1861 to 1865 show that each student, during that period, averaged a loss of 2.18 days annually during term-time from being too sick to study. The records from 1885 to 1889 show an average loss of only 1.75 days, a gain in health of 8 per cent.

"A comparison of the number of deaths in the decennial period of 1861–70, with the number in the decennial period of 1881–90, show a much greater viability in the latter than in the former decade. The deaths during 1861–70, exclusive of those who fell in the war, were 6.1 per cent. of the whole number graduating; the deaths during 1881–90 were 3.4 per cent. of the whole number. This certainly indicates a greater vitality.

"As the result of measurements, carefully collated, we have compiled a series of tables wherein are exhibited what we regard as the standard dimensions of the various parts of the body. Such tables, foreshadowed some six years ago, have not been hastily constructed; investigations made frequently since then have increasingly established their correctness and value.

"The basis of measurement is the height. It may be laid down as an assured principle that, given a certain height, the various bodily dimensions ought to be strictly and uniformly proportional. Accordingly we have specified some sixty different particulars in which the student should test himself. Every student who comes to us is furnished with these tables, wherein he sees in its various items the standard measurement corresponding to his height, and side by side with these his own measurement, agreeing or disagreeing with the standard. From this comparison both the young man and the department have the data for estimating his bodily powers and conditions, wherein he lacks and what are his possibilities of advancement in physical growth and development. This, of course, furnishes the basis of watchfulness and advice on the part of the department and of faithful work and training on the part of the student, attention being given directly to the points where the need exists.

"The results exhibited in the tables are obtained in four different ways, and give, accordingly—1. The average of the whole college; 2. The mean of the whole college; 3. The average of all the men of twenty-one years of age, and, 4. The Percentile Chart. The measurements are recorded essentially in the form adopted by the American Association for the Advancement of Physical Education, in 1887. We give herewith three tables as specimens:

TABLE I.—1890.

TABLE OF MEASUREMENTS OF STUDENTS OF AMHERST COLLEGE.

	AVERAGES OF 2,000 MEASURES.		MEAN MEASURES OF 2,086 STUDENTS.		AVERAGES OF STUDENTS 21 YEARS OLD.		50 Per Cent. of 2,230 Measurements.	Per Cent. of Increase in Class of '91.
	Metric.	English.	Metric.	English.	Metric.	English.		
WEIGHT	*61.2	§134.9	64.0	141.1	63.1	138.8	61.6	8.9
HEIGHT	1,725	67.9	1,720	67.7	1,726	67.9	1,724	0.6
" Sternum	1,410	55.5	1,410	55.5	1,407	55.3	1,410	0.7
" Navel	1,030	40.6	1,023	40.3	1,025	40.4	1,029	1.2
" Pubes	860	33.9	860	33.9	864	34.0	864	3.3
" Knee	476	18.7	480	18.9	477	18.7	476	0.4
" Sitting	903	35.5	910	35.8	903	35.5	905	1.3
GIRTH, Head	572	22.5	570	22.4	572	22.5	569	0.5
" Neck	349	13.8	350	13.8	356	14.0	351	2.5
" Chest, repose	880	34.6	880	34.6	892	36.1	884	3.0
" Chest, full	927	36.5	925	36.4	933	36.7	925	1.0
" Belly	724	28.5	720	28.3	725	28.5	730	4.1
" Hips	893	35.1	890	35.0	898	35.3	893	2.4
" Right Thigh	517	20.3	515	20.2	521	20.5	514	3.0
" Left Thigh	512	20.1	510	20.1	519	20.4	510	3.1
" Right Knee	361	14.2	360	14.2	359	14.1	359	0.8
" Left Knee	359	14.1	360	14.2	358	14.1	359	1.1
" Right Calf	359	14.1	359	14.1	350	13.8	347	2.8
" Left Calf	349	13.8	350	13.8	348	13.7	345	2.3
" Right Instep	245	9.6	240	9.4	244	9.6	242	0.8
" Left Instep	242	9.5	240	9.4	243	9.6	241	0.8
" Upper Right Arm	257	10.1	256	10.1	264	10.3	259	6.3
" U. R. A., contracted	295	11.6	295	11.6	301	11.8	295	6.4
" Upper Left Arm	253	9.9	250	9.8	259	10.2	252	7.8
" Right Elbow	251	9.8	250	9.8	253	9.9	250	3.5
" Left Elbow	247	9.7	250	9.8	249	9.8	247	3.5
" Right Forearm	267	10.5	270	10.6	266	10.5	262	3.3
" Left Forearm	261	10.2	260	10.2	259	10.2	256	3.1
" Right Wrist	166	6.5	165	6.5	166	6.5	165	0.0
" Left Wrist	165	6.5	165	6.5	165	6.5	163	0.6
BREADTH, Head	155	6.1	154	6.1	155	6.1	153	0.6
" Neck	108	4.2	110	4.3	109	4.3	108	1.8
" Shoulders	430	16.9	430	16.9	431	16.9	433	3.6
" Nipples	198	7.8	200	7.9	200	7.9	196	6.4
" Waist	250	9.8	250	9.8	256	10.1	253	3.4
" Hips	323	12.7	320	12.6	327	12.9	325	1.8
Right Shoulder Elbow	373	14.7	370	14.6	374	14.7	373	1.1
Left Shoulder Elbow	371	14.6	370	14.6	374	14.7	371	0.8
Right Elbow Tip	461	18.1	460	18.1	462	18.1	461	1.5
Left Elbow Tip	459	18.1	460	18.1	459	18.1	459	1.5
LENGTH, Right Foot	260	10.2	260	10.2	261	10.2	260	1.1
" Left Foot	259	10.2	260	10.2	260	10.2	260	1.1
STRETCH OF ARMS	1,780	70.1	1,770	69.7	1,794	70.6	1,789	1.3
HORIZONTAL LENGTH	1,732	68.2	1,730	68.1	1,738	68.4	1,739	0.6
STRENGTH, of Lungs	*1.5	§3.30	1.2	2.64	1.41	3.10	1.4	27.8
" Back	*137	§302	150	330	146	321	139	24.0
" Chest dip	†6.0	.....	4	.....	7.3	.....	6	38.0
" Chest pull-up	†9.0	.....	10	.....	10.2	.....	9	20.5
" Legs	*166	§365	175	385	172	378	169	26.0
" Right Forearm	*41.5	§91	40	88.2	41.5	91.3	39	23.7
" Left Forearm	*38.1	§84	37	81.6	39.5	86.9	37	15.6
Capacity of Lungs	‡3.77	‖230	3.90	238	4.23	250	3.89	4.0

*Kilos. †Units. ‡Litres. §Pounds. ‖Cubic inches. All others, millimeters and inches and tenths.

TABLE II.—1890.

TABLES SHOWING PHYSICAL GAINS OF STUDENTS IN AMHERST COLLEGE DURING A PART AND DURING THE WHOLE OF THE COLLEGE COURSE.

	GAIN OF TWO YEARS' CLASS.		GAIN OF FOUR YEARS' CLASS.		Per Cent of Increase in Class of '91.	
	Metric.	English.	Metric.	English.		
WEIGHT	*2.6	§5.72	5.40	11.8	8.9	WEIGHT, 8.9
HEIGHT	11	.43	16	.63	0.6	
" Sternum	3	.11	11	.43	0.7	
" Navel	4	.15	9	.35	1.2	HEIGHT, 2.72
" Pubes	8	.31	5	.19	3.3	
" Knee	4	.15	12	.47	0.4	
" Sitting	14	.55	18	.7	1.3	
GIRTH, Head	5	.19	7	.27	0.5	
" Neck	10	.39	14	.55	2.5	
" Chest, repose	14	.55	41	1.61	3.0	
" Chest, full	9	.35	34	1.33	1.0	
" Belly	10	.39	41	1.61	4.1	
" Hips	15	.59	36	1.41	2.4	
" Right Thigh	19	.74	24	.94	3.0	
" Left Thigh	13	.51	25	.98	3.1	
" Right Knee	4	.15	6	.23	0.8	
" Left Knee	3	.11	7	.27	1.1	
" Right Calf	9	.35	13	.51	2.8	
" Left Calf	11	.43	10	.39	2.3	GIRTH, 2.72
" Right Instep	2	.07	8	.31	0.8	
" Left Instep	2	.07	9	.35	0.8	
" Upper Right Arm	13	.51	13	.51	6.3	
" Upper Right Arm, contracted	11	.43	17	.66	6.4	
" Upper Left Arm	14	.55	16	.62	7.8	
" Right Elbow	6	.23	6	.23	3.5	
" Left Elbow	6	.23	5	.19	3.5	
" Right Forearm	4	.15	5	.19	3.3	
" Left Forearm	3	.11	6	.23	3.1	
" Right Wrist	1	.03	2	.07	0.0	
" Left Wrist	2	.07	3	.11	0.6	
BREADTH, Head	1	.03	3	.11	0.6	
" Neck	2	.07	4	.15	1.8	
" Shoulders	11	.43	19	.74	3.6	BREADTH, 2.93
" Nipples	7	.27	13	.51	6.4	
" Waist	2	.07	9	.35	3.4	
" Hips	2	.07	11	.43	1.8	
Right Shoulder Elbow	3	.11	4	.15	1.1	
Left Shoulder Elbow	2	.07	4	.15	0.8	
Right Elbow Tip	2	.07	10	.39	1.5	
Left Elbow Tip	2	.07	6	.23	1.5	
LENGTH, Right Foot	2	.07	5	.19	1.1	
" Left Foot	1	.03	4	.15	1.1	
STRETCH OF ARMS	19	.74	24	.94	1.3	
HORIZONTAL LENGTH	14	.55	20	.78	0.6	
STRENGTH, of Lungs	*.30	§.66	.64	1.41	27.8	
" Back	*2.8	§6.17	28	61.7	24.0	
" Chest dip	†2.6	.....	2.3	.....	38.0	
" Chest pull-up	†1.1	.....	1.2	.....	20.5	STRENGTH, 25.31
" Legs	*33	§72.7	37	81.5	26.0	
" Right Forearm	*5	§11.0	7	15.4	23.7	
" Left Forearm	*5	§11.0	5	11.0	15.6	
Strength	*73	§160.9	82	180.8	26.9	CAPACITY, 4.00
Capacity of Lungs	‡1.2	‖73.2	3.6	219.6	4.0	

A total average gain of 5.87 per cent.

*Kilos. †Units. ‡Litres. §Pounds. ‖Cubic inches. All others, millimeters and inches and tenths.

TABLE III.

AN ANTHROPOMETRIC TABLE CONSTRUCTED ON THE PERCENTILE METHOD.

Compiled from 2,230 Measurements of Amherst College Students between 1884 and 1891. Arranged According to the Percentage as Indicated at the Left. The Roman Figures Indicate Millimeters, Kilograms, Litres and Units; the Italic Figures Linear Inches, Pounds and Cubic Inches. The Average Age of the Individuals Observed is 20 Years and 4 Months.

PER CENT.	WEIGHT.	HEIGHT.						GIRTH.																				
		Height.	Sternum.	Navel.	Pubes.	Knee.	Sitting.	Head.	Neck.	Chest, repose.	Chest, full.	Belly.	Hips.	Right Thigh.	Left Thigh.	Right Knee.	Left Knee.	Right Calf.	Left Calf.	Right Instep.	Left Instep.	Upper Right Arm, contracted.	Upper Right Arm.	Upper Left Arm.	Right Elbow.	Left Elbow.	Right Forearm.	Left Forearm.	Right Wrist.	Left Wrist.
5	51.0	1,625	1,319	952	795	432	853	545	324	805	843	664	829	463	459	329	330	314	313	224	224	258	227	221	229	224	239	230	153	151
	112.4	*64.1*	*52.0*	*37.5*	*31.3*	*17.0*	*33 6*	*21.5*	*12.8*	*31.7*	*33.2*	*26.1*	*32.6*	*18.2*	*18.0*	*12.9*	*13.0*	*12.3*	*12.3*	*8.8*	*8.8*	*10.1*	*9.0*	*8.7*	*9.0*	*8.8*	*9.4*	*9.1*	*6.0*	*6.0*
10	53.4	1,647	1,339	970	812	442	866	550	330	823	861	675	842	474	470	335	336	320	320	229	228	265	234	229	233	229	243	237	156	154
	117.7	*64.9*	*52.8*	*38.2*	*32.0*	*17.4*	*34.1*	*21.6*	*13.0*	*32.4*	*33.9*	*26.6*	*33.2*	*18 7*	*18.5*	*13.2*	*13.3*	*12.6*	*12.6*	*9.0*	*9.0*	*10.4*	*9.2*	*9.0*	*9.2*	*9.0*	*9.5*	*9.4*	*6.1*	*6.0*
20	55.9	1,674	1,363	992	829	458	879	556	338	844	884	690	859	487	482	342	344	329	329	232	232	275	242	237	239	234	250	242	159	158
	123.2	*65.8*	*53.7*	*39.1*	*32.6*	*17.8*	*34.6*	*21.9*	*13.3*	*33.2*	*34.7*	*27.2*	*33.8*	*19.2*	*19.0*	*13.5*	*13.5*	*12.9*	*12.9*	*9.1*	*9.1*	*10.8*	*9.5*	*9.4*	*9.4*	*9.2*	*9.8*	*9.5*	*6.3*	*6.2*
30	57.8	1,692	1,380	1,007	842	461	888	560	342	859	900	704	872	496	492	349	349	336	335	237	236	283	249	241	244	239	255	249	161	160
	127.4	*66.6*	*54.3*	*39.6*	*33.2*	*18.1*	*34.9*	*22.0*	*13.5*	*33.9*	*35.4*	*27.7*	*34.4*	*19.5*	*19.4*	*13.7*	*13.7*	*13.2*	*13.2*	*9.3*	*9.3*	*11.1*	*9.7*	*9.5*	*9.5*	*9.4*	*10.0*	*9.8*	*6.3*	*6.3*
40	59.9	1,710	1,399	1,019	854	469	897	564	348	870	913	718	882	505	500	353	354	341	340	240	239	289	253	248	249	242	259	252	163	161
	132.0	*67.3*	*55.1*	*40.1*	*33.6*	*18 4*	*35.3*	*22.2*	*13.7*	*34 3*	*35.9*	*28.3*	*34.7*	*19.9*	*19.7*	*13.9*	*14.0*	*13.5*	*13.4*	*9.4*	*9.4*	*11.4*	*9.7*	*9.5*	*9.5*	*9.4*	*10.0*	*9.8*	*6.3*	*6.3*
50	61.6	1,724	1,410	1,029	864	476	905	569	351	885	925	730	893	514	510	359	359	347	345	242	241	295	259	252	250	247	262	256	165	163
	135.8	*67.8*	*55.5*	*40.5*	*34 1*	*18.7*	*35.6*	*22.4*	*13.8*	*34.8*	*36.4*	*28.7*	*35.1*	*20.2*	*20.1*	*14.1*	*14.2*	*13.7*	*13 6*	*9.5*	*9.5*	*11.6*	*10.3*	*9.9*	*9.8*	*9.7*	*10.3*	*10.1*	*6.5*	*6.4*
60	63.5	1,739	1,422	1,040	874	483	913	571	257	897	940	740	904	522	519	362	363	352	351	246	245	300	265	259	255	250	267	266	168	165
	140.0	*68.5*	*56.0*	*40.9*	*34.5*	*19.0*	*35.9*	*22.5*	*14.1*	*35.3*	*37.0*	*29.1*	*35.5*	*20.6*	*20.4*	*14.3*	*14.3*	*13.8*	*13.8*	*9.6*	*9.6*	*11.8*	*10.5*	*10.3*	*10.1*	*9.8*	*10.4*	*10.2*	*6.6*	*6.5*
70	65.4	1,756	1,439	1,057	886	490	921	577	360	910	954	752	915	531	529	368	369	359	356	250	249	308	270	264	259	254	270	264	169	168
	144.1	*69.1*	*56.7*	*41.6*	*34.8*	*19.3*	*36.2*	*22.7*	*14.2*	*35.8*	*37.5*	*29.6*	*36.0*	*20.9*	*20 8*	*14.5*	*14.5*	*14.1*	*14.0*	*9.8*	*9.7*	*12.1*	*10.7*	*10.5*	*10.3*	*10 0*	*10.6*	*10 5*	*6.6*	*6 6*
80	67.9	1,776	1,454	1,070	899	499	930	581	369	925	970	769	929	542	539	378	372	364	362	255	253	315	277	270	262	259	275	269	171	170
	149.6	*69.9*	*57.3*	*42.1*	*35 3*	*19.6*	*36.6*	*22.8*	*14 6*	*36.4*	*38.2*	*30.3*	*36.5*	*21.4*	*21.2*	*14.7*	*14.7*	*14.3*	*14.3*	*10.0*	*9.9*	*12.4*	*10 9*	*10.7*	*10.3*	*10.3*	*10.9*	*10.5*	*6.7*	*6.7*
90	71.3	1,804	1,480	1,093	919	512	943	588	377	949	992	794	948	559	556	380	380	374	371	260	260	327	286	280	269	264	281	275	175	174
	157.0	*71.1*	*58.3*	*43.0*	*36.1*	*20.2*	*37.1*	*23.2*	*14.9*	*37.3*	*39.1*	*31.2*	*37.3*	*22.0*	*21 9*	*15.0*	*15.0*	*14.7*	*14.6*	*10.2*	*10.2*	*12.9*	*11.3*	*11.0*	*10.6*	*10.5*	*11.0*	*10.9*	*6.9*	*6.8*
95	74.3	1,827	1,500	1,109	936	523	954	593	384	969	1,010	814	962	571	569	388	388	381	380	267	265	335	292	288	274	270	289	280	179	177
	163.7	*71.9*	*59.1*	*43.6*	*36.8*	*20.6*	*37.5*	*23.3*	*15.1*	*38.1*	*39.8*	*32.1*	*37.9*	*22.5*	*22.3*	*15.3*	*15.3*	*15.0*	*15.0*	*10.5*	*10.4*	*13.2*	*11.5*	*11.3*	*10.7*	*10.6*	*11.3*	*11.0*	*7.0*	*7.0*

TABLE III.—Continued.

AN ANTHROPOMETRIC TABLE CONSTRUCTED ON THE PERCENTILE METHOD.

Compiled from 2,230 Measurements of Amherst College Students between 1884 and 1891. Arranged According to the Percentage as Indicated at the Left. The Roman Figures Indicate Millimeters, Kilograms, Litres and Units; the Italic Figures Linear Inches, Pounds and Cubic Inches. The Average Age of the Individuals Observed is 20 Years and 4 Months.

PER CENT.	WEIGHT.	BREADTH.										LENGTH.				STRENGTH.							CAPACITY OF LUNGS.
		Head.	Neck.	Shoulders.	Waist.	Hips.	Nipples.	Right Shoulder Elbow.	Left Shoulder Elbow.	Right Elbow Tip.	Left Elbow Tip.	Right Foot.	Left Foot.	Stretch of Arms.	Horizontal Length.	Lungs.	Back.	Chest Dip.	Chest Pull-up.	Legs.	Right Forearm.	Left Forearm.	Total.	
5	51.0	145	99	393	230	301	173	345	343	428	427	242	241	1,670	1,637	0.7	99	0	3	112	28	26	309	2.93
	112.4	*5.7*	*3.9*	*15.5*	*9.1*	*11.8*	*6.8*	*13.6*	*13.5*	*16.8*	*16.8*	*9.5*	*9.4*	*65.7*	*64.5*	*1.54*	*218*	.....	.....	*247*	*61.7*	*57.3*	*681*	*178.7*
10	53.4	147	101	402	235	306	178	351	351	436	434	246	245	1,696	1,659	0.8	104	1	4	124	30	29	339	3.16
	117.7	*5.8*	*4.0*	*15.8*	*9.3*	*12.0*	*7.0*	*13.8*	*13.8*	*17.1*	*17.0*	*9.7*	*9.6*	*66.7*	*65.3*	*1.76*	*229*	.....	.....	*273*	*66.1*	*63.9*	*748*	*192.7*
20	55.9	149	103	413	240	313	184	359	357	445	444	251	251	1,725	1,687	1.0	117	2	6	189	38	31	374	3.38
	123.2	*5.9*	*4.1*	*16.3*	*9.5*	*12.3*	*7.2*	*14.1*	*14.0*	*17.5*	*17.5*	*9.9*	*9.9*	*67.9*	*66.3*	*2.20*	*258*	.....	.....	*306*	*72.8*	*68.3*	*825*	*206.2*
30	57.8	150	105	421	245	317	189	364	363	451	449	254	254	1,749	1,709	1.1	124	3	7	149	35	33	406	3.57
	127.4	*5.9*	*4.2*	*16.6*	*9.7*	*12.5*	*7.3*	*14.3*	*14.3*	*17.8*	*17.7*	*10.0*	*10.0*	*68.8*	*67.2*	*2.42*	*273*	.....	.....	*328*	*77.2*	*72.8*	*892*	*217.7*
40	59.9	152	107	427	249	321	192	369	367	456	454	257	257	1,769	1,723	1.2	130	4	8	157	37	35	431	3.71
	132.0	*6.0*	*4.2*	*16.8*	*9.8*	*12.7*	*7.6*	*14.5*	*14.4*	*18.0*	*17.9*	*10.1*	*10.1*	*69.6*	*67.8*	*2.64*	*287*	.....	.....	*346*	*81.6*	*77.2*	*950*	*226.3*
50	61.6	153	108	433	253	325	196	373	371	461	459	260	260	1,789	1,739	1.4	139	6	9	169	39	37	453	3.89
	135.8	*6.0*	*4.3*	*17.0*	*10.0*	*12.8*	*7.7*	*14.7*	*14.6*	*18.2*	*18.1*	*10.3*	*10.3*	*70.4*	*68.4*	*3.08*	*306*	.....	.....	*373*	*86.0*	*81.6*	*999*	*237.3*
60	63.5	154	110	439	257	329	200	377	375	466	465	263	263	1,808	1,750	1.5	149	7	10	175	41	39	479	4.03
	140.0	*6.1*	*4.3*	*17.2*	*10.1*	*13.0*	*7.9*	*14.9*	*14.8*	*18.3*	*18.3*	*10.3*	*10.3*	*71.2*	*68.9*	*3.30*	*328*	.....	.....	*385*	*90.4*	*86.0*	*1,056*	*245.8*
70	65.4	156	111	445	261	333	204	282	380	472	471	266	266	1,829	1,769	1.6	150	8	11	184	43	41	507	4.22
	144.1	*6.1*	*4.4*	*17.5*	*10.2*	*13.1*	*8.0*	*15.0*	*15.0*	*18.6*	*18.5*	*10.5*	*10.5*	*72.0*	*69.6*	*3.52*	*331*	.....	.....	*406*	*94.8*	*90.4*	*1,117*	*257.4*
80	67.9	158	113	451	266	338	209	388	387	478	476	270	270	1,850	1,789	1.7	160	10	12	199	46	48	542	4.42
	149.6	*6.2*	*4.4*	*17.7*	*10.4*	*13.3*	*8.2*	*15.3*	*15.3*	*18.8*	*18.7*	*10.6*	*10.6*	*72.8*	*70.4*	*3.64*	*353*	.....	.....	*439*	*101.4*	*94.8*	*1,194*	*269.6*
90	71.3	161	116	461	274	345	217	397	395	486	485	275	275	1,886	1,820	2.0	178	12	14	219	50	47	594	4.69
	157.0	*6.3*	*4.5*	*18.1*	*10.8*	*13.6*	*8.6*	*15.6*	*15.6*	*19.1*	*19.1*	*10.8*	*10.8*	*74.2*	*71.7*	*4.40*	*393*	.....	.....	*483*	*110.2*	*103.6*	*1,310*	*286.1*
95	74.3	163	119	468	281	352	222	403	402	494	492	279	279	1,910	1,841	2.2	194	14	16	238	53	50	644	4.95
	163.7	*6.4*	*4.7*	*18.4*	*11.1*	*13.9*	*8.3*	*15.9*	*15.8*	*19.4*	*19.4*	*10.9*	*10.9*	*75.2*	*72.4*	*4.85*	*428*	.....	.....	*526*	*116.8*	*110.2*	*1,420*	*301.9*

"We are looking out with zealous and scrutinizing eyes for the best conditions and advantages to the young men under our charge, that they may be fitted to make the highest possible attainments for the citizenship, the scholarship, the Christian vigor for the days to come. To this end, while the intellectual and spiritual remain paramount, yet, in order that these may have their true development, the physical man needs to be brought up to and kept in its highest normal condition. It is with this physical preparation, subordinate it may be, but still noble and worthy, that the department has to do."

Here we have both method and results highly suggestive for all our normal schools and for all of our public schools and colleges. The time has come when all educators, in the interests of common education, must have their attention turned, not merely to the importance of the theme, but to definite practical methods of physical education.

We refer thus much to Amherst College because of the notable example it has set this many years of a real *Department* of Physical Culture. The Instructors are Edward Hitchcock, M.A., M.D., Professor of Hygiene and Physical Education; Hiram H. Seelye, M.A., M.D., Instructor in Physical Education; Frank A. Delabarre, B.A., Lincoln Fellow in Hygiene and Physical Education, and Charles L. Upton, Lincoln Fellow-Elect.

4. ATTENTION TO SCHOOL BUILDINGS, THEIR APPLIANCES AND SURROUNDINGS.

Our fourth item is most important. When, as a matter of public policy, and for their own good, we assemble the children of the State in free schools, it goes without the saying that these places should be divested of all conditions and circumstances which imperil health. Nay, more, they should be up to the standard of best hygienic conditions and aid to develop the child in the best physical life. What this means for the growth, the eyes and the other senses, the lungs, the stomach, and other internal organs, for the skin and muscles and for the body in its holiness, *i. e.* wholeness, seems to be very feebly realized by some teachers, some parents, some trustees.

It is first important that the location and construction of the building be in accord with the number and needs of the pupils. We are glad to know that large attention has been given to this subject by the Hon. E. O. Chapman, Superintendent of Public Instruction, and that we now have in the State models of smaller and larger school buildings which should be studied by Boards of Education and Trustees of School Districts. There is no longer any excuse for erecting buildings on the notion of this or that intelligent citizen. Definite plans should be chosen, after due consultation, and such as have the approbation of the Superintendent of Schools or other school authorities.

We refer to the following specimens and furnish cuts, plans and descriptions as follows:

SPECIFICATIONS TO ACCOMPANY PLAN NO. 7 (CLASS 2.)

(Being School-House at Notch Road, near Paterson, N. J., page 75.)

Specification of Work and Materials for the erection and completion of a School-House in accordance with this specification and the accompanying drawings as furnished by Mr. C. Powell Karr, Architect, Room 217, Stewart Building, New York City.

Estimated Cost, $2,500.

GENERAL DESCRIPTION.

This building is to be so situated as to face the south with its main front.

GENERAL NOTES AND CONDITIONS.

Reference shall be made to drawings for the above, together with the arrangement of rooms and general finish. The drawings are to be considered as a part of this specification and should correspond in every particular.

Should any discrepancy appear in the figure and scale measurements or between the wording of the specification and the lettering on the drawings, the figures on the drawings and the wording of the specification shall in all cases exhibit the true intent and meaning of the design and specifications.

All materials to be of the best quality of their kind, unless otherwise specified. The contractor is to give his personal attention to the work, or have a competent foreman in charge. All work to be performed in a manner satisfactory to the architect. Any portion of the work done by the contractor of a quality not approved by the architect shall be forthwith removed by and at the expense of the contractor, and replaced by him in a proper and satisfactory manner. No part of the work to be sublet without the consent of the owner or his representative.

When it is necessary to cut or change the work of one mechanic in the placing of the work of another, then the said cutting must be done by the mechanic whose work has been changed or cut, the service rendered to be paid for by the mechanic whose work made the cutting necessary.

MASON'S WORK.

EXCAVATION.

Excavate for eighteen piers, six feet below the highest point of ground which the building covers, making excavations for each pier two feet six inches by three feet. Refill about piers. Clear away all rubbish and leave the ground in good order. Excavate a blind drain at or near the four corners of the main building for the

reception of the rain-water from the roof. The said drain excavation need not exceed a depth of four feet, nor be more than a foot in width, but it must extend in a direct line away from the building a distance of not less than twelve feet. The bottom of said blind drain must be covered with broken stone or refuse brick or clean gravel to a depth of not less than eighteen inches, and the remaining part filled to grade line with the excavated material.

FOUNDATIONS.

All lime used to be of first quality, equal to Rockland or Williamsville, Erie Co., N. Y. All cement to be equal to Akron Obelisk, Norton's Rosendale or New York & Rosendale "Bridge Brand." All sand to be clean, sharp and coarse. Every pier to begin with a properly-laid footing course, continued for at least two courses. The first course to be twelve inches wider on all sides than the neat regular cross-section of the pier. This first course is to be laid on broken stone filling deposited dry and rammed to a level. Said filling in every case to be not less than two feet in depth, the full width of the excavation.

WALLS.

Bed the sills of the building on the piers in cement mortar one-to-one.

BRICKWORK.

Build eighteen piers, as per dimensions shown on sheet number six (6), four feet in height, of hard-burned brick laid in cement mortar, composed of one part of sand to one part of cement, by measure. Lay the first course of brick, all headers, upon broken stone, to the depth of two feet and rammed carefully to a level the full width of the pier excavation.

CHIMNEY.

Build chimney, as shown on drawings, of hard-burned brick, laid in lime mortar, each brick being thoroughly wet before being set; header courses being laid every tenth course; foundation courses, for first ten courses, being laid in cement mortar one-to-one.

Smoke flue of chimney to be of galvanized iron twelve inches diameter, extending to apex of chimney and surmounted by a "globe" ventilating cowl to fit the same as indicated in the drawings; all joints in the interior faces to be neatly struck.

Provide and set iron thimbles and covers for smoke flue, and one of Tuttle & Bailey's plain black japanned registers for the ventilating thimble.

Chapter of chimney to be roofed on the inside of the bell shaped hood with two-inch slate flagging or half-inch iron plate; if flags are used the joints must be pointed with cement; if iron is preferred, the plate must be well dipped in boiling tar; in either case the aperture for the admission of the smoke flue must be neatly cut and the fitting done in the most workmanlike manner; the said roofing to be laid just above the square and arched openings provided for the exit of foul air, as shown on detail drawing, sheet number ten (10).

PLASTERING—TWO-COAT WORK.

Lath and plaster in best manner the walls and ceiling of the school-room and teachers'-room, carrying the plaster to the floor everywhere, lath to be seasoned pine or spruce, laid three-eighths inch open, breaking joint every six courses, and over all

door and window heads; the first coat of plaster to be of extra Williamsville or Rockland lime and clean-washed, sharp, and coarse white sand well mixed with long hair.

The lime to be slaked separately at least seven days before mixing the sand and the hair; the first coat to be well troweled, straightened with a straight-edge, made perfectly true and brought well up to the grounds.

Skim coat to be made of extra New York State lime, slaked at least seven days before mixing, and washed beach sand and well floated.

Point up with lime and hair mortar around window and door frames, patch up and repair all plastering at the completion of buildings and leave all surfaces in good order.

CARPENTER'S SPECIFICATIONS.

SCANTLINGS.

Sills four by eight inches and six by eight inches, halved and spiked at angles.

Plates four by four inches.

Corner posts four by six inches.

Window studs four by three inches.

Door studs four by four inches.

All other studs two by four inches, sixteen inches center to center, girts four by five inches, mortised to corner posts, if used.

Main girder four by twelve inches.

Floor beams in large room two by ten inches.

Floor beams in all other rooms two by eight inches, sixteen inches center to center, notched down four inches on sill and one inch on girder, rafters two by six inches, two feet on centers, every pair of rafters to be tied as shown collectively on the various sheets of framing plans, with one and one-quarter inch plank at least eight inches wide, all rafters to be notched on the plate and spiked.

Hip and valley rafters to be three by eight inches

Bridge the floor with two rows of double herring-bone cross bridging where indicated on drawings; said bridging to be two by four-inch stuff and carefully fitted and nailed to floor beams.

CORNICE.

Form cornice as shown on detail drawings, sheets 14 and 15, with gutter on wings of buildings and four three-inch patent expanding galvanized iron conductors where directed, with two-inch lead goose necks and quarter turn at foot of each; joints in gutter to be made tight with sheet lead.

ROOFING.

Carpenter shall frame and construct according to drawings and sections, and do all the framing required in gables and supply omissions if such there be in the detail drawing; cover the roof with hemlock boarding, planed one inch to an even thickness, and one thickness of fine tarred felt paper.

SHINGLES.

Where shown on elevations, shingle with good quality sixteen inch sawed pine, laid four and one-half inches to the weather and put on with two galvanized iron nails to each shingle.

FLASHINGS.

Shingle in wide zinc—thirteen-inch—flashings in valleys, and warrant all tight for one year; flash about ridge with best Alderly terne plate, and in and about fillet around porch entry.

OUTSIDE FINISH.

Make the finish on outside ornamental work, front, gables, brackets, cresting finials, porch rail, &c., all of clear, seasoned pine, according to detail drawings.

WALLS.

Inclose the walls with hemlock boards, planed one side to an even thickness, and two thicknesses of good felt paper, breaking joint, and cover with sap extra pine novelty sidings and shingles as respectively shown in the elevations and detail drawings, four and one-half inches to the weather, all nailed with galvanized iron nails, each board nailed to every stud and each shingle fastened with two of said nails; diagonally laid weather-boarding to be rebated and beaded according to detail drawings.

CASINGS AND CORNER BOARDS.

Casings and corner boards one and one-quarter inch thick; the top of all casings to be rebated and the under side of window-sills ploughed to receive clap-boards or shingles.

OUTSIDE STEPS.

With seven-eighths-inch pine risers and one and one-quarter-inch Georgia pine heads, with rounded nosings on the upper face and square edged on the lower angle, and returned at the ends on the steps belonging to the north elevation of the building; all steps to be supported on two by twelve-inch strings twelve inches on centers, the outer strings, where exposed to view, to be planed, and the foot of the strings to abut on a four-inch by four-inch piece supported by two cedar or locust posts four feet in the ground; the said posts must be completely charred or thoroughly coated with tar before being placed in the ground.

INSIDE FLOORING.

Coal shed to have a single floor of planed two-inch plank. Other inside flooring to be double, under floor to be of one-inch planed hemlock second-quality boards, laid diagonally across joists; upper floor of thoroughly seasoned and kiln-dried first-quality seven-eighths-inch matched Georgia pine, not over four inches wide, laid in courses, breaking joint every course, thoroughly strained and well blind nailed to every beam; all to be well smoothed and scrubbed at the completion of the building. Put one thickness of best asbestos felt paper between upper and lower floor.

GROUNDS AND FURRING.

Put on grounds for three quarter-inch plastering; cross-fur the ceiling with one by two-inch strips, twelve inches on centers.

INSIDE FINISH.

The inside finish to be of first-quality pine, filled with Valentine's or Murphy's wood-filler and stained a light and yet dull cherry color, without varnishing. The

flat surface of the window and door trim to receive a darker stain, but darker only in tone in order to accentuate the verticality of the two features.

SHEATHING.

Sheath the halls and wardrobe-rooms four feet high with five-eighth-inch matched and beaded vertical pine sheathing, not over four inches wide. Finish with capping shown in detail drawings.

Put on sheathing before upper floor is laid and allow one-half inch extra floor below.

DOORS.

All doors excepting outside doors, and windows to have five-eighth-inch by six-inch plain-centered architraves, the outer faces being distinctly marked by mouldings as shown in the detail drawings; said mouldings may be made in two ways, the general method is shown in sheet No. 11, and the better method in sheet 12.

All architraves to be neatly mitered. Outside doors to be trimmed as shown in details, to be eight inches wide, and inside doors to have trim six inches wide.

Outside doors to be five-paneled as per detail drawings, one and three-quarter inches thick, of best seasoned, clear pine, with finish as shown in drawings.

All other doors to be one and one-half inches thick, five-paneled, with stop-chamfer finish, as shown on the sheet of details No. 11; all doors to have rebated and beaded floor frames of ash and hard-wood thresholds; all doors to be of the best stock and kiln-dried.

WINDOWS.

All windows to have boxed frames with pockets, hard-pine beads and pulley-styles, two-inch sills pitching one and one-half inches, one and three quarter inch clear pine sashes in lights as shown, all double hung with good pulleys with cap over top and galvanized iron face, with Samson's window cord and iron weights, accurately balanced.

Inside bead of pine put on with blued screws. Trim of windows to be as shown on detail sheet No. 12.

WARDROBE SCREENS AND FITTINGS.

Set up an open screen partition in the two halls so as to form wardrobes as shown in detail sheet No. 13. The hooks to be in rows eight inches apart in each row. To be strong and of japanned malleable iron and to be screwed to strips at least four inches wide, as shown.

COLD-AIR BOX.

Make cold-air boxes as directed and shown on vertical section, sheet No. 5.

Cut hole in floor for connection with stove as required by furnace-men, make a seat in the northwest corner of the school-room, eighteen inches high and of a width and length as indicated on plan, sheet No. 1. One of the ideas involved in the construction of said seat being the purpose of concealing the passage of the air-box through the floor and thus enabling the supply of fresh air for heating the building to be drawn from an elevation which is above the stratum of damp ground-air.

Make coal or wood bins as may be directed, in the coal or wood-room.

HARDWARE.

All doors to be hung with loose-joint acorn butts, outside doors four and one-half inches by four and one-half inches—three on each door—and inside doors four inches by four inches.

Front door to have horizontal rim-knob, three-tumblered locks, Corbin's No. 1676, Inside doors to have horizontal rim-knob four inches by six inches with slide bolt, Corbin's No. 0540, and the coal door to have a knob and lock. The sliding coal door for the purpose of receiving the fuel into the building is to be secured on the inside by means of a stout wrought-iron hook and staple.

ROOF TRUSS.

Provide iron bolts made of the best cold-drawn wrought iron according to the dimensions shown on the drawings, and also the cast-iron shoes and knees as shown on sheet 16 and all the fittings necessary for the roof trusses.

The windows are to be secured by bronzed iron sash fasts to cost $1.32 per doz. net.

Wardrobe doors to be hung with a spring hinge equal to the "Gem Spring Hinge," so as to swing both to the left and the right.

STAINING.

Shingles on sides to be stained with either Cabot's Creosote Stain or Dexter's Patent English Stain.

If Cabot's is used, select stain No. 309 for the lower vertical weather-boarding, then use stain No. 335 for the diagonal beaded weather-boarding, then finish off the remaining woodwork with stain No. 332.

No. 309 is a rich, deep, olive green, No. 335 is a reddish salmon but with equal depth of tone, and No. 332 is a close approach to the softened yellow that weathering gives to good yellow pine. The trim of the windows may be made effective by using No. 335. Sash may be finished with No. 309.

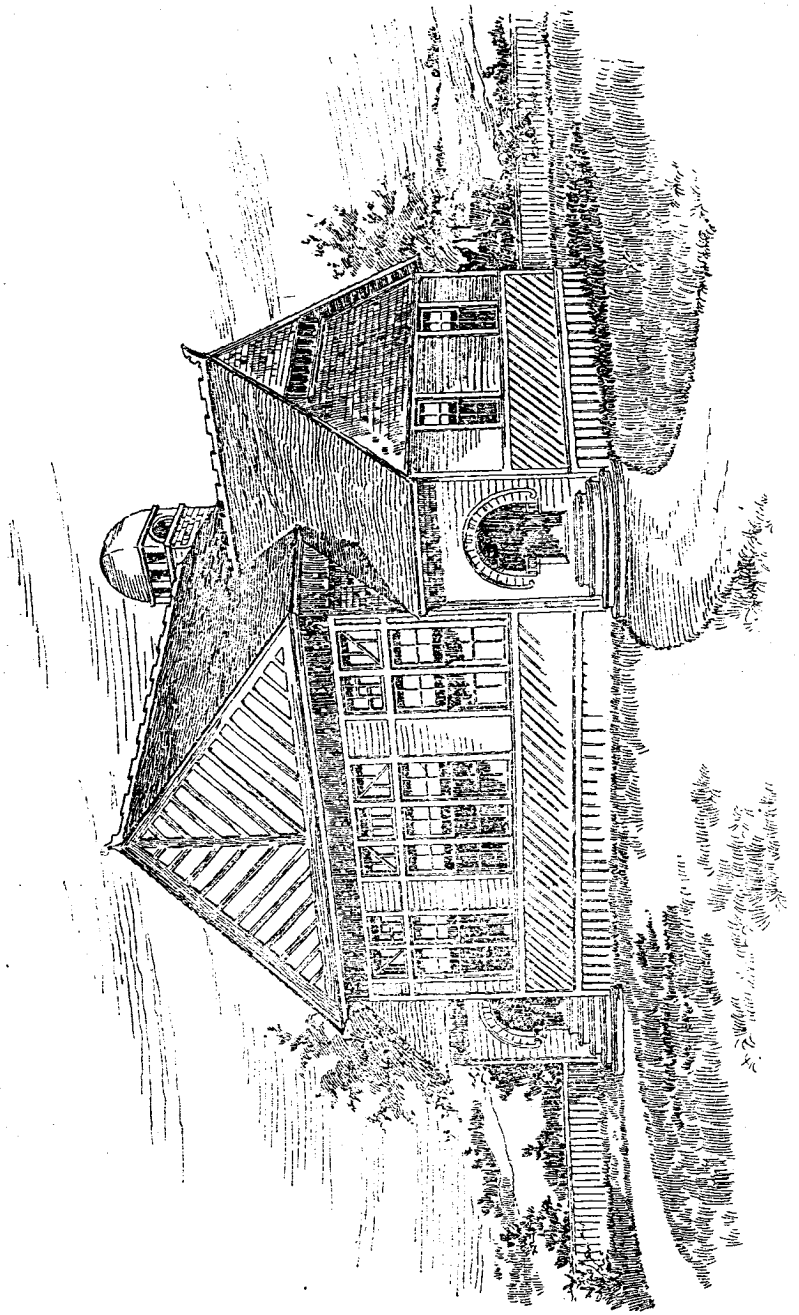
INSIDE WORK.

Fill doors and interior woodwork with patent filler, and finish with two coats of shellac well rubbed down with emery cloth and oil. Putty-stop after first coat and leave all in good order; oil with two coats school-room floor and outside steps.

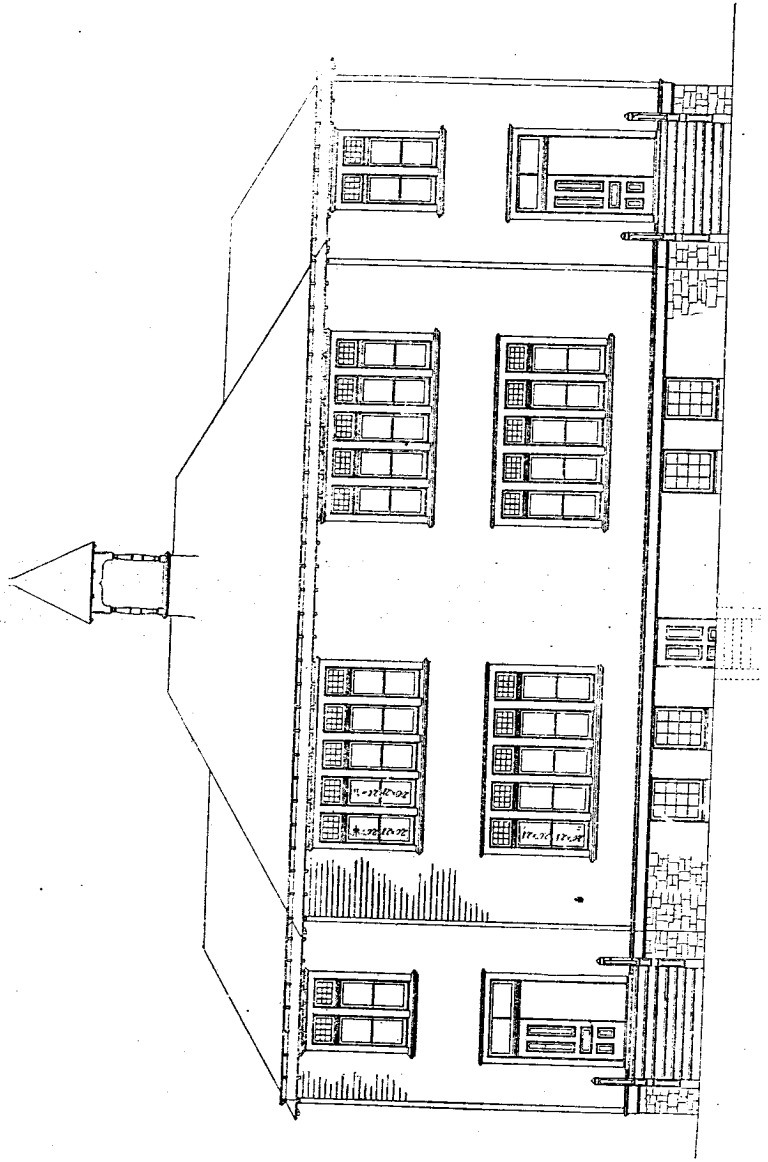
GLAZING.

Glaze in best manner in lights as shown, all outside sashes with first quality double-thick American glass, back tacked and back puttied, clean off at the completion of the building, and leave all work whole, complete, sound and finished.

The carpenter is to be responsible for the cleaning up of the building, to repair all accidental damage that may have occurred during the work of construction. He must take away all rubbish, have the flooring and wood work properly cleaned and leave the building in a habitable condition.

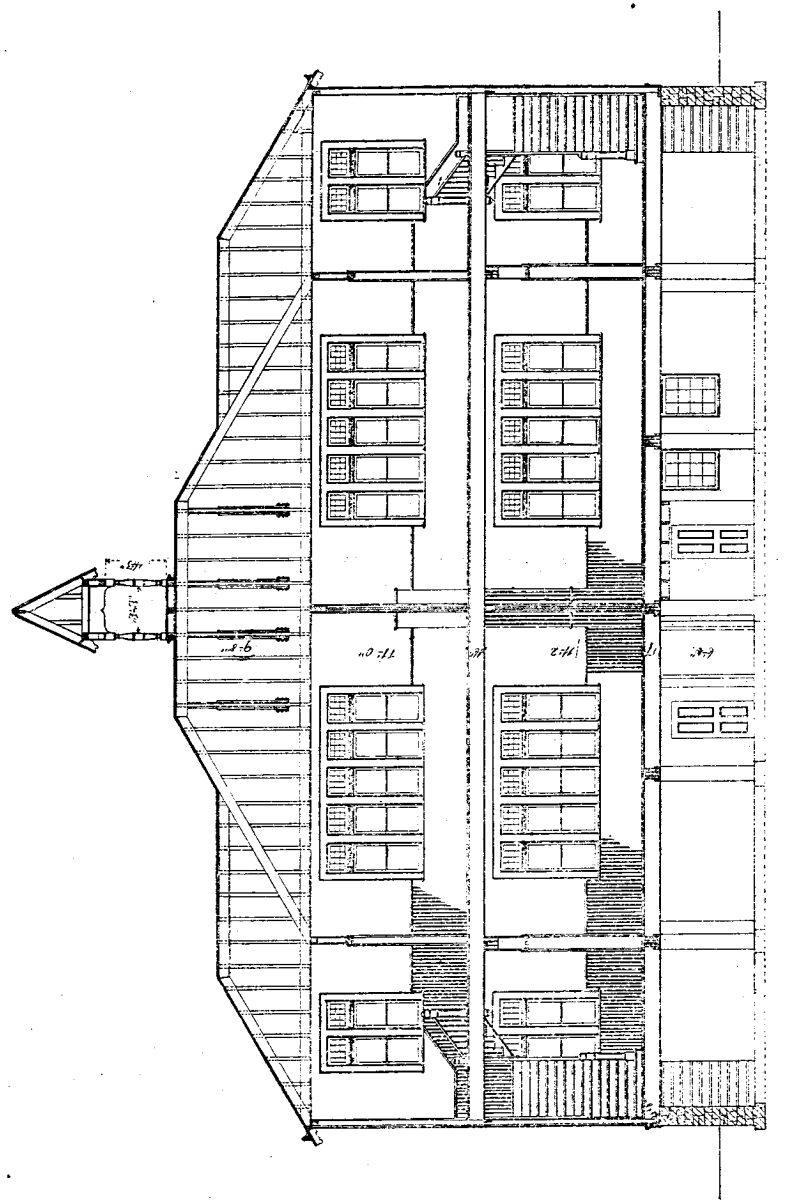


School House at Notch Road near Paterson, Passaic County, N. J.



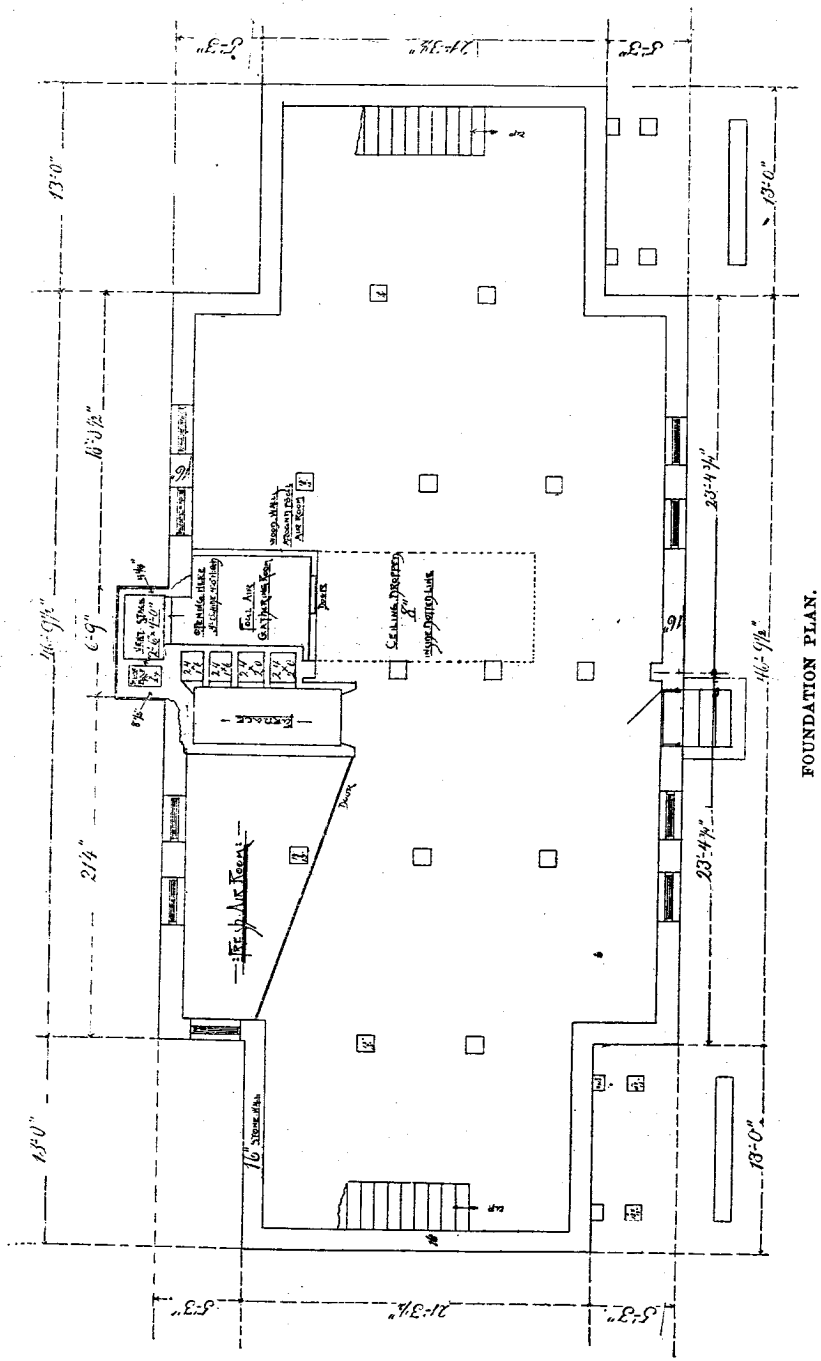
FRONT ELEVATION.

School House at Hopewell, Mercer County, N. J.



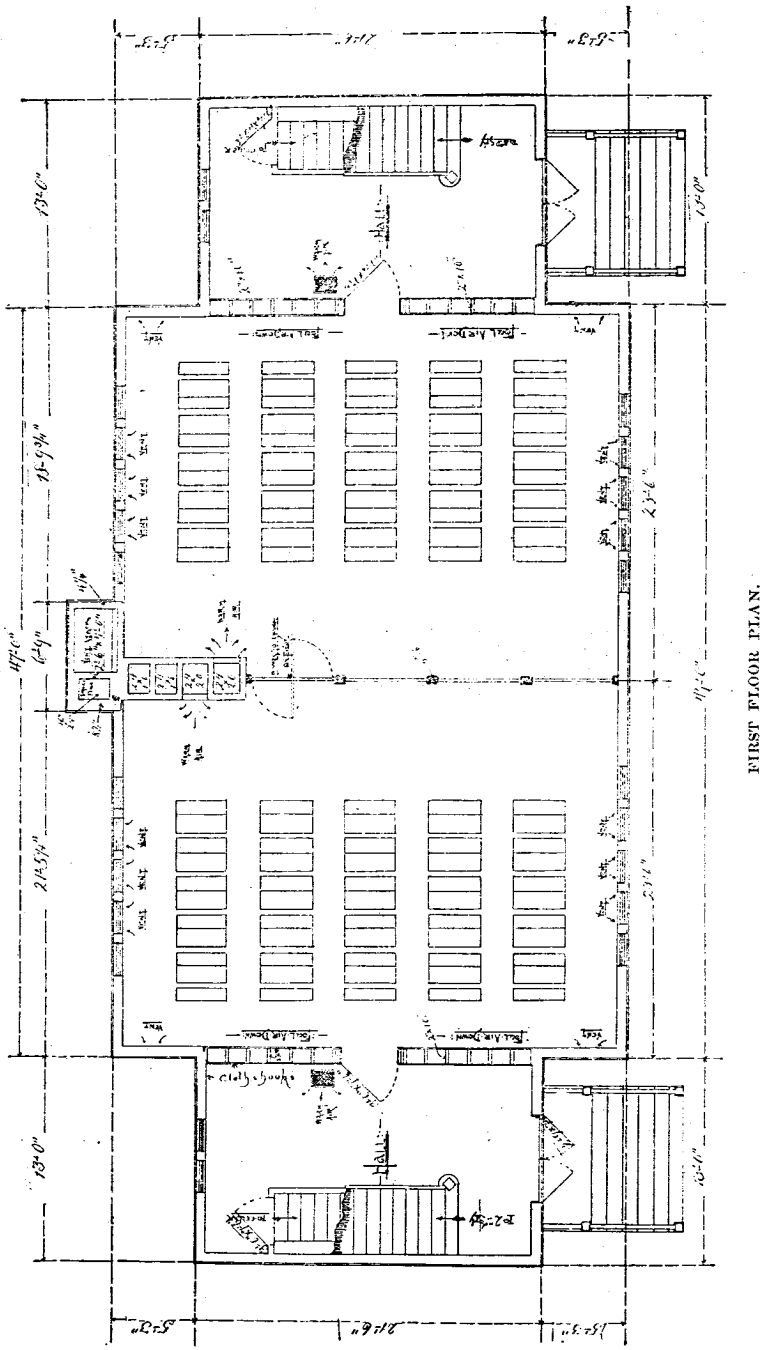
LONGITUDINAL SECTION.

School House at Hopewell, Mercer County, N. J.



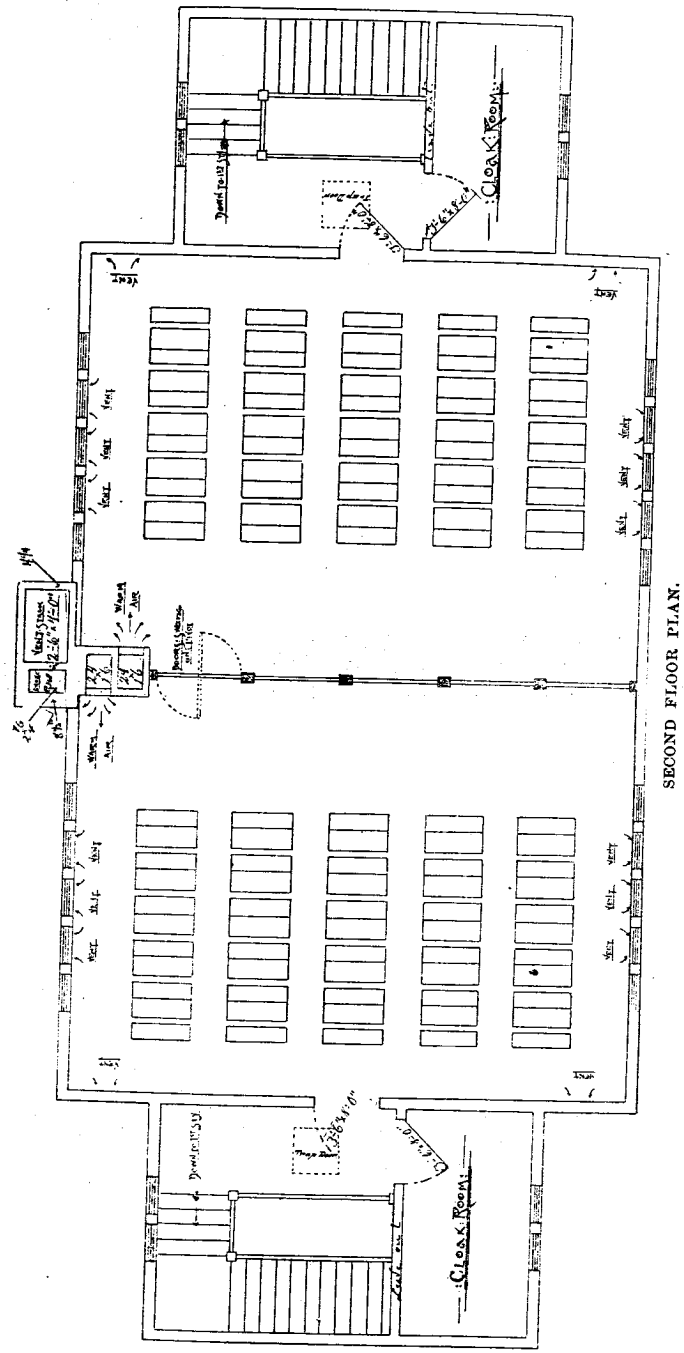
FOUNDATION PLAN.

School House at Hopewell, Mercer County, N. J.



FIRST FLOOR PLAN.

School House at Hopewell, Mercer County, N. J.



SECOND FLOOR PLAN.

School House at Hopewell, Mercer County, N. J.

I. The first is the one-story school-house at Notch Road, Passaic county, not far from Paterson. It furnishes a good example of a county one-room school-house, 24 by 33, of good size and appearance. The construction has been made with regard to sanitary requirements. It is taken from the designs of school-houses accepted by the Department of Public Instruction of the State of New York. For it we are indebted to Hon. Andrew S. Draper, State Superintendent of Schools, New York; also to Samuel Phillips, Esq., of Notch Road, Paterson, for valuable aid in procuring the accompanying illustrations and particulars. We give the perspective, not including various drawings, somewhat explanatory, to which reference can be had. The cost of the building was $3,000, of which $500 was mason-work.

II. Our next is the two-story school-house (four rooms) at Hopewell, of which we give (1) the detailed plans of the entire building, and (2) the front elevation and longitudinal section. We are indebted for this to the architect, W. A. Poland, of West State street, Trenton, N. J., and also to A. G. Fetter, Esq., of Hopewell, for various particulars. The cost of the building was as follows:

Contract work for material, carpenter and mason-work	$3,987 00
Extras	207 52
Heating and ventilating	502 67
Extra blackboards put in	26 81
Land	776 00
Whole cost	$5,500 00

III. Our third presents facts as to the commodious school building recently erected at Hoboken, N. J.

The subjoined local press account will give some idea of its extent and its advanced sanitary arrangements:

"The school building is located on the northwest corner of Willow avenue and Eleventh street, and covers 96 x 200 feet, of which must be deducted two playgrounds, one 43 x 96 and one 31 x 55 feet, both finished with smooth concrete and well drained. The building proper covers, therefore, 13,367 square feet, with a frontage of 157 feet on Willow avenue and 96 feet on Eleventh street. It has the form of an E, and is three stories high above the basement.

"The main entrance for teachers and visitors is on Willow avenue, while the scholars enter through their respectlve playgrounds, from Eleventh street and from Willow avenue, into spacious, well-lighted and ventilated fireproof stair-halls, which extend from basement to

dome, and are a feature of the building, showing at a glance strength, safety and ornament combined.

"We follow the children's entrance and first wend our way to the basement, which extends under the entire building. This contains two large play-rooms with concrete floors, large store-rooms, coal-rooms and the boiler and engine-rooms. Outside of the main building in the basement, as a distinct annex, are the toilet-rooms for boys and girls, lighted through large skylights and ventilated by separate flues in the main smokestack, running up its full height of 95 feet, so that no smell whatever can enter the class-rooms.

"The toilet-rooms are models of sanitary plumbing, being provided with the latest kind of sanitary cast-iron enameled closets, flushed continuously by automatic tanks.

"The basement also contains the entire heating apparatus for the building, which works somewhat like this: A large tubular boiler 5 x 6 feet supplies steam at low pressure to about forty-three special coils, which are distributed around the outside walls between the different windows; each coil is inclosed in a tin-lined box which receives air from outside, taken in under the windows; this air is warmed over the steam-coils and ascends through spacious flues to the different class-rooms, not into the faces of the occupants, but not less than five feet over the floor; the supply and temperature of the air can be regulated at pleasure.

"In the basement is also a separate boiler and engine which drive the fans for ventilating the class-rooms, &c. There are two ventilating fans, each five feet in diameter, placed in the floor of the tower, and the foul air is exhausted through separate flues from each class-room to the space under the roof as a common chamber, and then thrown or blown out into space through the large circular openings in the tower.

"Going up-stairs to the main floor we find ourselves in a wide and light corridor, which connects the two fire-proof stairs with the private entrance on Willow avenue. The private hall is separated from the public hall by a glass door. Handsome and easy stairs extend up to the attic for teachers' and visitors' use.

"Going back to the corridor we find, at the Eleventh street end, the Principal's office, and connected therewith rooms for supplies and library.

"Now comes the most important part of the building—its class-rooms—and as we enter one and another and still another, we are impressed by the light and airiness which is felt everywhere. We are assured that all the twenty-three class-rooms of the building are of uniform size, 23 x 33 feet, no room varying over a foot in any direction. The clear height of all the rooms is 14 feet, and the light and graceful metal ceilings and the grayish color of the walls give everywhere a pleasant rest for the eyes.

"Attached to each room is a large wardrobe with a large window to

every one, strong clothes-hooks for fifty pupils, thus reducing the dangers of contamination by infected clothes to the smallest degree.

"The building contains, besides the twenty-three class-rooms, two large recitation-halls, each 48 x 60 feet, the upper one being clear of posts and eighteen feet high in the clear, well suited to public meetings, &c., and capable of holding 1,000 people, as was demonstrated at the public dedication.

"The general impression throughout is one of comfort. The light woodwork, finished in natural colors, is a great credit to the carpenters, and equally well shows off the masons' and plumbers' work. Water is supplied on every floor. The teachers have a cozy sitting-room on every floor, well supplied with lockers, tables and chairs, with suitable toilet-rooms convenient thereto.

"The signaling and call system for the entire building will be perfect, the remotest room being in communication with the Principal's office, also with the janitor in the basement; each floor contains, besides, a large fire-alarm gong, which instantly warns the entire school of impending danger, which we hope will never have to be faced by the children and teachers."

It is the intention of the architects (Beyer & McCann) and the Trustees to have tests made, from time to time, of the heating and ventilating apparatus. We refer, in this connection, to an article in our Eleventh Report, 1887, pages 57 to 68, for air-tests furnished of other school-buildings by Prof. A. R. Leeds and Engineer McCann.

All of these buildings are well worthy of the examination of districts or School Boards contemplating the erection of new school-houses.

Hon. E. O. Chapman, the State Superintendent, or our Inspectors, can point to many others which present valuable improvements.

The matters of heating and ventilation, of location of blackboards, seating at desks, and various other points, need the same expert attention and advice. All these have been carefully attended to in the school buildings and schools which we have specified.

We have thus sought carefully and directly to call the attention of all interested in education to the vast importance of this definite preparation for the physical care of all children attending school, and of the need of a thorough instruction in hygiene and physical culture. The soul and the mind have indeed paramount claims, but in this mortal life they cannot get on well without the body. They who slight the casket or leave it to the common risks of circumstance,

endanger its contents. Let us have well-ordered attention to the welfare of the entire being, and in our school plans secure harmonious development of all the various parts, so that there shall be true symmetry in manhood and womanhood, and such results as come from a well-directed course and from the common ability and consent of all the powers to co-operate in securing their own profitable well-being and that of society at large.

THE AIR IN OUR SCHOOL-ROOMS.

BY PROF. SAMUEL LOCKWOOD, PH.D.

"The blood is the life." And how admirable the mechanism of the crimson fountain! For the distribution of the living stream a force-pump works steadily without stop. For the supply and purification two laboratories are busily engaged; the stomach in digesting the grosser food and the lungs in digesting the finer air. The gastric laboratory takes periods of rest, but the pulmonary activity never ceases, except with the dissolution of death. Food is taken upon the hint or prompting of hunger. But we breathe automatically in health—unconsciously, as upon instinct, even when asleep.

As to food, the greed for gain has begotten the science of adulteration. To some extent these practices are amenable to law. As to "the common air," virtually it has no legal restriction, however perilous it may become by vitiation. In kind, though not in degree, "The Black Hole of Calcutta" has its similar in some places devoted to worship and education, and notably the latter. For absolutely pure water the chemist dares not trust nature, but resorts to his aqua distillata. Nor is the outdoor air devoid of admixture from its terrene contact. Were it otherwise "the blue, ethereal sky" would be to sight simply colorless, invisible. So the pneumatologist can get pure air only by some laboratory process. But then the kindly ingenuity of nature has made provision in the efferent activity of the ciliated epithelia in the respiratory passages, a million tiny brooms dusting these air-chambers, all sweeping towards the outer doors.

Not all microbes are morbific. While some are the carriers of disease, others are functional in a sanitary sense. I apprehend that aqua distillata can never supersede the water from the spring. The one is dull, the other sparkles. So with the air. Space has its cosmic dust. It seems a need for the optic sense, and perhaps the health of the respiratory mechanisms. For if cilial activity should cease in the

epithelia of the air-passages, what changes in the direction of atrophy might not befall the mucous walls of these chambers?

Hence we must not be hypercritical, even in this affair, of the air in our dwellings. Up to a certain measure we must meet the inevitable. For this the internal service is adequate. But let us not rest content when the million maids are unable to sweep out the chambers. It is with this condition of the school-room air that I have been dealing. And hoping to make a clear and plain statement I will sketch, as concisely as may be, the problem in hand, the methods pursued, and the results obtained:

I. We must first keep in mind that we are dealing with indoor air. Hence we should expect to find something plus, or besides that in the outer air.

Besides it is restricted air. A child should have from 300 to 400 square feet of gently active air, whereas in some of our schools the average per child of still or almost unchangeable air is but 112 cubic feet. This compared with that which he breathes when out of doors at play, is as wading in a puddle to bathing in the sea.

The adulterants or impurities of the school air are personal—the excreta of the respiratory passages, exfoliata of the cuticle; also debris from friction of the floor and the wearing of clothing. Hence, as to the cuticle and clothes, how important is the individual cleanliness. The above concerns the present or usual state; the unusual state is when the microbes of contagious or infectious disease are found.

The fourth factor in this search is the presence of carbon dioxide in the air.

The determination of the carbonic acid appears on the spot. For the rest, all the study of our finds must be done at home; and the most intricate is the microscopic or specific determination of each object in our finds. If six villains have burglarized my domicile the enumeration is itself important, but the matter carries far greater significance the moment I am able to designate them respectively by name. This may draw upon the high art and patience of the professional detective. It is fully as much so in the determination of the specific impurities in the air. It is a work of patience, and may tax one's best knowledge of vegetable and animal biology and of physiology, with the most skillful use of the microscope. But whatever

may be the cost of work and patience we must know by name these morbific corrupters of the air breathed by our children.

II. In respect of my methods I have been, of necessity, for the most part a law unto myself. In testing for carbonic acid "Wolpert's Air Tester" is a device simple and efficient. I did not, however, follow Wolpert's instructions, as I found too much unutilized air when compressing the bulb. Instead of his 3, I used 4 cubic centimeters of lime-water, through which I forced 25 compressions of the bulb. As bulb and tube held not less than 53 cubic centimeters I allowed for residual and escaping air and called it 50 cubic centimeters. Hence I passed through the lime-water 1,250 cubic centimeters of air in each and every school-room tested. To be allowable, the black spot at the bottom of the tube ought not to be wholly obscured by the amount of carbonate of lime thus produced. I have tried the same in every way exactly in my study, which is warmed by heater, and have not even discolored the water.

Leaving the chemical test, the next is to get the floating impurity of the air. I here resorted to two methods, which I respectively called the wet and the dry. In the wet process permanganate of potash was used. One thousand cubic centimeters of air were washed by agitation in 20 cubic centimeters of distilled water. Into this were put a few drops of water-solution of the permanganate; oxidation would cause the impurities to settle.

For the dry method I had to devise an aspirator for myself. This for the qualitative response proved satisfactory, but I did not depend upon it for quantitative results. The exhaust chamber contained 100 cubic inches of space. As the aspirating valve was drawn twelve times, 1,200 cubic inches of air thus passed through after impinging in its passage upon four glass slides smeared with chemically-pure glycerine. To these little traps the impurities would adhere.

The reason for my using the two methods is simply this: By the wet process I got trustworthy quantitative results, but oxidation breaks down all organisms after some time, thus making the catch unsuitable for the microscope. Immediate mounting of the material in a preservative fluid will in part answer. But the tendency of the permanganate is to dissolve all organisms, whether animal or vegetable, whereas the catch, by the dry method, remains unaltered; hence, the best microscopic work can be done on the specimens thus caught.

Then came the need of material for comparison. Hence the necessity of mountings of the outer air-dust, and fibers of linen, cotton, and wool that have been worn, and even exfoliata of the skin, healthy and otherwise, the different scurfs, the starches that enter into the domestic use, &c., &c. Very much of this work, when done the best, proceeds by comparison from the known to the unknown.

III. As to the results obtained. These have exceeded my expectations. The carbon dioxide is abundant, I think the worse, where stoves are used, the difference being, I think, in favor of the furnace-heated air. In stove-heated air there is a double draft upon the oxygen—the consumption by fuel and by the lungs. I am unable, with the appliances at my command, to formulate upon my specimens these chemical activities in figures. It is easy, however, to see that, given a percentage of oxygen consumed when breathing pure air, an important factor is introdueed, when it is actually breathing air already in part eliminated of its oxygen. In this way we cannot say that so much carbon dioxide was generated from so much original air. With such data the power for injury is greatly intensified.

Here are several bottles; each one, less what I have taken out for examination by the microscope, contains, in 20 cubic centimeters of distilled water, the washing of 1,000 centimeters of air of a badly-ventilated school-room. The room should have afforded each child from 300 to 400 cubic feet of air. The actual provision varied from 112 to 125.

It would be somewhat startling to get at the actual weight of this impurity in a cubic foot of air, and thus approximate the possible amount taken by a child in the school hours of one day. The potency for evil, however, should, in my opinion, be charged more upon the smaller partieles or organisms than on the larger.

But, on the evidence of the microscope, who or what are these loathsome intruders? Their name is legion for number, and they are of great variety. If I should make a picture of the impurities in the out-of-door air in winter, I would get mainly mineral dust, such as the air in movement laps up from the road, with some vegetable dust, in like manner derived from the woods and fields. All this, however, is generally innocuous. It is expelled from the respiratory system by the ciliated epithelia, as already stated. Such a drawing I would compare with this, representing a very small part of the catch

in one school-room. I could then say, "Look on this picture and on that—Hyperion to a satyr." Here are particles of wood, the abrasion of the floor by restless feet. Here, too, is the mineral dirt from the rasping, or, if you will, the cleaning of dirty shoes. Here, too, are fibers—a few of linen, but quantities of cotton and not a few of wool. These are the friction or wear actually in process of the children's clothing. Curiously associated with the wear of cotton fabrics, starch grains are quite abundant. Here, then, is ocular evidence of the ease in which the child may be the carrier from home of communicants of morbific tendency. Take the starch-grains as one item among the innumerable. I was astonished at this frequency. But, if a starch-grain can sail so easily in quiet air, what is to hinder the morbific microbe in its insidious wandering, for, in comparison in size, the bacterium is to our starch-grain as a pistol-shot is to a cannon-ball?

But our story is not a quarter told. In great numbers here are the excreta of expectorated and coughed epithelia from the mouth and respiratory passages. Here, too, with fragments of hair, are dandruff scales and skin-scurf, with what is known as pavement epithelia. Nor is there wanting even the white, semi-corneous scales of exanthematous cuticle, with occasionally a little scale containing at its center a bright crimson spot. The child, to allay the itching, has scratched so deeply as to reach a capillary. But, though telling what the eye has seen, let us halt, lest the narrative, though interesting, react from its unpleasantness.

It surely must be that inured to these conditions the child to some extent becomes an immune. But it must also be certain that with so much evil seed implanted there are inevitable consequences, evil fruit in a painful manhood or womanhood. How plainly appears the distressing fact that the cleanly child must inhale the exfoliata of the unclean and even diseased.

I was a little perplexed by an unexpected difference in the result of the testing of two adjoining rooms in a graded school. One contained eighty little tots in their second year's schooling. The other had about fifty-five, but these were three years in advance of the others. In size and situation the two rooms were alike. Except as to the carbon dioxide, the room of the tots showed much the purer air. That of the advanced room contained a decidedly larger amount of impurity, such as exfoliata, dandruff, scurf and waste of clothing. It occurred to me that an advance of three years in age warranted

more animal spirit, more activity, more lung-work. Then came in the consideration of very recent physiological research or the varying make-up of tissue at different ages.

I feel that the above can only be presented as tentative. I shall hope to resume this work, with perhaps improved methods—in a word, with the light of experience.

Some work on the external air gave me some facility. But the air in an unventilated school-room presents a problem of a more complex nature. Although microscopic fungi were found, I made no special hunt for microbes. These disease germs must and will be disseminated by the subject of its special malady.

But all this apart, have I not shown how fearfully the hygiene of the air is overlooked and violated, and how imminent and disastrous are the possibilities of contagion, should the germs get sown upon a soil made so fertile by long morbific saturation? In childhood is an elastic resistance which is wanting in adult age. Hence it occurs too often that the teacher succumbs to the unhealthiness of the situation.

FREEHOLD, N. J.

METHODS AND RESULTS OF PHYSICAL TRAINING.

BY PROF. CHARLES H. RAYMOND.

When, through the Secretary of the State Board of Health, I was asked to prepare a paper for the Association this year, he was careful to explain just what he wanted, viz., "A technical outline of the physical instruction and training at Lawrenceville. What is required? What is taught? What exercises are compulsory? How much time each day or week is assigned to these? How much regard is had to the needs of the individual? In other words, we desire to show a course of teaching and training just as definite and just as really a required curriculum as in any other department of education." In what follows, I shall try to satisfy this desire and present a view of work actually done in physical culture in the Lawrenceville School. The nature of the demand must be an excuse for what might otherwise seem a too frequent reference to the school question.

Before passing judgment upon any course of instruction, the intelligent critic asks, first, something about the pupil himself, then what it is intended to do for him—how the work is done—and finally, what are the results.

With these four questions answered, practically all the data are in a form from which one may get a fair estimate of the value of the work. I will, therefore, take up in their order the critic's questions, and first say a word about the boy.

The Lawrenceville boy numbers at the present time about 225. He ranks, generally, in age, and always in ability, according to his form, the Fourth Form representing the senior grade of excellence. His physical status may be partly determined by a reference to the following statistics. As to age, the following brief table will explain:

First Form—Average age of			56	members,	$14\frac{43}{56}$,	or about	$14\frac{7}{8}$.
Second Form	"	"	58	"	$15\frac{53}{58}$,	"	16.
Third Form	"	"	28	"	$17\frac{5}{28}$,	"	$17\frac{1}{6}$.
Fourth Form	"	"	27	"	$17\frac{6}{27}$,	"	$17\frac{1}{5}$.

Average age, about $16\frac{1}{4}$.

As to extremes, another table compiled from the first measurements, taken last December, may be interesting, and will also serve to show what measurements are taken:

Oldest boy in school	20 yrs.	Youngest	12 yrs.
Tallest	6 ft. $1\frac{5}{8}$ in.	Shortest	4 ft. $5\frac{1}{2}$ in.
Heaviest	184 lbs.	Lightest	62 lbs.
Longest arm stretch	6 ft. 3 in.	Shortest	4 ft. $6\frac{1}{2}$ in.
Greatest breadth of shoulder	$17\frac{3}{4}$	Smallest	$11\frac{1}{2}$
" " " waist	11	"	7
" " " hips	$13\frac{1}{2}$	"	$8\frac{1}{2}$
" girth, neck	$14\frac{3}{4}$	"	$10\frac{3}{4}$
" " right arm, uncontracted	13	"	$6\frac{3}{4}$
" " " contracted	$13\frac{7}{8}$	"	$7\frac{1}{4}$
" " left arm, uncontracted	$12\frac{3}{4}$	"	$6\frac{1}{2}$
" " " contracted	$13\frac{1}{2}$		
" " right forearm	$11\frac{3}{4}$	"	$7\frac{5}{8}$
" " left forearm	$11\frac{1}{2}$		
" " waist	$35\frac{1}{4}$	"	$22\frac{1}{2}$
" " right thigh	26	"	14
" " left thigh	26		
" " right calf	16	"	10
" " left calf	$16\frac{1}{2}$		
" vital capacity	320 cu. in.	"	110
" number pulls-up	16		
" " dips	14		
" inspiration	$40\frac{1}{2}$ in.	"	23
" expiration	35	"	$24\frac{3}{4}$

To these I might add other statistics (not that they would really describe the boy, yet they might perhaps better classify him with reference to the more manifest facts that bear upon his physical training).

But, while the measuring-rod and tape may seem more especially fitted to indicate body and muscular conditions and development, it ought always to be kept in mind that there are present, wherever the boy is, certain other factors, which cannot be thus measured, and yet are frequently forgotten or ignored when answering the question, "What of the boy?" No physical statistics describe, or ever can describe, all the traits which touch upon, modify, and often embarrass

a boy's physical training. We may theoretically divest him of part, or most, of the robe which covers his three-fold nature, and view him solely as an animal, a creature of purely physical dimensions, a being of bone, muscle, nerves, if you please, respiration, circulation, digestion, growth. Wise or otherwise, we may do this theoretically, I say, but practically, never. The boy that enters the gymnasium brings more than a body to the master. He brings a complex organization, made up, not of flesh and blood alone, but of appetites, passions, will and intellect—or lack of them—personal peculiarities, eccentricities, inexperience, heredity. He must be treated accordingly, and the personality of the boy modifies the method of his training. How much, we can hardly stop to indicate. It is enough, perhaps, if we let this thought run on between the lines as we proceed. We have thus negatively, and very imperfectly, described the boy. Now, what do we purpose to do with him? "Make him healthy, and keep him so," I hear you say. True, the first object of all sensible physical culture is health, but as by getting money we may also get added comforts, pleasures, &c., so in obtaining health we may also obtain other things.

Strength, growth, grace are not incompatible with this main object. In fact they are in some degree inseparable from it. The same may less certainly be said of discipline, dexterity, confidence, character. Nay, more, one questions if the ideal system and, in some degree, every system of physical culture will not sometime insist that these last-named qualities are the natural products or results of all right health training; that the same process which bestowed this latter boon will, of necessity, produce strength, give growth, grace and dexterity, impart confidence and strength of character, and all this through the agency of a discipline of body acting in harmony with a discipline of mind.

The primary object, however, of the work done in physical culture in the Lawrenceville School may be simply stated as follows: To give health, development and strength to something like 225 American boys, of ages ranging from 12 to 20, with the associated idea that these terms suggest but a fraction of all that is really implied in them, and, too, that these things physical are sought for as a means of imparting and sustaining a higher, an intellectual, health, development and strength. What facilities are offered for this? What is done for the boy? In the first place, during the fall and spring plenty of outdoor room is given him for exercise, while during the

rainy winter months he has access to a small gymnasium. In the next place, a definite period of time is set apart when he is required to exercise. Finally, an endeaver is made to grade the play and gymnastics according to the age and strength of the pupil.

To go more into details (for generalities always fail to give exact ideas), a boy coming to Lawrenceville in the fall term will find his work assumes something like this form: From 8 to 12:15, with a brief intermission, study and recreation; from 2 to 4 P. M., the same. But at 4 P. M. (Wednesday and Saturday half-holidays excepted), he meets a new requirement, that of play. At the ringing of the bell, clad in his foot-ball, or tennis suit, he goes out upon the campus, and from that time until 5:30, he plays; he must play. There is absolutely no school requirement but his bath that takes precedence of play. This goes on day after day, from September to December, and from April until June. In the spring, of course, the games are not limited to foot-ball and tennis. There is a wider range of choice between base-ball, lacrosse, tennis, bicycling, and training for field-day sports. Two things ought to be noted in connection with all this play. One is, that while it is play, it is earnest play, and, so far as possible, what may be called intelligent play. The other is, that one of the masters on the athletic board is a school physician. So much for the outdoor exercise, which constitutes two-thirds of the recreation-time of the entire school year. We now turn to the other, third, the inside gymnastics, which begins with December and lasts until April. The present gymnasium is very small, and, of course, the problem here is to do the most work we can (for the health, development and strength of the boy, to get the best practical results possible) under the existing circumstances. The plan of work is something as follows: In the first place, before the gymnastic work properly begins, the boys are registered—that is, they fill out the following blank:

REGISTRY.

.....189

Student fills out all but first blank.

No.....

Age.....

Last Birthday.....

Where Born.....

Occupation of Father.....

Father Died of.....

Mother Died of.....

Have had or am subject to the following diseases:

[Student will put cross after those he has had and underline those he is subject to.]

1. Asthma.	9. Enlarged Veins.	17. Palpitation of Heart.
2. Bronchitis.	10. Headace, Nervous.	18. Rheumatism.
3. Constipation.	11. Indigestion.	19. Scarlet Fever.
4. Colds	12. Biliousness.	20. Shortness of Breath.
5. Dizziness.	13. Neuralgia.	21. Side ache.
6. Dyspepsia.	14. Pleurisy.	22.
7. Dysentery.	15. Piles.	23.
8. Diphtheria.	16. Pneumonia.	24.

SPECIAL REMARKS.

Next, the most important measurements bearing upon the physical developments are taken. Finally, tests are made of their lung capacity, heart action and strength.

From the showing of these three tests the boy's class and individual work is, in a general way, determined. In most cases none of these tests affect the boy's relation to his class-work, but in the individual's work they are the great factor. They determine many important things—how much work the boy ought to do, what kind, and what he ought to avoid. They also often exclude him absolutely from some of the more showy but exhausting work. Just here very frequently the work for the individual may need to step over the line of the merely recreative or developing gymnastics and approach the curative.

Along with measurements comes class organization. During the coming year the school will probably be divided into six graded divisions, each division exercising four periods a week. These periods vary from three-quarters to an hour in length of time, and are supplemented by an open gymnasium on Wednesday and Saturday afternoons. The registering, measuring and organizing begin soon after Thanksgiving. At this time from one to four leaders or captains for each division are chosen and started into their work. These captains are old students who, if not already initiated, have been working for the place during the past year. These now meet by themselves and are instructed in the formalities of roll-call, class formation, marching, order, &c., tested in old exercises or initiated into new, and finally taught the meaning of the different exercises and the value of graduation in work, economy of strength, and importance of good form. Books on drill, training and physiology are placed at their disposal,

and thus when, after Christmas vacation, work really begins, it starts off thoroughly organized and self-directed. What is that work?

There are three grades of class-work: The Roberts system of dumb-bell drill for the Fourth and stronger Third Formers; competitive dumb-bell drill to music for the two rival divisions of the Third and Second Formers, and free gymnastics, poise-work and marching for the First Form. To these grades of class-work, exercises must be added—

For the first year, light work in wands, clubs and mat-tumbling.
For the second year, clubs, low bar and recreative work on horse.
For the third year, parallel and horizontal-bar work, chest-weights and horse.
For the fourth year, ditto, but more advanced.

This fills out the schedule of graded class-work, and is, in the main, carried out, not satisfactorily always, by any means, but actually.

But in the face of all this class-work, what becomes of the individual? Isn't he completely crowded out? Yes and no.

Of course the issue is, which must predominate, class or individual work? Our divisions now can tell the former, and this, done as it is, promptly and earnestly, does not occupy more than from fifteen to thirty-five minutes of the period. The rest of the time, plus the half-holiday afternoons, is entirely at the boy's disposal, and the record of his measurements and the comparison of them with other measurements, especially with the printed tables showing what ought probably to be the proportions of a boy of his own height and weight; these things, coupled with the secret sense of shame which the ordinary boy entertains for his weak points, tend to stimulate a very large number of boys to improve their spare moments in sensible, enjoyable body-building.

For advice and help, when needed, he goes to his captain or instructor. It does not take long to find out what will help a small left arm, a weak chest or an elevated left shoulder. All such individual work, though, is of necessity optional.

Of the details of work done in the different divisions there is little time to speak. The Roberts system, used in the upper forms, is too well known to demand description here. To the uninitiated it may seem rather severe and drastic. A more intimate acquaintance with it may prove first impressions to be rather erroneous. It surely reaches the circulatory apparatus and evokes perspiration as well as respiration. Like all other exercises it needs to be well done to be really efficient. I was particularly interested to note how three months of it affected

two very different boys in the Fourth Form of last year. One was a fine-built, rugged fellow of eighteen, the other a weakly, consumptive-looking scholar a year younger. The result is as follows:

Age.	Height.	Weight.	Arm Stretch.	Shoulders.	Waist.	Hips.	Neck.	Upper Right Arm, uncontracted.	Upper Right Arm, contracted.	Upper Left Arm, uncontracted.	Upper Left Arm, contracted.
17	5.9½	108½	5.9¼	13¼	9	12	12¾	8	9¼	7¾	9
17	5.9⅞	113	5.9⅞	15	8½	12	13⅛	8¼	9½	8⅛	9½
.....	⅜	4½	⅝	1¾	−½	0	⅜	¼	¼	⅜	½
18	5.6⅜	118½	5.7⅛	14	8½	12	13	10¼	11¼	10⅛	11
18	5.6¾	132½	5.7	15	8½	12½	13½	11¼	12½	11¼	12⅜
.....	⅜	14	−⅛	1	0	½	½	1	1¼	1⅛	1⅜

Age.	Right Forearm.	Left Forearm.	Waist.	Right Thigh.	Left Thigh.	Right Calf.	Left Calf.	Pull-Up.	Straight Dip.	Vital Capacity.	Chest Inspiration.	Chest Expiration.	Heart.	Lungs.
17	9	8¼	24½	18	17½	12¼	12½	2	0	227	31½	28⅝	.....	.....
17	9⅛	8¾	25	18	18	12¾	12½	4	0	230	32	39	.....	.....
.....	⅛	¼	½	0	½	¼	0	2	0	3	½	1⅜	.....	.....
18	9¼	9⅜	25½	19	19	12½	12½	10	4	195	32¾	30¼	N.	N.
18	10⅜	10¼	26½	21	20½	13½	13⅜	11	9	200	34	31	N.	N.
.....	1⅛	⅞	1	2	1½	1	+⅞	1	5	5	1¼	¼	.....	.....

The competitive class-work done in our Third and Second Forms to music may meet a protest from some who believe not in competition or the "harmony of sweet sounds," in connection with gymnastic training. Music may stimulate to cause subsequent reaction. Competition may over-exercise head as well as body, but I find both well adapted and seemingly producing good results in our large classes and small gymnasiums. I have found the same fact true in young ladies' classes. Professor Hitchcock's statistics show them to be equally well adapted to the college gymnasium. The movements are so arranged as to bring into play all the principal muscles of the

body, giving frequent rests to the different groups. The music inspires the work and trains the ear as well as the arm and foot to time and accuracy, while emulation but helps to greater attention to the very important details. The figures in the comparatively few measurements taken at Lawrenceville seem to indicate gains here about equal to those obtained from the Roberts system.

Of the value to the fairly developed boy of light, systematic, graded work upon the parellel and horizontal bars and horse, a very great deal could be said. For growth, strength, confidence and control nothing equals them. All deforming tendencies can be easily counteracted by the chest weights, while the German system, which develops, with the utmost accuracy and exactness, the greater exercise out of the less, is in itself a stimulus to method and system in upbuilding the mind as well as the body. Graduated exercises on the bars done in good form with a judicious intermingling of chest-weight and horse-work, will afford the ordinary boy as much rest of mind, as much enjoyment and as much real exercise as anything I know of in the gymnasium.

I notice that my paper is headed "Methods and Results of Physical Training." I have hardly kept to the first half of my text, and I fear that I shall invite unlimited criticism upon the last. The work in gymnastics at Lawrenceville has been going on hardly long enough to give results there, and while I might have gathered statistics from work done elsewhere, I have not found the time to do so. But I do wish to say a word about the methods which seem to be necessary in obtaining results. The fact is that the deductions from body measurements need, generally, pretty exhaustive explanation to make them valuable. The registry form tells a straight story, so do the vital and strength statistics, but the measurements sometimes appear to defeat their own ends. They are so sensitive to conditions. The time of day affects heights and weights. If one knows the trick of it he can make a great development of the biceps in a day's time, consequently muscular work immediately before the tape is used makes sad contradictions in girths. The tape itself often does very unreliable work. Then there are individual factors which must have consideration. A man's weight ought not of necessity increase during a three months' course of training. The minus quantity is really a plus sign to the over-fat man, but when you add

his record to other men's record, his losses to their gains, your result don't really mean much. And so different boys bring different natures, different dispositions and I might almost say different tissues to the work that bear upon the mathematical results, and yet are just the things that cannot be satisfactorily recognized by cold figures and calculations. Then, too, it is very hard to tell definitely just how much of your gain is to be attributed to natural development and how much to your training. Twenty of our last year's boys made an average gain of nearly an inch in height during their three months' work. Was any or part of it due to their gymnastics? If so, what part. So with their weight, their arms, their chests. (Until our anthropometry is far more comprehensive than now, we must not boast too much of our gains or deplore too seriously our losses.)

Mind, I am not depreciating the value of measurements and physical examinations. Conditions may be such as to compel a wise economy, even the exclusion of measurement, but of vital statistics, never. (These latter are vital to the teacher, vital to the parent and intensely vital to the boy himself.)

Nor, after all, are our measurements much less important. With all their uncertainties they are the only way for testing the value of a system of gymnastics as to its effects upon growth and development, and they alone will lead us to the perfect physical pattern of manhood and womanhood. But they have a far more practical value even than this. They are a stimulus to the boy. They give him some basis to stand upon. When a boy reads his record and finds that he is actually eighteen years old and weighs exactly 145 pounds, that his arms and legs measure just so much, that he can exhale 250 cubic inches of air, he begins to know where he is, so to speak. More than that, he becomes interested in himself. He begins to compare himself with somebody else—with his neighbor. He isn't satisfied then; he questions which is the better physical man of the two. This leads him to seek out the best standard. Then, when he has found it, the work begins. The right work, mind you. The work, not of prodigally making the strong parts stronger, but of economically making the weak parts stronger. And by this process he has done what? Why, a very great thing. He has got a right start in physical training. He has discovered not merely that he wants something, but he has found out what he wants. And when a boy has found that out he can get

it; as Besant said, "His is the power and nobody can prevent him." But the secret lies in finding out his want.

The first of the four questions that I started out to answer is, What of the pupil? I hope what I have said will lead you to picture him as a young, healthy boy, fitting himself (at Lawrenceville) for college and the responsibility of after business or professional life. My answer to the question what it is intended to do for him, has been primarily to maintain his health, assist his development and supply him with a surplus, if you please, of physical strength. I hope, however, that what I have said has not given the impression that our endeavors are limited to those three lines alone, as certain words like interest, discipline, dexterity, confidence, character, dropped here and there, ought to hint at something more.

To describe in detail the work done has been impossible, but the general outlines have been generally laid before you. With the exception of the allusions to the so-called Roberts drill and German bar and horse-work, I have had no time to refer to any systems of training, some of which, especially the Swedish system, ought to have a decided hearing. I surely do not mean by my silence to imply any lack of indebtedness to many systems and many men and women. In so far as it is possible, it ought to be the endeavor of every instructor to test each and all systems.

The question of their use, however, in part or in totality, must depend greatly upon the conditions under which the teacher is placed. A thousand practical hindrances or opportunities weigh the balances here, and determine both kind and amount of work done, and all our criticisms must refer to this fact. The only true method in our present tentative attitude toward all exercise must be to prove all things and hold fast to the best.

I regret that, instead of indicating the gains and losses, the results of the work outside and in the gymnasium, I have felt obliged to limit my remarks almost entirely to the methods of obtaining them. But while our records, brief as they are, tell some very pleasant things about strong lungs gained upon the foot-ball and lacrosse field—the best place in the world in which to get them—and big arms and sound bodies developed within doors, there are many things which they do not, cannot tell, which are, nevertheless, just as really there as is the added inch that shows itself in the biceps or forearm.

I shall, therefore, close by saying that our registry list, books of statistics, together with the health record of our school physician, are always accessible, and if these do not suffice, we shall then endeavor to dispel all your doubts of the beneficial effects of plenty of out-door and indoor exercise by introducing you to the Lawrenceville boy himself.

NOTES ON MENTAL HYGIENE.

BY PROF. J. MADISON WATSON AND PROF. A. B. POLAND.

Our Association at its annual meetings, for the past decade, has had papers and discussions on hygiene—mainly relating to physical activities and bodily health.

It is high time that we differentiate the subject and consider its mental aspect. Mental hygiene inevitably involves heredity, environment, and corporeal and spiritual conditions.

It is a great subject, requiring careful and extensive observation, personal experience and scientific study. I shall name simply a few suggestive points.

First. What is the mind of infancy; an absolute blank, a sheet of mere white paper, or a sheet whose every fiber bears the invisible hieroglyphics of heredity? If, in the mind of childhood, the mental and spiritual elements of many progenitors—elements of strength and weakness, of vice and virtue—lie, like words written with sympathetic ink, unseen until the contact of a reagent makes them visible, how important the use of right reagents, or influences, to develop noble lives.

Hence the essentiality of innocent social pleasures, amusements and recreations, of right educational materials and natural methods of teaching. Also, it is evident that normal mentality requires a wise selection in marriage; and that the State, by legal enactment, should restrict or wholly prohibit the marriage of imbeciles, and the vicious and criminal classes.

Secondly. Recognizing the fact that a healthy mind can be preserved in a healthy body only, we should study pupils in two ways; by mental tests and physical inspection, with a view to their classification; and the regulation and limitation of their mental work, both in and out of school.

Thirdly. Education, to secure mental healthfulness, must be largely individual. The foundation must be laid at home, and the essential education must come from the student.

There is no sovereign mode, no universal method.

The undue cultivation of human muscle, the fierce struggle to win prizes in examinations and mental contests, and the subordination of moral and religious instruction, are alike thoroughly abnormal and vicious. Length of life and prolonged happiness depend on the continuous cultivation of the physical, the mental and the religious existence.

NOTES BY PROF. A. B. POLAND.

Although we use the terms mind and mental, with something of definiteness, yet we should be troubled quite a little to state precisely what we mean thereby. The ancient conception of mind or soul as something distinct from the body, but temporarily residing therein, and hence affected by its physical environment, has largely given way to the more modern conception of mind as a something (entity, if you please) wholly dependent, so far as we may know it, at least, upon the cerebral portion of the nervous system. The mind seems to be a functional activity of the brain. But whether we regard it as a distinct and potentially independent entity, or as the mere sum or aggregate of physical reactions, is inconsequential so far as concerns practical hygienic rules for its growth, development and conservation.

Starting, therefore, with the assumption that the phenomena of mind, if not identical with nervous processes, are so thoroughly involved as to be inseparable therefrom, we may safely affirm that the mind is affected for health or otherwise by the condition of the general nervous system, especially of the sympathetic system; that the sympathetic system, in turn, is so dependent, both in a causative and resultant way, upon the digestive and circulatory systems, &c., that they cannot be divorced. Hence, all hygienic rules that result favorably on the digestive or circulatory systems will also, through the sympathetic system, affect favorably mental action.

It would be manifestly inappropriate and unnecessary to repeat the many well-established rules for the preservation of physical health, especially those that appertain to eating, drinking, exercise, rest, sleep, &c.

The careful observance of all these is absolutely essential to a mind of normal health and activity.

But in this discussion the question first arises, "What constitutes mental health?" Is it normal activity, tone, efficiency, equilibrium, or what? Or is it, negatively stated, the condition marked by the absence of any factors or qualities tending to deteriorate or lessen efficiency?

If mind and brain were identical, then a healthy mind like a healthy brain would be one whose functional powers were intact. Here we have to distinguish between the strong mind and the healthy mind. We can conceive of the arm as being perfectly healthy while far from being strong. As, for instance, the arm of the laborer as compared with the arm of the man of leisure. There may be various degrees of strength, varying from that of a Hercules to that of a child.

The healthy arm is one in which the functional processes are intact and capable of normal development though undeveloped. I suppose, therefore, that the healthy mind is one on which there is a harmonious balance of powers and capacities.

The term healthy is the logical opposite, too, of diseased, and we may be helped to a conception of its meaning by considering the marks of a diseased mind.

A diseased mind is one in which the normal is varied from in the direction of a lowered potentiality.

Or, considering disease as an active agent, the diseased mind is one tending actively towards further deterioration.

It is necessary to have a clear conception of the terms involved or there is liability to confusion in discussion.

A weak memory or deficient imagination may be due either to lack of use or to some pathological condition.

If we are to regard, therefore, both a weak memory and a diseased memory as evidence of an unhealthy mind, the hygienic rules to be adduced will not be the same.

So, lack of balance or harmony of physical powers may be due either to disease or disuse, to pathological or non-pathological conditions, and the discussion of means to restore the balance of power might, by the necessity of our definition, fall outside of the category of hygienic rules.

1. Moderation and Regularity of Use.

Limiting the field of discussion to those rules which may be considered as more purely mental, I would first emphasize the need of moderation and regularity in the exercise of mental powers. It is a well-known fact that the great majority of mankind use their minds with greatly varying degrees of moderation or excess. Now, we all know what the effect is upon the body of spasmodic or excessive use.

One unused to hard labor goes into the field to mow or pitch hay, or hold the plough. The result is physical exhaustion, an undue strain upon the nervous system, followed, it may be, by temporary prostration.

Now no one is so ill informed as to the injurious effects of such practice as to doubt for an instant its unwisdom.

But what do we observe quite commonly as a mental phenomenon; namely, a man unused to hard mental labor making some protracted and exhausting mental effort, the working up of a brief, the preparation of a sermon, the intense and prolonged application to some business project, resulting in the great consumption and loss of nervous force, followed, as in the case of muscular excess, by nervous prostration more or less complete.

Nothing is clearer than that the oarsman in training for the race, or the pugilist for the ring, must exercise moderately and regularly—not spasmodically and to excess, but with a due regard to the plain hygienic principle that force its accumulated and tissue hardened by slow and regular processes.

Hence, I would lay down this hygienic rule for the maintenance of mental health—that there should be regular systematic exercise of mental function. Just as certainly as muscular vigor and strength cannot be attained by intermittent exercise in the gymnasium, so mental health cannot be conserved by occasional and spasmodic exercise.

There is no more common and reprehensible practice in the schools than that of injudicious lesson-giving. The teacher for a day or week, it may be, works her class leisurely, until she takes it into her head to "make a spurt," as the oarsman would say, when she ruthlessly, and innocently too, makes demands upon her class that if attained must be attained only by an excess of effort that will leave the children in a greater or less degree of resultant weakness or prostration. All this is wrong. It arises in practice from the fact that the analogy between the conditions of mental and physical hygiene are not clearly apprehended.

Regularity and moderation in mental exercise are absolutely imperative to mental health.

2. Variety of Mental Occupation.

Still another rule of mental hygiene may be derived from a comparison of physical and mental phenomena.

Just as a change of diet and of atmosphere is often desirable, so variety of mental employment is conducive to mental health.

The best physical results are often obtained not by complete cessation from work, but by a change of occupation or environment.

The practice, so prevalent nowadays, of going into the country or to the sea-shore during the summer-time, is a good one. True, the social exactions are often greater than at home, but the change conduces to recuperation of waning physical powers.

The physiologist has proved beyond a doubt that certain mental operations employ their particular groups of nerves and brain centers. These nerve groups and brain tracts by constant and exacting use become fatigued, and a change of mental occupation, such, for instance, as from mathematics to fiction, becomes imperative. The flow of blood is diverted to different brain areas and new and fresh groups of nerves are brought into play. The particular effect is that of giving temporary rest to one set of factors, but the process is quite different in its mode and effect from complete cessation of brain or mental exercise. The difference is quite analogous to that of resting one arm by using the other. An equilibrium of conditions is established that is more healthful than using one set of muscles to excess and a corresponding set none at all.

The school-room application of this rule is had in diversity of studies. The change from the arithmetic to the drawing or music, from the grammar, with its exercise of the logical and discriminative faculty, to the reading, with its call for an exercise of the imaginative and expressive powers, are both in the line of true hygienic practice. Frequent alternation of mental employment is found in all good schools.

Too many persons, however, in adult years allow themselves to become engrossed in business, in money-getting or saving, to the extent that certain brain tracts are used almost exclusively, with the result that a break-down occurs at an untimely age.

An observance of the practical rule that we have stated, viz., of change or variety of mental occupation, would have saved many a man without having lessened in any degree his necessary application to business.

Insomnia has become an almost universal malady. Drugs are taken to counteract the abnormal excitement and consequent weakness of the affected nervous centers.

Far better would it be if the unfortunate victim of this insidious and insatiable foe to health and comfort were fought off by change of mental occupation rather than by drugs or other physical agents or sedatives.

3. Weak, Insufficient and Unbalanced Use.

Still again we have observed that a physical organ loses its functions, not only by disuse, by improper or excessive use, but by weak or insufficient use.

Just as a muscle needs to be exercised up to its full demands in order to be kept in a healthy condition, so the mind must be engaged to the full limits of its normal requirements. The best gymnastic culture demands that no one part of the body should be cultivated to the disadvantage of another.

The test of the strength of a chain is its weakest link; the test of mental efficiency is determined by its weakest power. If a man be deficient in memory, for instance, he will be unable to marshal the facts upon which a correct generalization depends.

Hence, to strengthen the generalizing power the weak memory must be cultivated. Each part is necessary to the whole. The strengthening of one part tends to strengthen the whole. Habits of careless and illogical thinking are to be guarded against, for they beget a mind prone to a limited survey only.

4. Careless and Inexact Use.

So, also, the habit of careless and inexact expression is fostered by an incomplete and hazy thought. A clear thought is the only one of value, and can always be clearly expressed if time and care are taken.

The common expression, "I know, but cannot express it," is not true; whatever is known clearly can be intelligibly stated.

The person that pleads the above excuse is one who does not think clearly; he has only a vague notion of what he would say. The relations and dependencies of the images that have risen into his consciousness have not been distinctly apprehended. Such thought should always be put to the test of clear and exact expression. No rule for mental growth is more important than the foregoing.

5. Overfeeding the Mind.

The mind should not be overfed. We are all familiar with the effects upon the body of overfeeding, namely, a clogging of the digestive apparatus, a disordering of the assimilative processes, and a general nervous disorganization.

There can be a healthy mental condition only when the mind's food-supply of sensations, images and thoughts is properly digested and assimilated.

Every afferent nerve that takes a message to the central ganglion, every nervous center that receives a message it cannot attend to by reading it off and converting its stimulus into motor activity, is acquiring a permanent habit, good or otherwise. One who accustoms himself to look over the daily newspaper in a half hour must guard against the danger of aquiring the practice of *reading without knowing*. Not the least by any means of the evils of this newspaper age, is the loose mental habit inculcated by the rapid perusal of the multitudinous columns of the daily press. Time was when a man having few books or papers, read to remember. Now, few men read to remember. Hence, the average memory is vastly below its former standard. It may happen that long before man develops into a hairless and toothless animal he will become a memoryless one, and need to carry around a pad and pencil in every pocket. It is a good rule every day to read something to be accurately remembered.

Not all that one hears or reads need be remembered—far from it; but more of our serious reading should be done slowly and carefully, that any valuable and permanent mental reaction may be had.

Prof. Poland also dwelt upon the following points: Inhibition of disagreeable sensations and images; introspection morbidly acute; simulation of agreeable states; and observation of the external signs of mental states in children and the treatment therefor.

SANITARY LEGISLATION.

BY JUDGE WM. M. LANNING, TRENTON.

It is a maxim with us, imbedded in most of our State Constitutions, that all political power is inherent in the people. A portion of this power has, by the Federal Constitution, been irrevocably surrendered to the National Government. The remainder has been left with the individual States. Amongst the powers thus reserved to each State is that of establishing rules and regulations for the "protection of the lives, limbs, health, comfort and quiet of all persons, and the protection of all property within the State." This power, called the police power, has, by the Constitution of each State, been vested by its people, subject to some restrictions, in its State Legislature, whose authority in this respect is, within the limits prescribed by the State Constitution, supreme. The National Government can neither take it away nor impair it. Its only authority over State police laws is to declare them void when they are found to transcend the powers reserved to the States and to invade the sphere of authority vested in the National Government.* The establishment of sanitary laws by the Legislature of a State is therefore the exercise of a police power, and all property and social rights are held subject to them, provided they do not contravene the provisions of the State or Federal Constitutions.

Within the sphere of police legislation, the provision of our State Constitution that, probably, has been most frequently disregarded, is the one providing that "the Legislature shall not pass private, local or special laws regulating the internal affairs of towns and counties." In construing this constitutional provision our courts have held that the word "towns" includes cities, and that a law is special if it excludes from its operation any city or county naturally embraced in the class of cities or counties to which it belongs.† It is probably

*Cooley's Con. Lim. (5th Ed.), p. 708; Wilkinson *v.* Rahrer, 140 U. S. 545.

†Pell *v.* Newark, 11 Vr. 550.

not generally known that the act of 1880, establishing Local Boards of Health in this State, and that of 1886, which was a revision of the former act, came before our Supreme Court for review in the winter of 1886–1887, and, by excluding Hudson county from their operation, were upon the argument regarded as so plainly obnoxious to the constitutional provision referred to, that without waiting for the judgment of the court, application was made to the Legislature then in session, again to revise our sanitary legislation, which it did by the act now in force, approved March 31st, 1887, and made applicable to every city, town, township and municipality in the State. Except for this timely aid of the Legislature the people of the State would have been startled with a judicial declaration that not a Local Board of Health in the State was lawfully possessed of any power or had any legal existence.

It has also often been insisted that the fourteenth amendment to the Federal Constitution, which provides that no State shall deprive any person of his property without due process of law, operates as a restriction upon the authority of a State to ordain police laws. But the Supreme Court of the United States has determined over and over again that such is not its effect, and that it does not interfere with the police power of the State to prescribe regulations to promote the health, peace, morals, education and good order of the people. Accordingly, a law which prohibits the manufacture and sale of intoxicating liquors, even though it renders almost valueless property devoted to such purpose before its passage, does not contravene the amendment referred to.* And the enforced removal of the manufacture of fertilizers from a densely populated neighborhood, although the removal necessitates the abandonment for such purpose of valuable property, is within the lawful police powers of the State.† It is only where a State Legislature, assuming to act under a power reserved to the State, in fact invades the authority vested in the National Government, or violates a right secured to the people by the Federal Constitution, that the Federal courts will declare the act to be void.

Having now seen that just police regulations prescribed by a State Legislature do not conflict with the Federal authority, and that the restriction in our State Constitution upon the exercise of the State's

*Mugler *v.* Kansas City, 123 U. S.; Kidd *v.* Pearson, 128 U. S. 1.

†Northwestern Fertilizing Company *v.* Hyde Park, 97 U. S. 659.

police power relates rather to the manner of exercising the power than to the subject-matter of the regulations, it is obvious that the State Legislature may prescribe all such sanitary rules as it may deem necessary and expedient. It is not possible to fix definite limits to the exercise of such power. Under it, persons suffering from contagious diseases may be isolated; sources of foul odors removed; the sale of impure articles of food and medicine prohibited; the drainage and plumbing of houses inspected and supervised; vessels quarantined and passengers restrained of their liberty; infected goods and cargoes seized and destroyed; various trades regulated or prohibited within specified limits; vital facts and statistics gathered; men prohibited from the practice or sale of medicine who do not possess certain prescribed qualificatione. In short, the power of the State Legislature to ordain sanitary laws is adequate to all our sanitary needs.

The most familiar example of the exercise of the power for the protection of health, is the abatement of that class of public nuisances that give rise to noxious odors. Any person who keeps upon his property putrefying animal or vegetable matter injurious to the health of the neighborhood, may be indicted at common law for maintaining a public nuisance, without the aid of any special Legislative provisions. But such procedure does not remove the nuisance, and it is the right of any citizen to remove it without waiting for an adjudication that it is a nuisance. In such procedure, however, the citizen, if he destroys or injures property, renders himself liable to an action by the owner for damages, and unless upon the trial he can prove to the satisfaction of the jury that the thing removed was in fact a nuisance, and that in removing it he has done no more injury to property than was necessary, the owner will be entitled to recover from him the damage sustained. Such risk the citizen will seldom assume.

The evils that threaten the public health are often of such a nature that ordinary judicial procedure is too slow to secure proper protection. Hence arises the necessity, especially in densely-populated districts, of wise legislative provisions. The primary object of police legislation is to *protect* rather than to *detect;* to *prevent* rather than to *punish.* The Legislature, therefore, in the exercise of this peculiar power which we are now considering, may, by clearly defining what shall be prohibited, prescribe summary procedures for the protection of the public health. It may provide that skimmed milk shall be

sold from cans so labeled, that every pound of oleomargarine sold shall be accompanied with a label of a prescribed size and character, that all other articles of food and all drugs shall be of a prescribed standard of purity, and that anyone violating any of such provisions may be punished by a summary judicial proceeding without a jury. It may, as it has in this State done, provide that all milk offered for sale that is not of a certain standard of purity may be poured upon the ground. In case of a suit brought by the owner of such property for its destruction, the defense is that the sale of the thing destroyed was absolutely prohibited, and its destruction authorized as a police regulation.* The wisdom of clearly defining what shall be prohibited, and appointing officers to enforce the law, is well illustrated in the act of our Legislature that authorizes the destruction of all horses affected with glanders. The Secretary of the State Board of Health ordered a number of horses suffering with that disease in one of the car stables of Newark to be shot. The company owning the horses instituted suit against the Secretary for the destruction of its property. The defense offered was that the horses were afflicted with the glanders, and that the act above referred to authorized the defendant, as an officer of the State Board of Health, to kill them, and the defense was deemed to be a complete one.†

A little reflection will, however, show that it is impracticable for the State Legislature to define, for every portion of the State, all acts that sanitary rules should prohibit. In order to provide a proper system of sanitary rules for any particular municipality, not only must the sanitary needs common to all municipalities be considered, but also its special needs, determined by its density of population, the character of its soil, its facilities for natural or artificial drainage, the location of its markets, the business carried on within its limits, and the like. Even if it were practicable for the State Legislature to provide rules adapted to the special needs of a particular municipality, it would be exceedingly difficult to do so without infringing the constitutional provision against special legislation. But the State Legislature may create municipal governments and invest them with local municipal authority. And while it cannot in general delegate its legislative authority, it can delegate to municipal governments (including townships) by a general law such legislative powers as reasonably pertain to such governments.‡

* Shivers *v.* Newton, 16 Vr. 473.

† Newark Horse R. R. Co. *v.* Hunt, 21 Vr. 308.

‡ Howe *v.* Plainfield, 8 Vr. 149; Riley *v.* Trenton, 22 Vr. 498.

And it may distribute such legislative powers amongst various municipal bodies, giving to a Board of Fire Commissioners the power to prescribe rules for the government of the fire department, to a Board of Police Commissioners the power to prescribe rules for the government of the police department, to a Board of Water Commissioners the power to prescribe rules for the regulation of the water-supply, to a Common Council the power to adopt ordinances concerning the general municipal affairs, and to a Board of Health the power to prescribe health rules. This right of delegation was exercised by our State Legislature in the 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 31st, 1887. By this act, and its supplements, after providing for the establishment of a Local Board of Health in every city, borough, town and other local municipal government in the State, it is enacted that every Local Board of Health shall have power to pass, alter or amend ordinances, and make rules and regulations in regard to the public health within its jurisdiction, for the following purposes:

1. To aid in the enforcement of the law as to the adulteration of all kinds of food and drink, and to prevent the sale or exposure for sale of any kind of meat or vegetable that is unwholesome or unfit for food.

2. To define and declare what shall constitute nuisances in lots, streets, docks, wharves, vessels and piers, and all public or private places.

3. To prevent the spreading of dangerous epidemics or contagious diseases, and to declare that the same have become epidemic, and to maintain and enforce proper and sufficient quarantine whenever deemed necessary.

4. To regulate, control and prohibit the keeping or slaughtering of all kinds of animals.

5. To regulate, control and prohibit the accumulation of offal and all decaying animal or vegetable substances.

6. To prohibit and remove any offensive matter or abate any nuisance in any public highway, road, street, avenue, alley or other place, public or private, and to cause the removal of the same at the expense of the owner.

7. To compel the return of all births, deaths and marriages by

physicians, midwives, nurses, clergymen, magistrates and other persons professionally officiating at any death, birth or marriage.

8. To secure the sanitary condition of tenement-houses, jails, prisons and all public buildings.

9. To regulate, control or prohibit the cleaning of sewers, the dumping of garbage, the filling of sunken lots or marshlands, and to provide for the filling up of such lots or lands.

10. To license and regulate persons to engage in the business of cleaning cesspools and privies, to fix the fees that shall be charged for each license granted, not exceeding twenty dollars per year for each vehicle or conveyance, and to require all vehicles and conveyances used in such business to be approved by the Local Board granting the license.

All Local Boards, except Township Boards, also have the power—

11. To regulate and control the method of construction, the location and the manner and frequency of the cleaning of cesspools and privies.

12. To compel, prescribe, regulate and control the plumbing, ventilation and drainage of all buildings, public and private, and the connection thereof with outside sewers, cesspools or other receptacles, and to require plans for the same, with necessary drawings or descriptions, to be submitted to the Boards for inspection and approval, and to require all master and foreman plumbers and all building contractors to register their names and addresses.

13. To protect the public water-supply and prevent the pollution of any stream of water or well, the water of which is used for domestic purposes, and to order not to be used, or closed, any well the water of which is polluted or detrimental to the public health.

14. To remove persons affected with communicable diseases to a suitable place, where, in the judgment of the Board, such removal is necessary and can be accomplished without undue risk to the person or persons diseased, and to disinfect the premises when deemed necessary.

15. To regulate the burial and disinterment of human bodies.

The delegation of powers thus made to Local Boards of Health gives ample authority to define clearly by their codes and ordinances what shall be prohibited, and so to secure to the officer who enforces their

provisions the same protection as in the case of clear definition by the State Legislature. Since the Local Board of Health possesses no legislative powers not delegated to it by the State Legislature, its sanitary code should be so framed that the authority for each of its provisions will be readily discerned in one of the sources of authority above given.

In many of our city charters, which are special acts passed before the adoption of the constitutional provision against special legislation, there are delegations of power authorizing Common Councils to provide by ordinance for the *abatement* of nuisances, but not authorizing them to *define* nuisances. Under such delegation of power nothing injurious or hazardous to the public health could be abated that is not a nuisance at common law or has not been defined as a nuisance by an act of the Legislature. It is apparent, therefore, that a Local Board of Health which by its code or ordinance provides merely for the abatement of nuisances without defining them, fails to exercise one of the most important powers delegated to it.

But while Local Boards of Health may define nuisances, and provide for their summary abatement without judicial proceeding, and the officer removing a nuisance under such authority, may successfully plead that authority in his defense to an action for damages, it is equally important that there should be a clear definition of *all* acts of persons and conditions and uses of property which the interests of public health require should be forbidden. In a case where the offense against the ordinance is not a continuing one, as where one has sold an unwholesome article of food, or impure milk, or violated a provision concerning the dumping of garbage, or the cleaning or a cesspool, or where a minister or Justice of the Peace has failed to make return of a marriage, or a physician to make return of a birth or death, the act of 1887 provides that a summary judicial trial may be had before a District Court, Police Justice or Justice of the Peace, without a jury and without formal pleadings. The higher courts have uniformly held that to warrant the trial of an alleged offender against a statute or ordinance by a summary proceeding without a jury, the jurisdiction must be clear. Doubt upon this question is fatal.

A case occasionally arises, however, where the offense against a sanitary code or ordinance is a continuing one, and the abatement of which would be attended with consequences so great that no prudent health officer would assume the personal risk of deciding in what

manner the evil should be removed. Such a case was that of the State *v.* Hutchinson, where the laundry and waste-water, and fæcal matter of a large hotel in Trenton were sewered into a small natural stream, giving rise to noxious odors. One of the defenses made in this case was that until the city had constructed sewers, which it had not then done, no disposition of the hotel's sewage less hazardous to health could be made. But the highest judicial authority of the State declared that a nuisance was clearly proven, and that if the city could not or would not provide a system of sewers, and if without sewers the proprietor could not devise a method of disposing of the sewage of the hotel without creating a nuisance, the hotel must be closed. Another defense was that the sewage of the hotel was conveyed to the stream through a private sewer, constructed by the proprietor of the hotel under a license granted by an ordinance of the Common Council. The court in answer to this defense said that the Common Council had no power to license an act, the natural result of which would be to create a nuisance.*

Another case possessing some similar features, decided by our Court of Chancery, was that of The State *v.* Freeholders of Bergen. In it, the Board of Health of Hackensack complained that the Board of Chosen Freeholders were sewering the county court-house and jail into a small natural stream flowing through the city, and thereby creating a nuisance hazardous to the public health. The city had no sewer system with which the court-house could be connected. In that case the court found that the creation of a nuisance by the court-house sewer was not proven. But if it had found otherwise it is by no means certain that it would have ordered the discontinuance of the sewer; for the opinion contains an intimation that a distinction might be made between the sewering of a county court-house and jail, which the law requires to be maintained, and the sewering of a hotel, the maintenance of which is not required.†

Another case was that of the proprietor of a large tomato-canning factory who conveyed the refuse matter of his factory into a natural stream, thereby causing foul odors and threatening the public health.‡

And another, that of the proprietor of a soap factory from which sickening odors emanated.§

* Hutchinson *v.* Trenton Board, 12 Stew. 569.

† State *v.* Freeholders of Bergen, 1 Dick. 173.

‡ State *v.* Butterfoss, 13 Stew. 325.

§ State *v.* Niedt; a Mercer county case not reported.

These cases presented important questions for consideration, and he would have been a bold man who in any of them would have dared to abate the nuisance or stop the act complained of, without first having obtained the authority of a judicial decision. And, happily, by a provision of the act of 1887, such authority in any proper case need not long be delayed. Any Local Board of Health, instead of proceeding in a summary way to abate a nuisance, may apply to the Court of Chancery for an injunction and have the matter adjudicated according to the practice of that court. This, indeed, was the course pursued in the last four cases to which I have referred. It is the better course in all cases affecting important industries. And even in every such case the Board of Health asking the aid of the Court of Chancery should be able to show what particular section or sections of its code or ordinance have been violated. Unless it can do so, it must show its right to the aid sought, under some general provision of the act of the State Legislature.

It cannot be too strongly impressed upon the minds of health officers that the State Legislature has left it to each Local Board of Health to perfect by its code or ordinances such a system of rules as may, in its judgment, be necessary for the protection of the public health within the limits of its jurisdiction. Without such a system there can be no summary trials and no adequate protection. It is true that the act of 1887 does provide that the power of a Local Board of Health to abate a nuisance hazardous to the public health shall not depend upon the previous adoption by it of a code or ordinance in relation thereto, but as already intimated there are many acts which may properly be prohibited by code or ordinance, that are not recognized as nuisances at common law, and are not so defined by any act of the Legislature.

I have frequently been asked by health officers as to their powers in doubtful matters which might easily be made certain by code or ordinance. We do not so much need additional legislation by the State, as additional and intelligent legislation by Local Boards of Health. Having personally had no hand in the preparation of the sanitary code of Trenton, I feel free to say that I consider it a model of excellence in so far as the Local Board of Trenton has thereby attempted to exercise the powers conferred upon it. Although the Board has in this code exercised power under thirteen of the fifteen sources of power mentioned, it has

exhausted none of them, for the State law is so general in its terms that it authorizes the addition to the code of new provisions as often as the public good may require. Whatever defects may exist in the administration of sanitary law in our State must therefore be due chiefly to the failure of Local Boards to provide proper codes or ordinances, or, if they have provided them, to their failure properly to enforce them.

The act of 1887 provides that the various Local Boards may, for the purpose of enforcing the provisions of its code or ordinances, appoint Health Inspectors and Agents. Each Board should appoint a sufficient number of these officers to insure proper inspection of its health district. We not only provide laws against the employment of young children in factories, but, in the exercise of our police power, we also appoint Inspectors, whose duty it is to visit the factories of the State to ascertain whether the law is violated, and if so, to bring the offenders to justice. And so in the all-important matter of preserving health, a Local Board should not only adopt good and wise sanitary rules, but should provide for their vigorous enforcement by the appointment of men whose duty it is not to sit still until some one shall complain of the violation of a sanitary rule by a neighbor, but to visit frequently the various parts of their respective districts and *inspect* those parts, ascertain who are in any manner violating the code, and advise, warn or sue, where advice, warning or suit is necessary. Not only should the code clearly define what should be prohibited, as I have already observed, but it should also as clearly define the duties of Inspectors and Agents.

The acts of the Legislature of our State for the protection of health and the record of vital statistics, embracing, as they do, the act of 1887, already more than once referred to, and its supplements; the act for the certification of marriages, births and deaths, and the vital facts relating thereto; the act to prevent the adulteration of food or drugs; the act to regulate the cutting and sale of ice in cities; the act to prevent the adulteration and to regulate the sale of milk; the act to regulate the practice of pharmacy, and others that might perhaps be named, contain provisions far in advance of the local legislation of our Boards of Health. To be effective to such an extent as the State Legislature has intended, these acts must be supplemented by proper local legislation.

Local Boards need to be frequently instructed concerning their

powers and urged to exercise them. Such work has been for years efficiently carried on by the Secretary of the State Board of Health. Under his wise administration popular prejudice against the execution of sanitary law is disappearing. The people are more and more appreciating the advantages of such law, and in the place of offering obstacles to its enforcement we find that it is now the common experience of Local Boards to be besieged with petitions for the abatement of this or that nuisance or the correction of this or that evil. When Local Boards generally shall better understand their powers and shall ordain and enforce reasonable rules for the sanitary welfare of their respective health districts, we shall have a greatly-improved sanitary system.

In concluding this paper, I have but two suggestions to make respecting additional State legislation. The act of 1887 gives to the Local Board of a city, town or borough the right to draw annually on the treasury of its municipality for a sum not exceeding five cents for each inhabitant, unless the Common Council or other governing body shall have consented to the appropriation of a larger sum. Is it not absurd to expect that a Local Board, composed of intelligent men, who have informed themselves as to their powers and who are willing and desirous of executing them, can, with an annual allowance of $3,000 in a city of 60,000 inhabitants, properly execute the fifteen powers delegated to such Board? For the larger cities, at least, greater discretionary power should be given to Boards of Health as to the amount of money that may be expended.

The other suggestion is, that the State Board of Health should have the right to apply to the Court of Chancery for an injunction to restrain a nuisance or a business hazardous to the public health in all cases in which the proper Local Board fails to act, and in all cases where the nuisance or business affects the health of citizens within the limits of two or more sanitary districts.

TRAPS AND VENTS ON SEWER OR SOIL-PIPES AND THEIR USES.

BY E. M. HUNT, M.D.

If the pipes through which soiled liquids and floating solids pass from the house to the common sewer, as well as the sewer itself, could be of smooth and unabsorbent material like glass, and if we could always be sure of an unvarying draught outward and through the sewer to its outfall, traps would not only be useless but hindrances.

If, as is the case, pipes of the best construction and grade will retain a slight coating of decayable matter and odors of foul particles or gases, we are able to reduce these to a minimum by a free ventilation and by doing all we can to promote downward and outward currents. While, to a small degree, we may avail ourselves of heat to promote draught, we are to know that this also promotes decomposition where there is moisture.

Because we are not able to rely on the cleanness of pipes and the absence of decaying particles and gases, or upon a constant and complete ventilation and outward draught, we resort to traps.

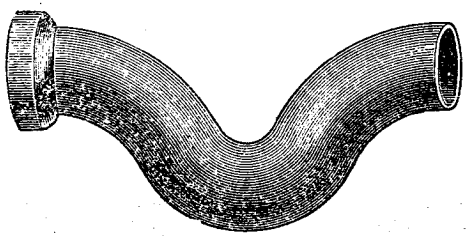
A trap, therefore, is a device for breaking the air or draught connection between parts of a pipe or sewer system, so that gases cannot pass through its length and so enter a building.

It is now generally agreed that there should be a trap near each fixture, between it and the main soil-pipe, and a trap on the main soil-pipe where it leaves the building.

It has been objected to this trap on the soil-pipe where it leaves the house, that it impedes ventilation, slows the flow of sewage, and is apt to have foul matter lodged in it. These objections are inconsiderable, since they can be fully compensated for by other ventilation, and by sufficient fall of pipe and flow. Without a trap we have too little assurance that gases and particles from the sewer or cesspool will not reach the house system. This outside or intermediate trap should

have passing from it a ventilating pipe, and should be of size and inclination and depth suited to the size of other pipes and to the amount of liquid it is to carry. When good fall cannot be had it can be supplemented by artificial flushing, or there are rare cases where the trap may be omitted.

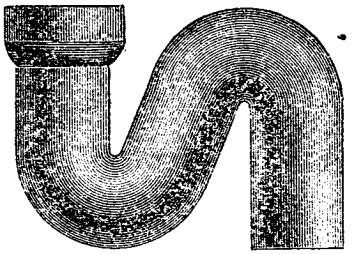
In order that traps may afford a seal and yet be self-cleansing, they should never be larger in bore or caliber than the waste-pipe they receive their liquid from, and should have such bend, setting and inclination as to give fall and yet have a dip or depth of water-seal of two inches, the variation from this, as a rule, not being over a half inch, as modified by circumstances. If they can be arranged with cleaning screws to which access can be had, so much the better.



RUNNING TRAP.

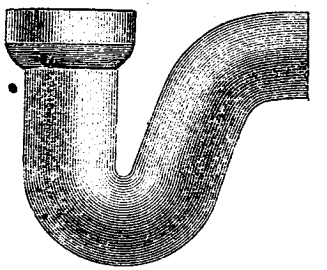
The simplest form of trap is the running trap. A running trap is simply a U bend in a horizontal pipe for the purpose of forming a water-seal.

By a bend or dip in the metal of the pipe a small bowl is formed, which holds enough of the passing liquid to make a seal.



S TRAP.

An S trap is an S bend in a vertical pipe for the purpose of forming a water-seal.

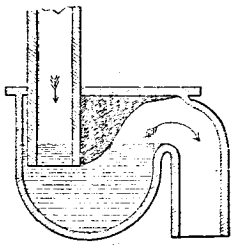


HALF-S TRAP.

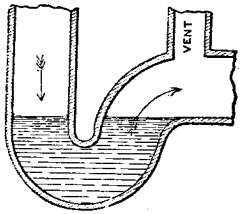
A half-S trap is where a vertical pipe is connected with a horizontal one, so that by what is called a half-S bend a trap is formed with a vertical inlet, and a horizontal outlet serves to form a water-seal.

It is sometimes objected to these and other traps depending alone on water as a seal, that water can absorb foul gases and particles, and so pass them from one part of the pipe to another. Carmichael, Frankland, Pumpelly and others have shown that the experiments of Fergus do not represent what takes place in actual use, and that practically the water-seal, when continuous and sufficient in depth, can be relied upon.

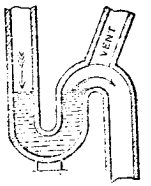
While in some localities and in special conditions other traps are to be recommended, the running and S traps are likely to be the chief reliance in house-plumbing.



D TRAP.



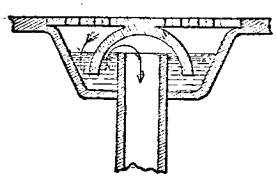
P TRAP.



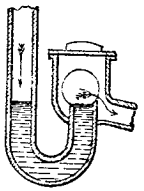
S TRAP.

As, however, there are possible cases in which other forms of traps may be used or when the usual water-seal of these traps is liable to be broken, traps are generally spoken of as of three kinds—water-seal traps, mechanical traps, mercury-seal traps.

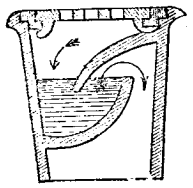
Of the first we have already given examples (D, P, S), but as there can be variations in shape, in direction, in material, in mode of access, there are such modifications as the ordinary bell trap, Buchan's trap, Antill's trap, Adee's trap, Putnam's Sanitas trap, the Puro trap, the bottle trap, &c. These are traps with tortuous passages.



BELL TRAP.



BUCHAN TRAP.



ANTILL'S TRAP.

The chief point claimed as to most of these is that by change of shape, direction of flow and slight devices they do not admit of easy siphonage or discharge of the water-seal. This difference is generally claimed to be secured by changing angles or the line of direction and impetus of flow of the water through the trap. We here select a description of the Puro trap from the "Sanitary News" (1891), because it gives the chief points which distinguish this class of trap:

"THE PURO TRAP.

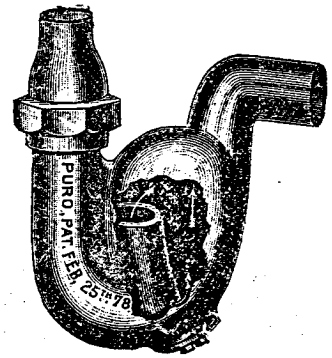
"There has never been any question that all the *positive* requirements of a trap are best fulfilled—indeed almost ideally fulfilled—by the plain S trap. Its interior is smooth, its water-way is free, and its self-scouring quality is complete. But it has one defect; it is subject, under certain conditions, to siphonage. Hence, the problem seemed to be to preserve all the good qualities of the S trap and eliminate its one weakness.

"The usual answer to this problem has been and is the use of a vent-pipe from the trap to the outer air; but this device is often cumbersome, costly and frequently ineffective. A recognition of these facts has stimulated invention in a rather remarkable degree, and the result is a large number of traps, differing in form, but all seeking the same end, and few without some merit. The trouble has been that inventors have, as a rule, avoided one defect by running into another.

"The chief danger recognized has been siphonage. To avoid this, traps have been made of such large capacity as to diffuse the water

entering them, making them slow of discharge, not self-scouring, and hence retaining deposits. Others have had so many bends and angles and corners unwashed by the flow as speedily to fill up with filth. Others have had moving parts liable to wear out and to derangement Still others have had mechanical obstructions to the flow, preventing not only their own scouring, but also the proper flushing of the waste-pipe.

"In the Puro it is claimed that all the advantages of the S trap have been retained, that its liability to siphonage has been obviated, and that no advantage has been gained in one direction at the cost of a defect in another. It is made of brass or lead in P and S forms.

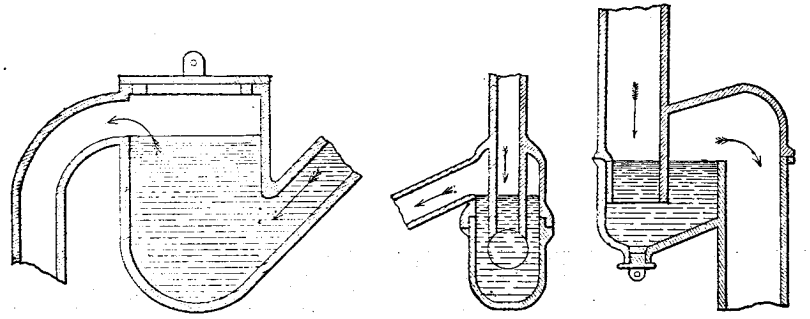


THE PURO TRAP.

"The cut shown is that of the P trap. In shape it is an easy curve. The interior of the trap proper is perfectly smooth and rounded, and the diameter of the enlargement is about double that of the inlet. A small partition or funnel is formed near the bottom of the trap. Were this omitted, the trap would be effective to a certain degree, but its interior would not all be scoured, and in case of siphonage, much of the water could be thrown out. This funnel serves two purposes. It will be noticed that its outer wall is set at a slight angle to the line of flow. Hence, while most of the water in discharge passes across its mouth at the bottom, a small proportion is deflected and passes upward through its interior and is thrown in different directions against the upper portions of the trap, thus creating as it were an artificial scouring of those parts against which the water otherwise would have but little force. The second office of this funnel is to facilitate the admission of air into the trap from the inlet side when the discharge from the fixture above ceases, or in case of siphonage from the discharge of other fixtures, and thus to save as much as possible of the contained water for a seal. Experiments with siphons have shown that air entering at the crown of a siphon acts much more quickly in arresting siphonage than when taken at any other point. In the case of the

Puro trap, the water flowing up through the funnel is much broken and mingled with air, and through this channel air finds a much more ready admittance to the crown of the trap than if it were obliged to struggle up through a solid mass of water. This sudden 'breaking' at the final moment of discharge enables the trap to retain a large portion of its water, enough indeed to give it a good seal, even though no tailing flow filled it up again to its overflow point. On this facility in the admission of air the Puro trap rests its claim to be non-siphonable.

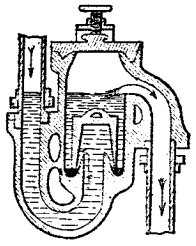
"The funnel, which at first sight might appear to be an obstruction to the flow, has in fact quite a contrary effect. The strongest flow in any part of the trap is across the bottom of the funnel, which is found in practice to act as a *vena contracta*."



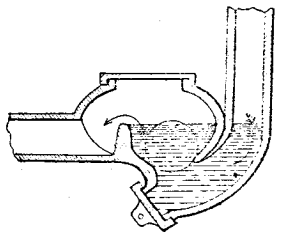
ROUNDED FORM OF BOTTLE TRAP. BOWER TRAP. ADEE TRAP.

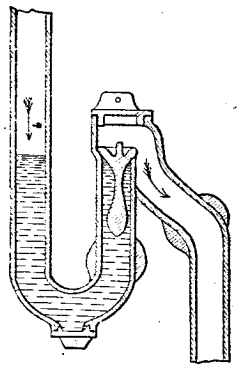
The Adee trap and the rounded form of the bottle or pot trap are also water-seal traps with slight modifications.

NICHOLSON'S MERCURY-SEAL TRAP.



CUDELL'S TRAP.



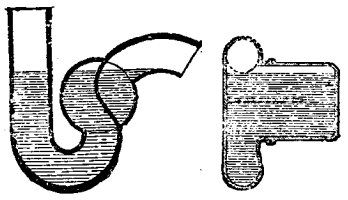


~~CUDELL'S TRAP.~~ ~~NICHOLSON'S MERCURY SEAL TRAP.~~ WARING'S CHECK-VALVE TRAP.

We illustrate the mechanical traps by Bower's, Cudell's and Waring's, and the mercury-seal traps by Nicholson's.

Mechanical traps are those in which the water-seal is largely supplemented by some device for sealing, such as balls, valves or floats. One of those in common use is the Bower trap, in which a floating india-rubber ball helps to insure perfect closure. Cudell's trap, in which the closure is by the weight of a metallic ball, and Waring's check-valve trap, which has a valve-seal closing by its weight, depend upon similar principles. All those traps which close by gravity may be prevented from close shutting by small particles, strings, &c.

Mercury-seal traps have, in addition to the water-seal, a column of mercury, of which Nicholson's mercury-seal is an example.



PUTNAM TRAP.

The Putnam trap, or Sanitas trap, while belonging to the first class, is so elaborate in construction and shape as almost to be classed with the second order. It seems to preserve the scouring advantages of the ordinary S trap, and yet by its shape to be less liable to siphonage.

Mr. Putnam, in his articles on sanitary plumbing in the "American Architect" (1883–4) has well specified the characters of an improved trap. Some of the points are these:

(*a*) It must so utilize the water-seal as to need no other.

(*b*) Must be capable of resisting the severest tests of siphonage, momentum and back pressure.

(*c*) Must contain sufficient depth of water to be practically safe against evaporation.

(*d*) Must admit of inspection and cleansing, and

(*e*) Offer the minimum of resistance to the flow of the water.

It is well, also, for the Inspector to notice the thickness and material of traps, since the metal may be of poor kind or quality, too thin or have sand-holes. Thus, the "Du Bois" traps or drawn-lead pipes are, as a rule, better than those of the same material cast in a mould.

EMPTYING OF TRAPS BY SIPHONAGE AND EVAPORATION OR CAPILLARY ACTION.

Siphonage is the effect produced by a partial or complete vacuum in the waste or soil-pipe beyond the trap. The effect of this is to draw or let up the contents of the cup or downward bend of the trap, so as to permit the passage of air or gas.

Emptying by momentum or back pressure or by suction is generally included in siphonage. The terms suction of gas or air pressure, as used in connection with siphonage, chiefly occur as follows:

Traps on a long and steep line of waste-pipe, or which have an easy bend, or with a small dip or depth of seal, are liable to empty themselves by the momentum of a body of water rushing through them, which, passing beyond the trap and filling the pipe, will cause a vacuum behind it.

Water running through a larger pipe, as the main soil-pipe, also by its momentum may suck the air out of a smaller pipe which joins it, and so empty its pipe. The pressure of pent-up air or gas may also by its back pressure push the water out of a trap. These effects somewhat correspond with the plenum and exhaust methods of ventilation.

Evaporation empties a trap simply by giving up its water to air, and of course is most liable to occur in traps of small dip, bend or water-seal, in those out of use and in those that have free ventilation.

The siphonage of traps by capillary attraction takes place when for any reason a siphon is formed by a string or other particles, and the water so conducted out of the seal.

"'The Hydraulic Plumber,' some time since, discussed the effects of siphonage, or rather, of combined siphonage and capillary attraction, often produced in traps through the medium of bits of cloth, or strings of matted lint and hair, which catch in the outlet of the trap, and hang down, with one end in the dip of the trap and the other extending down the outlet pipe. Every one knows that a wet towel, hung over the side of a wash-basin, will soon draw all the water out of the basin, and the mat of lint and hair on the edge of a trap seems to act in precisely the same way. In illustration of the principle, a correspondent relates a story of his employment, some time ago, to investigate the causes of a foul smell in a certain bath-room, where other plumbers had worked before him in vain. The pipes had been swabbed out; the closet, an old-fashioned pan apparatus, had been

burned out, and disinfectants applied, in vain. The wastes of bath and wash-basin, according to the old practice, entered the water-closet trap, but no sign of leakage could be discovered about this or the waste-pipes. The new plumber, not knowing what else to look for, removed the closet and filled the trap with water. As soon as the agitation had ceased he measured the depth of the water, and then left it to itself for twenty minutes. At the end of that time the water-level had fallen half an inch. Twenty minutes later it had fallen still more, and in an hour the seal was so far broken as to allow a slight current of sewer air to enter the room. The plumber then left the room for two hours, locking the door and taking the key with him. When he returned the place was full of foul air, and on passing his hand under the bend of the trap he found a space of about an inch and a quarter between the surface of the water and the underside of the bend of the trap. The next step was to cut away the crown of the trap so as to expose the upper portion of the bend. An opening was made, four inches long and three and one-half inches wide, but examination through this showed nothing out of the way until the trap was refilled, when a wet line was observed over the bend, which proved to follow the course of some hairs, twelve or fifteen in all, which had been caught, together with some lint and ravelings, in the slimy lining of the bend. By detaching the lower part of this collection from the walls, allowing it to hang down free in the outlet-pipe the water was observed to drip from the end at the rate of seventy or eighty drops a minute. The whole was then cleared away and the closet replaced, and no more trouble was experienced. The plumber in question then made some very interesting experiments to ascertain the amount of conducting substance necessary to cause the emptying of traps in this way, using a small beaker glass in place of a lead trap. He found that with five pieces of number eighty spool-cotton, about seven inches long, hung over the edge of the beaker, the water-level was lowered three inches in nineteen hours, and one-half inch in about fifteen minutes. With five long hairs the lowering amounted to one inch in ten hours, and three inches in about a day and a half. With five hairs and two threads, of the same size as before, the lowering in seven and one-half hours was one and one-half inches. One piece of cotton twine lowered the water three-quarters of an inch in four and one-half hours. Two pieces of twine drew over an inch of water in two hours, and two inches in less than four hours. A bit of cotton cloth, half an inch wide, siphoned over three-quarters of an inch of water in an hour and a quarter. As nothing is of more common occurrence in drain-pipes than lint or hair, it seems likely that this observation will explain many cases of offensive odors in bath-rooms and bed-rooms not otherwise to be accounted for."

In traps not too large and well flushed this can very seldom happen. While siphonage does not occur as frequently as sometimes

asserted, it is easy to see that with an imperfect understanding of how it may occur, it may often result by the ignorance of plumbers or the carelessness of house occupants.

The chief means of prevention are as follows:

As great a dip or depth of seal as is consistent with proper scouring of traps.

Such shape and setting of traps as will reduce the chances of it to a minimum or prevent it, as is claimed for some mechanical traps.

Extending of the main soil trap, of full size, to the roof, with its top open, and also an opening at the lower or basement part of the pipe, where it leaves the building.

The venting or ventilation of the trap by extending from it an open pipe directly to the roof.

This last is now the usual way of securing such local venting of trap as will insure against siphonage. It meets with the approval of most authorities and is included in the specifications of many plumbing laws.

There are those, however, who claim for it some disadvantages, such as the more rapid evaporation of water in the trap, and that it is unnecessary, because traps can be so located as to have little or no risk of siphonage, or can be secured against it by mechanical devices.

In a recent discussion in the "Sanitary News," of Chicago, these views are well presented, and so we quote freely from Col. George E. Waring and a writer who signs himself A. J. T.

THE BACK-VENTING OF TRAPS.

"It is assumed by some that unless a trap is back-vented it is sure to lose its water-seal by siphonage; and that if it is back-vented, the water-seal cannot be withdrawn. Neither of these assumptions is true. Many traps are so placed that they are by no means subject to siphonage, and traps which are necessarily subject to the suction which would produce siphonage may have fresh air supplied to them by a much simpler, less costly and more effective method (McClellan trap-vent), or, which is still better, may be replaced with traps (like the Sanitas and Puro) which no amount of suction and siphonage that can occur in house-drainage can rob of their seal. The use of the back-vent pipe prescribed is by no means always effective in preventing siphonage. If there were a hole in the top of the trap nearly as large as its interior diameter, sufficient air to supply the suction would always enter and prevent the disturbance of the seal.

If this hole were connected with a pipe a few feet long, it would still be secure. The larger the hole and the larger the pipe, the longer the pipe may be and still produce the same effect; but in practice we soon reach a point where the inertia of the air in the pipe and its frictional resistance to the movement of air require more suction to set up a current that is required to move the water-seal. This has been demonstrated in detail by ample, carefully-conducted experiments.

"I found in my experiments that under the ordinary conditions of house-drainage the free ventilation of the soil-pipe sufficed to prevent unsealing. Mr. Helyer found that with a properly-ventilated soil-pipe it took ten discharges of a water-closet to cause a small trap connected with the lower point of the soil-pipe to lose less than one-half of its $1\frac{3}{4}$-inch seal. Mr. Philbrick tried a 2-inch trap on a 2-inch waste with a 1-inch vent-pipe less than thirty feet long. Its seal was $1\frac{5}{8}$ inches. In nine experiments with a discharge through it of a pail of water, it lost its seal twice. Substituting a $1\frac{1}{2}$-inch vent fifty feet long, this trap lost one inch of its seal in five trials out of ten. With a 4-inch trap on a 4-inch soil-pipe with $1\frac{7}{8}$-inch seal and a vent-pipe $1\frac{1}{2}$ inches in diameter and one foot long, the discharge of a pail of water destroyed its seal three times out of ten. Increasing the vent to two inches, the discharge of six pailfuls broke the seal once and nearly broke it twice. Increasing the vent to three inches, ten pailfuls broke the seal once and reduced it to less than one-half its depth six times. He also says: 'Under conditions which indicate perfect security, with a pipe one foot long and one and a half inches in diameter on a four-inch trap, a coil of pipe fifty feet long coupled to the vent rendered it inefficient once in eight trials—the trap, having two inches seal, being siphoned in this case—and lost one inch of water three times out of the eight. In another case, where a short vent of one inch in diameter seemed to be quite efficient, a coil of 1-inch pipe, with a length of twenty-eight feet and six inches, being coupled to it, rendered the vent of apparently little use, for the trap lost its seal at every trial.' He concludes that with ordinary hopper closets used for emptying slops, 'it is difficult to preserve the seal in the ordinary form of S trap, even by a vent-pipe attached thereto, unless this be applied directly to the crown of the trap, and be as large as four inches in diameter for at least a foot above the trap.'

"Putnam, in a long and elaborate series of experiments, reached a conclusion no more favorable, and found that it made a great difference whether the vent-pipes were straight or coiled. Short bends are worse than the larger bends of a coil of pipe, and short bends are indispensable in the modern practice of trap-venting. Aside from the inefficiency of back-venting as a preventive of siphonage, it has the very serious objection that it brings a current of air into close proximity to the trap, tending to lessen the sealing-water by evaporation. This is a serious and constant danger. It may indeed be

believed that the existing back-venting of traps, carried out under the plumbing regulations of different towns in this country, results much more often in emptying traps by evaporation than it does in preventing siphonage by furnishing air to the suction.

"Then again, the trap-vent at the crown of the trap is very liable to become reduced in size, or entirely closed, by the accumulation of sticky matters thrown against it, so that even where a vent-pipe is effective when it is new, it becomes ineffective after a little use. In short, it is an unsafe reliance, and is rarely, if ever, to be depended on with entire confidence.

"I venture the opinion that the back-venting regulations would never have attained their wide influence and popularity, had they not opened a field for a great increase of work and profit for the plumber. They increase the cost of plumbing-work very much and are an apparant advantage to the trade by which they are supplied. It is not unlikely, however, that the cheapening of house-drainage which the abandoning of this system would secure, would ultimately greatly increase the amount of plumbing-work to be done. So far as back-venting pipes are made of lead, they are objectionable because subject to injury from the careless driving of nails and from the gnawing of rats, either of which may cause an unsuspected opening between the foul air contained in the drainage system and the interior atmosphere of the house.

"I have no hesitation in saying that, in my judgment, all ordinances and regulations requiring the back-venting of traps by special pipes communicating with the air above the roof, or with the upper part of the soil-pipe, should be abrogated, and that some reliable trap, that will hold a sufficient water-seal in spite of any amount or continuance of suction that can be produced in house-drainage, should be required to be used in all positions where there is a liability to siphonage.

"It may not be improper for me to add that I consider myself in matters of house-drainage a thoroughly practical man; that I have no interest whatever in the Sanitas trap, the Puro trap, or any other 'combination' trap; and that neither the Sanitas nor the Puro ever holds any deposit whatever, ever has its water-way reduced, ever approaches the condition of an S trap, or can ever have its seal broken by any conditions occurring in house-drainage.

"Respectfully yours,

"GEO. E. WARING, JR.

"February 7th, 1891."

Another writer (1891) speaks thus:

"On the subject of back-venting and combination traps I will briefly state some experience of my own. I had long been an advocate of back-venting, and would listen to no argument in favor of

combination traps, as I was told that they were filthy, liable to siphonage, and generally unreliable.

"It so happened in my experience that I plumbed a three-story and basement flat building, using the best method of back-venting, and afterwards occupied one of the lower apartments myself. I felt very comfortable in regard to the reliability of the plumbing; for had I not done the work myself in accordance with the most approved system? But I was not long in the building until I began to study that system and look into it very closely. My attention was first called to the matter by observing a rumbling sound in my wash-basin every time the fixtures above were discharged. I investigated and found that the bubbling sound proceeded from above the back-vented trap, and not below it. I then made experiments and found that at every discharge the basin trap lost a portion, and often all, of its seal. This satisfied me that the plumbing was not right. I examined the vent and found it clear, unobstructed to the top. I removed it at the trap-crown to examine more closely the trap, and found that, with the vent disconnected in this way, the trap did not siphon, nor was the seal at all disturbed by the discharges. I could come to no other conclusion than the length of the vent-pipe, the inertia of the air and the friction along the pipe wholly destroyed the efficacy of the vent, and left the trap subject to the breaking of its seal at every discharge of any of the fixtures connected with the system.

"To remedy this plainly-discernible evil in my pet plumbing job, I procured a Bower trap, and with it replaced the S trap and vent. It has now been over three years since this was done, and I have a perfect seal all the time, and I have not touched the trap once. I likewise replaced all the traps in the flats, and now live in perfect comfort and security regarding sewer-gas. Since then I have seen this trap tested in every way possible, and it has never failed. I do not wish to be understood as disapproving of other traps of this general character. There are the Cudell, Sanitas, Puro, 'Clean-Sweep' and others—all good traps; but I use the Bower because I have found it efficient. I do not particularly advocate any one trap, but cannot advocate back-venting under all circumstances. In fact, I find few conditions where I would use it at all. The McClellan vent is practical and effective under many conditions, and all these, in the large majority of cases, are to be preferred to the back-vent.

"Let us look a little into the reasons for this conclusion, having seen the facts on which it is based. The three principal causes that produce the effect of unsealing a trap are siphonage, evaporation and capillary attraction. In regard to capillary attraction, it is just as likely to occur in a back-vented S trap as in any other, so in that matter it is a 'stand-off;' but when the S trap has lost its water-seal it has no seal whatever, and its form naturally contributes to capillary action. In the matter of evaporation we find in the back-vented

S trap about all the conditions necessary for unsealing the trap in this manner. We have changing air in contact with the water-seal, an air-current carrying off the vapor, and air-pressure on the house side of the trap, which aërates the whole of the seal, producing the conditions for rapid evaporation. We do not have any of these conditions in the 'combination traps.'

"As regards siphonage, the theory of back-venting is plausible, but the practice is a 'vexation of spirit.' A short vent-pipe, if large enough, will prevent siphonage; but to find this condition in general plumbing-work is very rare. The theory of back-venting includes that of ventilation, and a current of air is supposed to be moving *up* the pipe continually. If we accept a theory in one particular we must in all, and the back-vent, in order to prevent siphonage, must have this current of air reversed and made to rush *down* the pipe. Here we have to overcome this ascending velocity of the air, its dead weight, and the frictional resistance of the pipe. I have found, to my own satisfaction, that all this resistance is greater than that of the seal and short pipe to fixture, and the seal gives way first.

"In conclusion I wish to state that back-venting is efficient where the length of pipe and its size afford a less resistance than the water-seal; but when this is passed, which is the case in the majority of buildings, this system is ineffective, and a resort to a 'combination trap' seems to me to be wise. A. J. T."

Instead of the back-venting of traps, to prevent siphonage, besides the various modifications of traps, Dr. E. S. McClellan, of this State, has invented an "Anti-Siphon Trap-Vent," which has come into extended use. It is well described in an article by Prof. J. E. Denton, of Hoboken, in the last volume (1890) of the American Public Health Association. We give here a sectional diagram of it.

There can be no doubt as to its successful use and its adaptation to many conditions.

Figure 4 is a sectional view of the body, A, and the bridge, L, with a perspective view of the cup, B, and thimble, C, in their normal position.

Figure 5 is a sectional view of the body, A, the screw nipple, E, the nut, F, the solder nipple, G, a perspective view of the thimble, C, in its normal position, and of the cup, B, lifted out of the mercury-seal by the air-pressure against its under surface, and admitting a free inflow of air, as indicated by the arrows. As soon as the demand for air is satisfied, and the equality of pressure re-established between the air in the room and the air in the pipe, the cup drops back, by gravity, to the position shown in Figure 4.

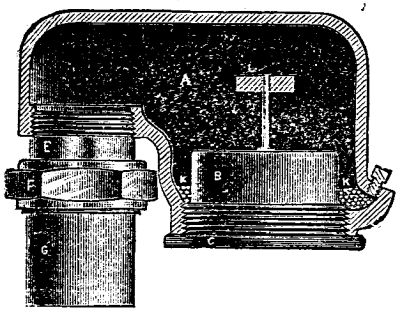


FIG. 4.

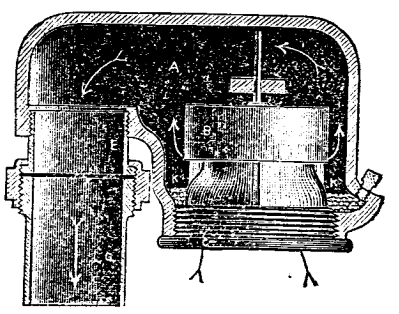


FIG. 5.

K is a mass of mercury resting in the annular groove between the body, A, and the thimble, C, and serves to seal the edge of the inverted cup against the passage of sewer-air into the apartment.

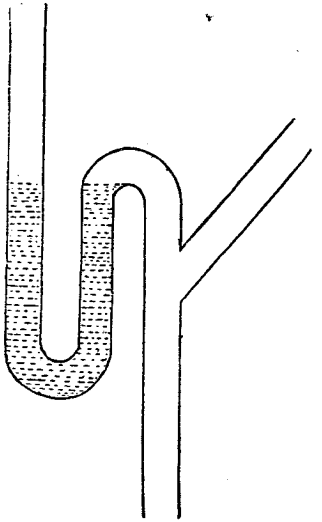
L is a bridge to support the guide pin of cup, B, as shown in Figure 4.

We give these statements because the efficacy of venting is so generally accepted, and so it is proper to consider methods in which it can be dispensed with. We do not wish to be understood as indorsing these views except so far as believing that the expensive method of venting all traps should be so far modified as to inquire more accurately into the possibility of locating traps so as to avoid siphonage, and also into that class of cases in which the mechanical traps are cheaper and equally reliable.

Where traps are vented the vent generally starts from the crown. We give, however, the view of Mr. Kelly, a practical plumber, who claims that the vent ought to start a little beyond this, on the downward bend of the pipe. He speaks thus:

"Some claim that the only proper way to ventilate a trap is from the crown of the trap. I claim that, according to my idea, that is an improper way, for it brings the air-pipe so close and directly over the seal that the seal is endangered by evaporation, and the vent is endangered also by becoming stopped up with filth thrown up by the action of the water. The proper place to connect the air-vent is below the crown and above the bottom of the trap, so as to bring the branch on a level with the center of the water in the trap, and the vent should always be taken from the waste-pipe and not from the trap, with a Y branch, as illustrated in the cut.

"It is clear to me that by doing this the action of the water passing the air-branch causes the air to start gradually, and relieves the trap and the air-vent of that sudden strain which takes place when



the fixture is emptied. I have not received those ideas from theoretical experiments but from practical experience, and my ideas are theoretical and practical."

In long lines of soil-pipe, as on high buildings, the fixtures are more apt to siphon, and the vent pipes must be of larger diameter to compensate for the effects of friction. Where traps are not in use, if glycerine or oil is let into the trap it will not evaporate. Many, when houses are vacant, leave a very slight drip from some faucet. These few facts will aid Inspectors in their examination of house fixtures and prepare them for the use of such an excellent manual as that of W. P. Gerhard, C.E., on House Drainage or Sanitary Plumbing, or the many larger works which discuss the whole subject more fully.

NOTE.—We hereby acknowledge our great indebtedness to W. P. Gerhard, C.E., of New York City, for the use of several of his cuts of traps, as well as to his publishers, D. Van Nostrand Company, 23 Murray street; also to Dr. E. S. McClellan, and Du Bois Manufacturing Company, 245 Ninth avenue, New York City, for use of cuts.

For convenience of reference we add hereto a few facts as to pipes, traps and siphonage in the form of question and answer:

Q. How can a trap be emptied or unsealed?

A. By leakage, evaporation, siphonage or air-pressure.

Q. Explain leakage?

A. Leakage from the cup of the trap may be due to an imperfectly-fitted trap-screw at the bottom of the cup or downward bend; or to an opening in the walls of the trap itself, due to defective material or workmanship; or, in case of a very old trap constructed of soldered lead, to corrosion and decay in the metal, usually at the joints.

Q. Under what circumstances does evaporation unseal traps?

A. The traps of fixtures not in ordinary use, such as fixed wash-bowls in spare bed-rooms, are liable to be unsealed by evaporation if the precaution is not taken to draw a little water into them at regular intervals, say once a week.

Q. How does air-pressure unseal traps?

A. Air may be compressed in a soil-pipe or unvented drain-pipe before a rapidly-advancing body of water, and force the water backward out of unventilated traps on branch waste-pipes.

Q. How can this last evil be prevented?

A. By right construction, which includes proper fall, a not too shallow water-seal, or by vent-pipes from traps, or by use of some form of trap not depending on water-seal.

Q. What is meant by the siphonage of a trap?

A. Siphonage results from the formation of a partial vacuum in that part of the soil-pipe into which a trapped waste-pipe discharges. It consists in the sucking up of so much of the contents of the cup or downward bend of an unventilated trap as to permit the passage of air or gas through it to destroy the vacuum. If the trap is of insufficient depth, enough water will not remain in it to renew the seal.

Q. How is the vacuum produced in the soil-pipe?

A. The sudden downward rush of water in a soil-pipe which is closed at the upper end will produce a partial vacuum behind it.

Q. What are the conditions under which running traps are siphoned?

A. Unventilated running traps, especially those with an easy bend or with a small depth of seal, are liable to empty themselves by the momentum of a body of water rushing through them, which, passing beyond the trap and acting as a piston, will cause a vacuum behind it and siphon the trap.

Q. How is a trap ventilated?

A. By a pipe branching upward from it at the highest point

beyond the cup or downward bend, and as near it as possible, whether it be a running trap or an S trap. To be effective, the ventilating-pipe should be of liberal size, and must either open into the outer air or be arranged as a by-pass for air by connecting it with the vertical soil-pipe some distance above the trap, provided the soil-pipe is open at its upper end and carried above the roof.

Q. How does the ventilation of a trap prevent siphonage?

A. By permitting air to enter freely into the trap it prevents the formation of a vacuum.

NEW JERSEY SANITARY ASSOCIATION.

Report, With Outline of Papers and Discussions. Session of 1891.

BY D. C. ENGLISH, M.D.

The seventeenth annual meeting of the New Jersey Sanitary Association convened at the Court of Chancery room, at the State House, Trenton, at 11 A. M., Friday, December 5th. In the absence of the President, owing to illness, the meeting was called to order by Dr. English, Chairman of the Executive Council, who nominated Prof. J. Madison Watson, of Elizabeth, a former President, as chairman of the meeting. He was elected and took the chair. Dr. E. M. Hunt, Secretary of the State Board of Health, made a short address of welcome to the members, expressed his deep regret at the absence of the President, and informed the members as to hotel accommodations, &c. After the transaction of some routine business, Prof. John C. Smock, Ph.D., State Geologist, was introduced and read an interesting paper on

THE CLIMATE OF LOCALITIES IN NEW JERSEY.

He gave extracts from some old chronicles of the state of the weather in New Jersey, and then some recent climatological notes of Cape May, Atlantic City, Lakewood and Schooley's Mountain, to illustrate the broad generalizations which are made on the climates of localities. These statements are thus given without the full proof which ought to come from careful records of meteorological phenomena. Climate was said to be determined by the inter-action of atmospheric agents but not by them alone. The influence of geologic formation was noted as important, especially in a sanitary direction. Meteorology is, however, the handmaid of climate. The rapid advance in this progressive science, and the modern meteorological

observations with their magnificent equipment of the instruments of precision for measuring almost continuously the phenomena of the atmosphere, give promise of great discoveries and the elucidation of general principles affecting the climate of locality. The methods of modern meteorology are applicable in New Jersey, and the knowledge to be gained is worthy of some effort to secure it. Existing meteorological records are wanting in continuity of observation in all stations where they have been kept in the State, and are, therefore, not representative, as they ought to be. Daily, or even tri-daily observations, leave gaps through which the true curves of progression are not traceable with accuracy. The topography of the State has been mapped with care, after years of expensive work in making the necessary survey. Upon this basis the climatology may be built, if the observations are made with equal care and attention to details. All of the weather phenomena are to be noted, and not periodically, but continuously. The establishment of well-equipped meteorological stations is a governmental work or that of private endowment. They are an impossibility except at a few points. It is, however, within the ability of our health resorts to maintain stations at which to observe the more common phenomena, and keep hourly or continuous records. Observations on the temperature, by means of self-recording thermometers, on the atmospheric pressure, on the hours of sunshine, and the clouds or the cloud movements, on the winds and their changes, and on rainfall, demand patient labor and painstaking care and the use of good instruments. Such data will enable us to make comparative study in the climates of localities. The importance of accurate record of climatic features in relation to the causation and propagation of disease, or to its prevention and cure, is so great that the expenditure of time and care in the accumulation of data is eminently desirable, and particularly at those localities which are said to possess noteworthy advantages of situation and of climate. What is the cause of the greater dryness of a given locality, of the beneficial effects upon consumptives at another, or what is there in the environment of another which makes it so attractive and popular a health resort? These questions ought to be answered by meteorological statistics. To explain these beneficial effects as due to some subtle agencies, which instruments fail to detect or measure, is unscientific and a backward step. The relation between known phases of the weather and certain forms of disease, and the violence

of some epidemic within known territorial limits, are suggestive of cause and effect in climatic conditions. To discover them is a part of the work of the sanitarian. At the present time the records of these studies are too scanty and incomplete, and hence the urgent need of more observation. The importance of more accurate knowledge is attested by the inquiries about climates and localities, and its need by the thousands and tens of thousands of invalids who are seeking the Mecca of health among the multitude of health resorts. The publication of papers and books on the advantages of these resorts, adds little to the store of knowledge. They ought to be supplemented or replaced by more precise data of meteorological science.

Dr. Ezra M. Hunt then opened the discussion on Prof. Smock's paper. He commented on the exceeding timeliness of this paper and on the importance of a more scientific study of climate. He was glad to know that we are entering upon a new era when people are weighing the evidence presented as to the claims of health resorts, and demanding more accuracy in meteorological observations and conclusions. The desultory character of records have made them of but little value. To analyze this subject a precise method should be adopted. The health resorts should be demanded to furnish us the data upon which they base their claim. How far is the testimony of local authorities to be credited? He called attention to a paper by Prof. C. F. Brackett on the importance of precision in collecting records. (Report of N. J. State Board of Health, 1879.)

Mr. W. G. Hoopes, of Atlantic City, said he had been deeply interested in the excellent paper on this subject. He spoke of the excellent climate and healthfulness of Atlantic City, but he agreed with both speakers that the great need was more accurate observations.

TUBERCULOSIS.

The afternoon session opened with a long and exhaustive paper on "Tuberculosis, Human and Bovine," by Joseph William Stickler, M.D., of Orange, N. J.

As we might say of the papers generally read at the annual meetings, it is worthy of publication in full and of wide circulation, and it is our deep regret that the space at our disposal requires a mere outline, which fails to do it justice. Among the many points brought out by Dr. Stickler are the following:

"Tuberculosis, whether human or bovine, has, as its characteristic feature, a tubercle which has a special and definite structure, and which contains within it the specific tubercular virus, the tubercle bacillus of Koch. All the necessary conditions for the development of bacilli are, so far as their life history is known, alone to be found naturally in the animal body. The organism is of very tenacious vitality, and will preserve its virulence and capacity for development for six weeks or longer in decomposing sputum; for six months or longer in the dry state. Bacilli, whether derived from free cultivation or from tubercle, if intimately diffused in water, and scattered in the form of spray in an atmosphere in which animals are placed, so that they inhale it, will produce tuberculosis in them.

"Tuberculosis has a progressively destructive tendency, destroying not only the organ primarily attacked, but all other organs or tissues to which the bacilli are subsequently conveyed. It is clearly distinguished from various other inflammatory lesions by the development of nodules in its original seat, and also in the parts secondarily attacked.

"Some of the general causes of tuberculosis are hereditary tendency, impure air, poor food, residence in crowded towns or cities, soil and climate.

"Mothers transmit phthisis more certainly than fathers, and when but one parent is affected the mother is more apt to transmit to daughters than to sons. Air laden with dust is a factor, as I discovered when I made inquiry in regard to the physical condition of hat-finishers. Over fifty per cent. of these men die of consumption.

"The following conditions of dwelling-houses tend to the promotion of tubercular consumption:

"1. A soil either naturally damp and cold or subject to the influence of the rise and fall of a subsoil water lying within a few feet of the surface.

"2. A dwelling-house of which either the foundations, the area they inclose, or the walls are, by reason of faulty construction or otherwise, liable to dampness.

"3. Such immediate surroundings of the dwelling-house as tend to prevent the free movement of air about it, and its ample exposure to the influence of sunlight.

"4. Such structural defects as would prevent the maintenance within all parts of the dwelling-house, of ample movement of air by day and by night, and the free exposure of its habitable rooms to daylight.

"Tuberculosis is more common in the temperate than in the frigid or torrid zone. A clayey, impermeable soil, a damp, cold atmosphere and sudden changes favor the development of tuberculosis. Infection must have its place in the etiology of this disease. Among many proofs cited is that of the Fifth ward of Philadelphia, where,

during the year 1888, over one-half the deaths occurred in houses in which tubercular patients had lived. The influence of age is shown as follows, the number of cases noted, 583:

From 10 to 20 years, both sexes	39 cases.
From 20 to 30 years, both sexes	307 cases.
From 30 to 40 years, both sexes	132 cases.
From 40 to 50 years, both sexes	67 cases.

"The influence of sex in 669 cases: In private practice the number of male cases, 321; of female cases, 127; in hospital practice, males, 187; females, 37. Occupation has much to do in developing tuberculosis. Clerks, tailors, factory hands, milliners and seamstresses are especially prone to it. Children improperly fed and cared for are more apt to have tuberculosis late in life than those who are well cared for. Pleurisy, bronchitis and pneumonia predispose to the disease. Cornet believes the disease is chiefly spread by dried sputum. Liebermeister supports this view and cites many cases. Rhule, C. T. Williams, Spillman, Haushatter, Hoffman, Cameron, Galtier, Steinheil, Prof. Walley are also quoted. The mortality amounts to fifteen per cent. of the whole mortality of the world at large. 'About one-fourth of all deaths occurring in the human being during adult life are due to tuberculosis, and nearly one-half of the entire population, at some time in life, acquire it.'"

Symptoms, physical signs and prognosis of acute, and chronic tubercular phthisis are then described. Dr. Stickler then proceeds to consider bovine tuberculosis, observing that the histology of tubercles as found in the bovine species does not differ, as far as he could learn, from that of tubercles found in man. The bovine tribe is pre-eminently disposed—equally so with man. Its etiology, development, symptoms and physical signs are fully discussed. As to the query whether human and bovine tuberculoses are identical he answers, that when the lower animals are inoculated with tuberculous matter from man, the results are the same as when the tubercular virus of other animals is used, and in each case the tubercle bacilli are found, and he cites Gerlach, Creighton, Orth, Bollinger, Klebs, Baumgarten and Cheveau in support of their identity, while Koch's discovery of the specific bacillus in the pearly nodules appears to remove all doubt upon this point. Proof is then offered as to the contagiousness of bovine tuberculosis:

"In the light of our present knowledge it is not necessary to ask whether human tuberculosis is communicable to the lower animals.

We know it is. The question, 'Is bovine tuberculosis communicable to man?' may, I think, be satisfactorily answered in the affirmative. If milk from cattle with tuberculous udders be given for a lengthened period tuberculosis will be developed.

"I am of opinion that the sanitary measures of the strictest necessity are:

"1. Isolation in sanitaria or otherwise.

"2. The treatment of scrofulous patients from a tender age.

"3. The bringing up of children upon the bottle with boiled milk.

"4. The perfect disinfection of the expectoration of all tubercular patients, and of every place they have lived and expectorated in.

"5. The prevention of marriage between tuberculous subjects as far as possible.

"6. Abundance of good food and air.

"7. The obligation of creating large factories and large, airy workhouses, so that workers should not be aggregated in a small space.

"8. General comforts, such as necessary food, warm clothing, good air, moderate work, &c.

"The methods to be adopted for the prevention of the transmission of bovine tuberculosis to the human subject may be summed up in three sentences:

"1. Kill all tuberculous cattle, *i. e.* those in which the existence of the disease in their systems can be diagnosed, and destroy their carcasses and organs.

"2. Prevent the use of milk from animals in whose system it can be shown that tubercle exists, or the existence of which is even suspected.

"3. Prohibit the use (for human food) of the flesh of tuberculous animals."

Dr. Stickler's paper contained interesting letters conveying valuable information, in reply to his letters of inquiry, from Dr. Lefevre, of the Consumptive Hospital, in Villepinte, France; Dr. Dobbins, Secretary of the Hospital for Consumptives, at Brompton, England; M. Nocard, member of the French Academy of Medicine; Prof. Von Hebra, of Vienna, Austria, and others.

The discussion on this paper was ably opened by Henry R. Baldwin, M.D., of New Brunswick, substantially as follows:

"Tubercle is as old as human history. It was recognized 400 years before the Christian era, but was first described by Baillis in the year 1794, as a small, grayish, transparent nodule which was found in the lungs and in other parts of the body. Bayle, in 1810, as the result of 900 autopsies of phthisical patients, directed attention to the frequency in which these nodules were found in the phthisical

lung; he believed these nodules were the expression of a general diathesis.

"Lænnec followed in the view that not only the gray miliary tubercle was the disease, but also the caseous formation (infiltration) which occurred, and these he called yellow tubercle.

"Virchow followed and denied the identity of caseous formations and the gray tubercle, claiming that caseous formations were often due to other morbid processes, inflammatory in their nature.

"Villeman developed the fact that the disease could be communicated from man to other animals by inoculation, and proved that the disease was developed whether the agent used was either the caseous formations or the gray miliary tubercle.

"Koster and Bolkman showed that the fungoid disease of joints was tubercular in character.

"Schuppel found characteristic tubercles in scrofulous lymph glands.

"Friedlander advanced the idea that lupus and tuberculosis were one and the same disease. It was found that from a single focus the infectious substance could be carried by means of the lymphatic and blood-vessels to other parts of the organism, such as intestines and the glandular structures, and Weigert gave to this infecting substance the name of tubercle virus. Finally, in 1882, Koch, as the result of his laborious research, gives us the following definition of tuberculosis:

"An infectious disease caused by the tubercle bacillus and characterized by the production of tissue and of inflammatory products, which appear both in the form of nodules and as a more diffuse infiltration, and which rapidly undergoes caseation. These bacilli are about one-eighth as long as the diameter of a blood corpuscle, and about one-tenth as broad as they are long; they are not infrequently carried, and when stained can be seen under a magnifying diameter of 700."

"These bacilli exist in great numbers in the expectoration from diseased lungs, and it is claimed that this is one of the potential factors in the spread of the disease. There are, however, several points in opening this discussion which may be presented for your consideration:

"1st. Can the bacillus tuberculosis be transmitted by heredity? This has been denied by Cornet, but the bacilli have been found in a fœtus dying *in utero*.

"2d. If not, is there a hereditary susceptibility or responsive state rendering the subjects more liable to become victims of the disease?

"3d. Does cohabitation, the absorption of the perspiration, or inhaling the breath cause the development of the disease to partners in life?

"4th. What relation does an infected animal, whether through milk furnished or through flesh eaten, bear to the spread of tuberculosis?

"5th. What are the efficient means of combating and curing the disease. Under this head may be enumerated cuspidors to receive the sputum, the use of germicides, abundance of pure air in houses, the avoidance of soil moisture, the use of such agents as will improve the general health, including iron and the carbo-hydrates.

"6th. All agencies which promote sound health, such as exercise in the open air, horseback riding, &c. The statistics of the army during the recent war show that men affected with phthisis recovered under the discipline and out-of-door life."

Dr. David Warman, of Trenton, referred to the few cases of small-pox in Trenton during the last few weeks as having created a panic, although it was easily controlled by vaccination. Not a single death from small-pox in the State was reported by the State Board of Health during the year 1890, whereas there had been 3,669 deaths reported from consumption. He asserted his belief that consumption was just as contagious as small-pox, and when contracted, was a thousand times more destructive to human life; he, therefore, contended that all cases of consumption should be isolated and all the prophylactic measures used as recommended by Dr. Stickler. He cited a case of a tuberculous child—in his own practice—who had contracted the disease from her brother by kissing him and spending much of her time in his sick-room, frequently sleeping with him, against his (Dr. W.'s) repeated remonstrances. There was no history of tuberculosis in the family. The brother had contracted the disease somewhere and gave it to his rosy-cheeked, healthy little sister of 4½ years. The brother died one week and the sister the next week, from consumption. He spoke, in closing, of the gross ignorance of the public as to the contagiousness of this disease and of the importance of enlightening them.

Dr. Franklin Gauntt, of Burlington, thought the subject one of vast importance, and that it had been treated very ably in the paper. We need to study the etiology of tuberculosis. He was convinced of its contagiousness. He thought inoculation the safeguard against all such disease.

Dr. Daniel Strock, of Camden, said he had listened with deep interest to this excellent paper. He thought that perhaps the most important point developed by the recent investigations of tuberculosis was its contagiousness. The communicability of tuberculosis from a diseased person to a healthy individual had been thoroughly established, and we now know that it is not necessary that a tuberculous

person should have had a tuberculous parent or grandparent. He believed that every case of tuberculosis of the lungs was a menace to the neighborhood, due to the popular ideas concerning this disease, and the carelessness of the patient and members of the family. The time had come when physicians could do a grand sanitary work by explaining to individuals the importance of precaution in their intercourse with patients known to have tuberculosis, more especially of the lungs, and by various methods educate the public in regard to the ways in which the disease may be communicated. Parents should be taught to enjoin upon their children the importance of reserve in their intercourse with others. School hygiene should embrace regulations governing the intercourse between pupils during play. It is not a step too far in advance to say that the discipline of every school should include a penalty for the infringement of the rule forbidding kissing while upon the school premises. By these means we can hope to curtail the ravages of contagious diseases, and, in the aggregate, prolong human life.

SANITARY LEGISLATION.

The Chairman then introduced Judge William M. Lanning, of Trenton, who read a paper on "Sanitary Laws and Court Decisions in New Jersey." (This paper will be found on page 111 of this report.)

This paper should be read and studied not only by every member of a Local Board of Health, but by all who desire the sanitary improvement of our towns and cities, and to understand the powers of their Board of Health in their efforts to secure proper sanitary administration.

Judge John A. McGrath, of Jersey City, opened the discussion on Judge Lanning's paper. He referred to the excellent and thorough manner in which Judge Lanning had treated the subject; that we had but few health laws in our State; that the law of 1887 was as nearly perfect as we could probably secure. We had before that laws enough, but they were somewhat conflicting, and there were no appropriations to secure their enforcement, and that was too much the case now. The people must be led to see that appropriations are absolutely necessary. Municipal authorities need to be educated as to the importance of adequately supporting the Health Board. Harmony in health laws

throughout the State is essential. We ought to have a law to compel municipalities to create Health Boards instead of the condition of things which exists in some sections, *e. g.* as is found in Hudson county, with a County Health Board, and in Jersey City a Health Board acting under a special law. He believed in this Sanitary Association—it is doing a good work, it is worthy of crowded meetings, &c.

Dr. F. Gauntt said he had been greatly interested in the paper and thought it worthy of study. He objected strongly to the discharge of the sewers of Trenton into the Delaware river, contaminating the water which is used by the towns and cities below Trenton.

Counselor William I. Lewis, of Paterson, said that while too high praise to the "Health Law" of 1887, in relation to the object for which it was passed, could not be given, yet that experience in the administration of that law, as of almost every other, suggested amendment or supplements that it might be wise to adopt. As relevant to that statement, he called attention to the fact that no provision of the law existed by which Boards of Health, in cities, could obtain additional appropriations of money in case of an epidemic of disease; that while cities had power to spend money in such emergencies, the Board of Health in such city had no control over the expenditure. Then he called attention to the fact that while by Section 14 of the law of 1887 the Local Boards were enabled to abate a nuisance existing on property and to recover from the owner the expense incurred, yet that where the owner was a non-resident, in which cases recalcitrancy is most often found, the fact that the recovery of the amount must, according to the form of the statute, be by action of debt, precludes recovery by the Board, but that an amendment to the act, allowing a recovery by attachment, would give ample remedy in such a case.

Judge McGrath, of Jersey City, asked Judge Lanning, "Why are we troubled in Jersey City with the pollution of our water-supply? Suppose Newark or Jersey City should enforce existing laws would the pollution of the Passaic be stopped?" Judge W. M. Lanning replied substantially as follows:

"That is a hard question to answer. The Newark Aqueduct Board recently sought to obtain what we call a preliminary injunction against the city of Passaic to restrain that city from polluting the waters of the Passaic river, from which the water-supply of Newark is obtained, and the injunction was refused. I can only suggest that there might possibly be a different result in case the Newark Local Board of Health should, by its sanitary code, under the power granted to it by the law of 1887, provide for the protection of her water-supply and prohibit the pollution of the Passaic, and should they then apply to the Court of Chancery for an injunction to restrain the pollution of that. In all the cases that have been brought before our Court of Chancery by Local Boards of Health the application for injunction has been based upon the general provisions of the act of 1887, and not upon any specific provisions of local sanitary codes for the protection of the public health. As stated in the paper which I have had the honor to read before the Association, the act of 1887 is an exercise of the police power of the State, and is intended to authorize Local Boards to prevent what may be injurious to the public health as well as to detect and punish. The language of the law is that Local Boards of Health may pass ordinances 'to protect the public water-supply and prevent the pollution of any stream of water, the water of which is used for domestic purposes.'

"It seems to me that a Local Board of Health is authorized by this language to prohibit any pollution of a stream which endangers the public health, for, otherwise, how can a Local Board 'protect the public water-supply?' I would, therefore, suggest that the legal advisers of the Local Boards of Health of Newark and Jersey City should consider whether it would not be wise to prohibit, by code, in clear and unmistakable language, the pollution, by any person or persons, or private, public or municipal corporations, of any stream from which those cities draw their water-supply, and then to base their application for an injunction especially upon such provisions of their sanitary codes.

"A code containing a prohibition against throwing a dead animal into a city's reservoir of water, even though that reservoir were outside of the city's limits would undoubtedly be deemed a reasonable prohibition. Whether a prohibition in the sanitary code of Newark against conveying into the Passaic river, above the point from which Newark draws her water-supply, the sewage of any city or town, would be deemed reasonable, is a question involving so many important legal rights and principles that I forbear to express an opinion on it. By adopting the suggestion I have made, I think, however, that either Newark or Jersey City may get its case before the Court of Chancery in a better manner than by acting through any other local authority."

MICRO-ORGANISMS OF THE SCHOOL-ROOM.

The evening session was presided over by Prof. Watson and began with prayer by Rev. Dr. John Dixon, pastor of the First Presbyterian Church, Trenton. Rev. Samuel Lockwood, Ph.D., of Free-

hold, was then introduced and read a most excellent paper on "The Micro-Organisms of the School-Room," and afterwards exhibited a very ingenious apparatus, made by himself, for the purpose of securing accuracy in his observation in the study of the subject. He also showed several specimens of organic matter which had been gathered from the dust floating in the atmosphere of school-rooms, and explained his methods of securing and depositing it in tubes.

(Prof. Lockwood's paper will be found on page 85 of this State Board of Health Report.)

Dr. H. G. Wetherill, of Trenton, opened a discussion on Prof. Lockwood's paper. He said the paper covered the ground very fully, and he had but little to add after such a valuable presentation of the subject. He spoke of the almost invariably vitiated air of school-rooms. The micro-organisms of the school-room which interest us most, he said, are those which may be a factor in producing or disseminating disease. They may be of a kind generated in sewers, or foul or damp cellars, or of a kind which convey disease from person to person. The consideration of this question he believed was inseparably connected to the consideration of cleanliness and ventilation and leads directly up to the dust problem. Dust is a common carrier of micro-organisms, and is no mean factor as a disease producer aside from its being so freighted (witness, he said the asthma and consumption of potters and flour-millers), but the dust of the school-room carries to each child an assortment of schizomycetes, more or less dangerous. Dr. Richard Stern concluded after careful experimenting—(1) That micro-organisms rapidly sink to the floor in quiet air. (2) The usual ventilation effecting a removal of air from one to three times an hour, has effect upon the removal of micro-organisms with summer ventilation, and only to a limited extent with winter ventilation. (3) Ventilation effecting a more rapid change of air (six or seven times an hour), affects the removal of micro-organisms but slightly, without a sensible draught. (4) A rapid and complete removal of the micro-organisms from the air is only obtainable by a strong draught. (5) Micro-organisms are not blown off the floor, wall, furniture, clothing, &c., even with a stronger draught. (6) The evolution of steam in a room is not capable of rapidly and completely precipitating the micro-organisms, although it hastens this process to an appreciable extent.

Dr. Wetherill then asked:

May we not thoroughly conclude, then, that the best means to avoid danger from the micro-organisms of the school-room are cleanliness of person, of room, and above all, having an atmosphere free from dust? Ventilation is shown not to make any greater circulation of micro-organisms, and should be encouraged. The transmission of contagious diseases, and the susceptibility to filth diseases are simply questions of seed and soil. He said he was on one point only compelled to differ with Dr. Lockwood, and that was his statement that the child was not as susceptible to disease as were older persons. He considered that children were particularly susceptible to disease. In young children we have the most fertile material for a pathogenic organism to grow and multiply in that the human family affords, and we must throw out every safeguard that will keep the seed from the soil. We are not so apt now to say of a child that he inherits consumption, as to explain that his family have consumption, and we must guard this susceptible one from exposure to the disease. Rigid quarantine of contagious disease, prohibiting spitting on the floor, and the prevention of flying dust, together with the maintenance of good sanitary conditions in and about the buildings, he believed would do much to keep out the most dangerous of the micro-organisms of the school-room.

MENTAL HYGIENE.

The Chairman of the Executive Council then took the chair. He spoke of the pleasure it gave the members to see so many of our ex-Presidents in attendance during the day, and he has the pleasure of introducing one of them, who had been called to preside over to-day's sessions—Prof. J. Madison Watson, of Elizabeth—who made a short address on "Mental Hygiene." (See notes on Mental Hygiene, page 103 of this report.)

Prof. A. B. Poland, Superintendent of Public Instruction of Jersey City, was then introduced and opened the discussion. (See notes on Mental Hygiene, page 104 of this report.)

PHYSICAL TRAINING.

Prof. Charles H. Raymond, Ph.D., of Lawrenceville, was then introduced and read a paper on "Methods and Results of Physical Training."

(This paper will be found on page 91 of this State Board of Health Report, and is worthy of careful perusal and study.)

On Saturday morning the session began at 9:30 o'clock, ex-President George P. Olcott, C.E., of East Orange, in the chair.

On motion, the rules were suspended and miscellaneous business was taken up.

Dr. John L. Leal reported from the committee the following nominations:

President—E. L. B. Godfrey, M.D., Camden.
First Vice President—C. Phillips Bassett, C.E., Newark.
Second Vice President—Prof. A. B. Poland, Jersey City.
Recording Secretary—Shippen Wallace, Ph.D., Burlington.
Corresponding Secretary—Prof. J. Madison Watson, Elizabeth.
Treasurer—George W. Howell, C.E., Morristown.

EXECUTIVE COUNCIL.

(With the above named officers.)

D. C. English, M D., *Chairman*, New Brunswick.
Prof. Charles H. Raymond, Ph.D., Lawrenceville.
Judge William M. Lanning, Trenton.
Rev. Samuel Lockwood, Ph.D., Freehold.
Prof. H. B. Cornwall, Ph.D., Princeton,
Judge J. A. McGrath, Jersey City.
Prof. J. C. Smock, Ph.D., State Geologist, Trenton.
William Pierson, M.D., Orange.
Prof. Charles M. Davis, Bayonne City.
Henry R. Baldwin, M.D., New Brunswick.
Daniel Strock, M.D., Camden.
James Owen, C.E., Montclair.
W. G. Hoopes, Architect, Atlantic City.
John L. Leal, M.D., Paterson.
J. H. Platt, M.D., Lakewood.
Dr. Nicholas Murray Butler, Paterson.
Prof. W. N. Barringer, Newark.
J. R. C. Thompson, M D , Bridgeton,
David Harvey, Counselor, Asbury Park.
H. G. Wetherill, M.D., Trenton.
J. R. Chambers, M.D., East Orange.
Edw. S. Atwater, Counselor, Elizabeth.
Joseph H. Powell, Esq., Bridgeton.
Richard H. Reeve, Esq., Camden.
George W. Rockfellow, Esq., Plainfield.
Herbert B. Baldwin, Chemist, Newark.
A. Clark Hunt, M.D., Metuchen.

The report was accepted, and no other nominations being made the officers nominated were unanimously elected.

Dr. J. L. Leal offered the following resolution, which was unanimously adopted:

"*Resolved*, That the Chairman of the Executive Council be directed to prepare proper credentials and have them signed by the President and Secretary of this Association, and issue said credentials to any members of this Association who may wish to represent the New Jersey Sanitary Association at the meeting of the American Public Health Association, next year, in the City of Mexico."

George P. Olcott, C.E., on behalf of the owners and managers of the "Laurel House," Lakewood, invited the Association to meet next year at the "Laurel House," Lakewood. The invitation was by a unanimous vote accepted, and a Committee of Arrangements was appointed, consisting of Geo. P. Olcott, C.E., J. H. Platt, M.D., and W. J. Harrison, Esq.

On motion, the paper on "Water-Supply in Northern New Jersey" was laid over till the next annual meeting.

TRAPS AND VENTS.

On motion, the paper on "Traps," laid over from last year's meeting, was presented by Dr. E. M. Hunt, Secretary of the State Board of Health. (For this paper see this State Board of Health Report, page 123.)

E. L. B. Godfrey, M.D., of Camden, President-elect, appeared and took the chair. He introduced George P. Olcott, C.E., who opened the discussion on Dr. E. M. Hunt's paper.

Dr. E. S. McClellan, of Paterson, called attention to the two main points upon which opinions differ on the subject of traps and trap-seal protection; first, as to the disconnecting trap at the cellar wall, and, second, as to the question of preserving the seal of the trap immediately connecting the fixture with the drainage system. He believed the trap at the cellar wall serves no useful purpose, because the air of the common sewer is more diluted and less dangerous to health than the air in the pipes on the house side of the trap. It obstructs the free discharge of sewage and establishes a cesspool which serves as a nidus for the development of disease germs, and its fresh-

air inlet, when operative, serves to conduct the foul air and disease germs to the street curb, whenever the house pipes are flushed by the discharge of a fixture. It complicates the plumbing, and adds from twenty-five to fifty dollars of needless cost to the plumbing of a house, besides giving to the occupant a false sense of security; but the maintenance of a trap-seal against all disturbing causes is a most vital point to be secured. Such a construction as can be relied upon under all possible conditions arising in plumbing practice should be employed, and none other should be tolerated. All sanitary authorities, he believed, agreed that a simple bent pipe, resembling the letter S, forms the best possible trap ever yet devised, provided its seal can be preserved; but the readiness with which siphonage occurs in such a trap, if not provided against, has led to the production of all manner of so-called anti-siphon traps.

Dr. McClellan called attention to the extended series of experiments on trap-siphonage conducted in the department of tests at the Stevens Institute of Technology, in order to determine with accuracy the comparative merits of the various means resorted to in plumbing practice to preserve the trap-seal; that it was there shown that all unvented traps, of whatever name or form (so-called anti-siphon traps), are liable to have their seals destroyed by siphonage under conditions frequently occurring in ordinary plumbing practice; and that the instantaneous admission of an adequate amount of air at the crown of the trap is the only absolutely reliable means of preventing siphonage. This supply of air is sought to be secured by extending lines of pipe from the crown of each trap to a point above the house-top, but it is attended with many complications and great cost, and is subject to many contingencies that give rise to frequent failures, such as the rapid destruction of the pipes by corrosion, the choking of angles in the pipes by rust, debris, the closing of their tops by frost and the frictional resistance of the contained air in long and angular lines. In addition to these defects, it was also demonstrated that in certain situations, common and unavoidable in plumbing practice, the orthodox vent-pipe, owing to back pressure, directly contributed to the total destruction of the trap-seal. Thus he argued that neither the so-called anti-siphon traps nor the recognized system of trap-venting by lines of pipe can be relied upon with certainty as a means of trap-seal protection, and that the only other alternative is a resort to the automatic method of venting. Objection, however, has been raised

to this, because the result is secured by a mechanical device, but he thought this objection was infinitely less than those found to exist in the method described. He closed by referring to the device offered by himself to the public about six years ago as having demonstrated not only the feasibility but the great superiority of the automatic method of venting sewer-gas traps for the protection of the trap-seal over all other known means.

James Owen, C.E., of Montclair, spoke in substance as follows:

About fifteen years ago considerable attention was called to the improvement of the trapping of plumbers rendered necessary by the agitation of the question of sewer-gas. The system of trapping then considered proper was to put a trap in the main sewer, with a vent-pipe outside the house, a vent-pipe inside the house, with a fresh-air intake, improved traps at each connection in the house, with a ventilating-pipe from each trap to prevent siphonage. With these precautions generally adopted the question of sewer-gas has practically disappeared as an ordinary experience and is only considered an exceptional occurrence.

A reaction, however, seems to have set in, and the discarding of three of the standard precautions is now openly advocated, viz., the trap in the main, the outside vent-pipe and the ventilating-pipe to each trap, leaving only the trap as now improved as the one and only safeguard in a house. He begs leave to differ with Dr. McClellan, that the air in the street-sewer is purer than the air in the soil-pipes of the house. Only under very exceptional conditions is there anything but fresh fæcal matter in the house-pipes, and it is well known that such matter is comparatively innocuous. Now, when it is proposed to carry the air, supersaturated with the noxious gases from the sewer, through the house, with the hope of oxidizing the gases in the soil-pipes of the house, the idea seems fatuous, and, in addition, when we consider the number of days in the year when the air-currents are liable to prevent free circulation in the house-pipes, and also the risk from unused wash-basins in the houses affording an unobstructed current for the gases into the house, it seemed to him that the advocacy of the abolition of well-considered methods and practices in plumbing is opened to strong criticism, to say the least.

Mr. Julius Coty, plumber, of Atlantic City, spoke substantially as follows:

"I am very much interested in this discussion, and I would like to add a few remarks to what has already been said in regard to trapping the main drain at the house or property line. So far as my experience goes I am not in favor of it, and I believe, as the gentleman who just spoke says, that it is a useless expense, for which there is no commensurate return, and in some cases it is a positive evil; as, for instance, in the city of Atlantic City, where our system of sewerage is such as requires comparatively small pipes for main sewers, and there are no air-currents, the pipes running nearly or quite full. In this case the house trap serves merely as an interruption of solids, which should find their way to sewer; this in time obstructs the trap and drain, and often causes the overflow of fixtures, with serious attendant consequences. With a straight, unobstructed house drain this would not happen, and by properly regulating the size of soil and vent-pipes, a complete safeguard from back pressure is provided for.

"The discussion seems to be tending towards what particular or peculiar kinds of traps are best. My experience is, that nearly all traps are good or bad, according as to the manner or position in which they are placed. For instance, we will take the "Cudell Trap" as a type of mechanical trap. Place this close to a fixture as possible, and you have catch-basins and trap combined, which soon fills up, because the force of the water is not sufficient to scour out any sediment which may lodge in the body of the trap. Place this same trap twelve or eighteen inches below the fixture and you change the conditions. The impetus of the water gained by the additional fall, will thoroughly clean the trap. It seems to me that the question should be, not as to any particular trap or traps, but rather as to the best manner and methods of using them. Again, we will take an ordinary S trap, place this under the same conditions as the other, and you get directly opposite results; from its construction, the currents are continuous towards the outlet. It is evident, therefore, that this trap will offer less resistance than the other. Now, if placed twelve or eighteen inches below the fixture, the same momentum that cleans the Cuddell trap will, by the velocity attained, almost, if not quite, exhaust the seal, and this under conditions which the trap vent is powerless to prevent. I also believe that architects are, in a measure, responsible for a great deal of the badly-constructed plumbing we often see; of course, I do not mean to infer that it is intentionally so, for as a class they take great pride in their work, but, for example, Mr. Architect will start out and specify minutely all fixtures, baths, basins, sinks, &c., the size of drain, weight of pipe per foot, how joints shall be made, pipes to be run straight, &c., all fixtures to be trapped separately, and the trap set as close to the fixture as possible, and then at the end tack on a clause that all traps shall be 'Cuddell,' or perhaps some other traps of the same general pattern. The plumber, if he is an ordinary man, will be at a loss which to do; his experience tells him the trap would be better lower

down, but the architect says up, so the plumber prefers to let the architect shoulder the responsibility, who consoles himself with the thought that it must be right, because authority says so, *i. e.* 'that it is best to place traps close to fixture as possible.' This is one of the many mistakes that are made, and which would not occur if an intelligent and practical plumber were consulted. It is a common saying among the building craft, that it is much easier to build a house on paper than with solid material, and this is especially so of plumbing.

"The art of plumbing has been rapidly advancing during the last decade, and at the present has become almost a science—a science which is constantly advancing and calling to its aid the medical, scientific and practical minds of the country, and this Sanitary Association is a grand step in the right direction, as tending to unite scientific theory and practice in their search of the best means and methods for protecting the health of our people. All practical plumbers, as well as professional men and engineers, should belong to this body, and lend their aid to educate the plumbers as to the best systems to adopt, rather than what styles of traps and vents to put in—a knowledge of the condition under which each trap will work, rather than which is the best trap."

Dr. E. M. Hunt, in concluding the discussion, said that the object of his paper had been to present the accepted method of applying traps and of avoiding siphonage. The chief discussion had been over the outside trap. He did not believe that this could always be dispensed with, although with a manhole or vent-pipe outside where the sewer-pipe leaves the building there were cases in which the use of this trap was not imperative.

PREVENTION OF EPIDEMICS.

Dr. E. M. Hunt then read an able paper on "What is to be Done with Schools when Communicable Diseases Occur in Them?" (For this paper, see Circular 77 of the State Board of Health.)

DISPOSAL OF GARBAGE.

Ex-President Alcott then took the chair and introduced Dr. E. L. B. Godfrey, of Camden, who made an able address on "The Removal and Disposal of Garbage," as follows:

"I believe you will agree with me when I state that the disposal of garbage is one of the most important, if not the most difficult

problem that Local Boards of Health have to deal with. It is a problen that has grown, *pari passu*, with the growth of cities. This being admitted, two propositions present themselves—first, that the overruling thought in all ordinances relating to the removal and disposal of garbage should be a regard for the interests of health; second, that as cities grow, the need of cleanliness increases and the more stringently should health ordinances be enforced. Having presented these underlying propositions, I beg briefly to consider what seem to me to be the leading points relating to the collection, the removal and the disposal of garbage.

"As to the collection of garbage, it seems necessary, in order to obtain the best effects, that laws regulating the collection should be addressed with equal force and clearness to the housekeeper and the garbage collector. Housekeepers should be required to keep dry refuse, like the peelings of vegetables, apart from ashes and liquid refuse of any kind. Indeed, there is no excuse for a wet slop-can when there is underdrainage. They should be obliged to provide proper receptacles for both dry and moist refuse, and place them upon the sidewalk at specified hours. For moist animal and vegetable substances, vessels of galvanized iron with proper covers and large enough to hold the accumulations of two or three days, will be found to be the best and most serviceable. Cleanliness of the receptacles should be insisted upon.

"The collectors of garbage should be required to collect from certain streets at stated hours, and have the power, as is the case in Boston and other cities, to enter the yard if necessary for the collection.

"As to the collection of garbage there are two systems, both of which find favor in different cities, *i. e.* the contract system, and the system of collection under the direct supervision of a department of city government.

"The contract system is usually objectionable, especially in large cities, where the requirements of health are greater than financial considerations. Under the contract system there is not that direct responsibility that should be required. The collector is not responsible, as a rule, to any single official, but generally to a committee, where division of interests leads to lax discipline. The contractor is more apt to look to his financial interests than to the health of the city; neither does he provide, as a rule, for the transportation of garbage, the best implements in use. It seems best, therefore, if collection of garbage is conducted for the maintenance of health, that the collection should be done under a special department of city government, where the collector is directly responsible to and under the supervision of an official of that department. Then regular collections will be made and garbage removed while in a fresh state, before decomposition occurs, which is a material point; the admixture with ashes and other dry refuse, which greatly complicates both the collection and disposal, can be prevented; reports of neglect of collection can be quickly investigated; leakage along the street remedied; bad odors disinfected; housekeepers held to a strict accountability, and the Supervisor himself will know where all garbage is dumped, which is by no means an insignificant point. In addition to this, the removal of garbage will be more satisfactorily carried out under the supervision of a city department, because an ample appropriation will then admit of the use of the proper implements for transportation. These should consist of water-tight carts, lined with a non-absorbent material and having air-tight covers, thus preventing leakage along the street and bad odors; or water-tight barrels, with proper linings and coverings, and of the size to admit of easy handling, which may be left at large establishments, like hotels, and removed upon trucks when filled.

"The proper disposal of garbage is a problem of difficult solution. Dumping it upon open spaces within city limits is so reprehensible that it does not admit of discussion. Dumping-places should be outside of city limits and located at a point where they will give the least disturbance, for they are sure to cause, in a greater or less degree, contaminations of the air, water and the soil. In the same place garbage is separated, picked over at specially-built dumping-places and sold to farmers as food for swine and cows. By this method of disposal it is claimed in one of the larger cities that enough money is realized to pay for the cost of collection and transportation. But the method cannot be other than objectionable, because the selling of any food that has or is about undergoing decomposition is objectionable.

"Removal to sea, in boats built for the purpose, is employed as a method of disposal in a few of the sea-coast cities, but the method has met with decided opposition from the smaller towns along the coast, especially in our State, on account of the garbage drifting upon the shore.

"By far the best method for disposing of garbage is burning, although this has not been accomplished with entire success in many of the cities that have adopted the method. In some of the larger cities abroad, it is claimed that garbage is successfully burned, and that all disagreeable gases arising from the burning are consumed. It has been practiced in a number of our larger cities, but not with unvarying success. With proper plant, however, it cannot be doubted but that the disagreeable odors incident to burning of garbage will be overcome, and the practice adopted on an extensive scale, since this seems to be, when properly carried out, the best method for its disposal.

"Another method that is now practiced consists of drying garbage, extracting the oil products, and disposing of the residue as fertilizers."

Dr. E. M. Hunt thought the address had well covered the points to be considered as to garbage disposal.

Jacob S. Wetmore, Esq., of Englewood, expressed his pleasure in listening to and approving the paper. His attention had been called to an inexpensive system of burning garbage at Coney Island; the plant, he had been informed, cost about $5,000, and it was said that there had been no complaint of it as a nuisance. He spoke of the great and increasing importance of this subject.

Dr. J. L. Leal, of Paterson, reviewed the chief garbage destructors, as the Engle, the Rider, the Metz, &c., and doubted whether any of them had been entirely successful.

George P. Olcott, C.E., spoke of the difficulties attending a satisfactory method of disposing of garbage, but he thought that if it was possible to induce care on the part of the householders and servants, it would be far less difficult. In reference to sewage he said he believed that East Orange, after it had spent about $60,000 for its experience, had a system which answered the purpose better than any other he knew of, where the sewage is received into tanks, the solids are separated from the liquids, and the solid sludge is pressed into cakes. The odors are very slight. The question of the disposal of the sludge was somewhat difficult, but it was being burned in a furnace with smokestack running forty feet high, rendering the odors unobjectionable.

He said that Col. Waring, on investigating these disposal works recently, expressed himself as agreeably disappointed at the degree of success which these works promised.

Mr. Wetmore strongly questioned whether sewage disposal into running streams should be allowed.

Dr. E. M. Hunt said it was very generally believed to be objectionable and should not be permitted. He thought precipitation, by chemical methods, was valuable in purifying effluents.

The President, Dr. E. L. B. Godfrey, appointed as the Committee on Legislation the following:

L. B. Ward, C.E., Jersey City; William I. Lewis, Paterson; Judge J. A. McGrath, Jersey City; Judge W. M. Lanning, Trenton; John S. Westcott, Atlantic City.

THE PRESENT TESTIMONY OF SCIENCE AS TO ALCOHOL.

BY EZRA M. HUNT, M.D.

By alcohol we mean ethylic or common alcohol. It is necessary to specify this, as there are several alcohols. Some, like methylated spirits, are added in the falsification of liquors. Amylic alcohol, variously known as grain oil, fusil oil, &c., is very frequent in ethylic or common alcohol, because it is made in the usual manufacture of spirits from corn, potatoes or the mash of grapes, and it is very difficult to separate it completely from the ethyl alcohol. Alcohol has long had its place among poisons, and the present testimony of science keeps it there. It is a toxic, and it intoxicates now as always. It is not the minute dose but the full dose of an article that tests its physiological effects. Because a minute dose does no declarative harm, it is not thereby removed from the poison category any more than are opium, belladonna, strychnine or arsenic, because moderate doses are used as medicines.

We now ask definitely, What is the most recent testimony of science as to the use of alcohol as a food?

In order to determine this we properly inquire, What constitutes a food? The answer still stands that "the food employed for nourishment of the body must have the same or nearly the same chemical composition as the body itself. Our bodies and our foods consist of essentially the same materials."

This is found to be the case not only with animal food but vegetable albumen. Fibrin and caseine are scarcely to be distinguished from the bodies of the same name extracted from blood and milk. These are variously called the nitrogenous, albuminoid, cell-forming or protein compounds constituting the "plastic elements of nutrition," which afford nutrition by "tissue-building," whether for growth or

repair. These include the modern division of albuminoids, gelatinoids and extractives, all of which contain nitrogen.

The answer also stands that the other division of foods is that of respiratory or force and heat-producing foods, in which the starches, fats and sugars produce a heat or vital force, which is to a great extent the measure of the comparative value of such foods. These "keep up the temperature of the body by the combustion going on between them and their products and the oxygen of the air in the blood." These are variously called hydrocarbons or carbonaceous aliments, as gums, starch, sugar and fats. If we examine these we can trace and estimate the processes by which they evolve heat and are changed into vital force, and can determine the capacities of various foods. We find with both of these classes of foods certain definite salts which make up the one other class of foods. Water serves as a dissolving or distributing menstruum by which interchange in the system and riddance of effete substances are secured. We are aware that chemists and physiologists do not separate these two classes of foods by so hard and fast lines as did Liebig and his followers. But to show how fully the general principles of the divisions are maintained, although modified, and how even more accurately than formerly we are able to define and classify foods, we need only to refer to such recent statements as those from Prof. W. O. Atwater, who has given to the subject of food experiment and food values such skilled investigation:

"The protein compounds, sometimes called muscle-formers, are the only ones that contain nitrogen. According to the best experimental evidence, they alone form the basis of blood, muscle, tendon and other nitrogenous tissues of the body. As these tissues are worn out by constant use they are repaired by the protein of the food." (See article on the "Chemistry of Foods and Nutrition," W. O. Atwater, Vol. XXXIV., page 73, 1887, of "The Century.")

The fats of food are stored in the body to produce heat. Fats are consumed for fuel, *i. e.* to keep it warm and provide muscular energy for the work it has to do.

The carbohydrates are changed into fat; are consumed for fuel. The modification is that, in addition to these distinct effects of these foods, the protein of foods, besides being, alone, the basis of blood, muscles, tendons and other nitrogenous tissues of the body, is also available for change into fats and hydrocarbons, and for fuel. Yet it

has but little of that which is called "potential energy." (See series of articles above referred to.) While the protein or nitrogenous compounds are thus available, "to a degree the carbohydrates and fats cannot replace the protein."

So far as we know, no one, by the light of more recent science, pretends to claim that alcohol is a source of protein. It has no nitrogen, and cannot do any of the work of nitrogenous foods. If, therefore, it is to be searched for as a food we are to look for its power as a producer of fat or of hydrocarbons, or as, in some other way, furnishing fuel. The fuel value of a food is what is called its "potential energy."

Some time ago Professor Frankland, of London, determined the heats of combustion of different food materials by measuring the heat generated in the consumption of various foods in a calorimeter, and stating this as their fuel value, or potential energy. Our latest scientific researches have shown that the heat thus generated in the calorimeter is "an accurate measure of the energy developed by the same materials in the body." This energy is the result of a process of combustion by union with oxygen, as when fuel is burned in a fire. Heat, as produced in the animal, is only known as a result of the process of combustion. We can measure thus the energy developed by the comsumption or combustion of these foods.

It was formerly supposed that the ingestion of alcohol increased bodily heat and temperature, and so it was concluded that it acted just as others of the force or energy-producing foods do, when by entering into combination with oxygen there result carbonic acid and water with the production of heat.

But now the experiments of Prout, of England, Bocker, of Germany, as followed by the evidence of Anstie, Richardson, Brunton, Atwater, Hammond, Davis and others, show that "alcohol does not form tissue, flesh or fat and apparently has no effect as a fuel." The testimony of modern experiment is uniform in showing that alcohol "diminishes temperature and is a sedative and paralyzer rather than a stimulant."

As a result, medical practice now recognizes it as one of the medicaments for reducing temperature. No one has yet explained in what way a fuel or heat or force food can do this. But why it does this is not so difficult to explain. It is because its action is neither that of a food nor in any true sense a stimulant. Dr. Sidney Ringer, in a

report made in 1883, as a result of experiments on the action of alcohols upon the heart, records the effect as "clearly paralyzant, and that this appears to be the case from the outset, no stage of increased force of contraction preceding."

It now finds its place in the materia medica as a "cerebral sedative," to which class belong narcotics and anæsthetics, the effects being chiefly expended on the nervous system. These diminish and suspend the functions of the cerebrum after a preliminary stage of excitement. Bartholow puts under the same head opium, chloroform, chloral and the bromides.

More recently, Professor Martin, of Johns Hopkins Uuniversity, fully confirms these views. Its effect on the circulation is chiefly due to its effect on the cardiac and vaso-motor nerves which are distributed to the blood-vessels, and is that of an anæsthetic or sedative. It diminishes sensibility and often does so to actual paralysis.

Thus the whole direction of evidence, both of recent chemistry and recent physiology, is to deny any place to alcohol among the food products. As never before, modern chemical investigation, with its greater perfection of methods, fails to find it either amid constructive, reparative or energy-producing foods.

Hence, the last few years have been fertile in hypotheses by those who have from immemorial custom looked upon it as a stimulant and force-producer and who seek to find evidence that it originates or conserves force. These arrange themselves at present under two heads:

The first speak of it as among the food adjuncts, accessory foods or possible foods. Professor Atwater, as to these, quotes from Professor Forster, a well-known experimenter, in speaking of what the Germans call "'genuss-mittel'—appetizers is perhaps our nearest corresponding word." He shows by actual experiment that these have been overestimated as helps to digestion. He then refers to alcohol as one of these appetizers or food adjuncts, claimed to aid digestion, and says of all of these, "the quantities digested appear to be less affected by flavor, flavoring materials and food adjuncts than is commonly supposed."

The next contention has been that although alcohol does not respond to the usual definition of foods, it is an accessory in that it retards "regressive metamorphosis and so adds to the physical force." Now, all chemists and physiologists are familiar with the metamorphosis which takes place under the general name metabolism. Life itself is

a process of daily income and expenditure, the income being the food that is digested and appropriated. Some of this is used for the construction of new tissue, some for force and repair. The outgo is in the form of carbonic acid and water by the lungs, kidneys and skin, or in that of urea and allied products that escape by the kidneys. This appropriation of foods by the system, the combinations made with used-up material and its removal, constitute the uniform and indispensable phenomena of life. The contention of those who claim alcohol is acting the part of an accessory food, is that somehow it delays metabolism and causes what has been called a "retrograde" or "regressive" metamorphosis and so husbands the resources of the system. This is equivalent to saying that it interferes with the natural process by which life is conserved. The advocates of this view are singularly deficient in facts needing to be furnished by chemistry or physiology, but rely upon what they call the experience of practitioners of medicine.

Now, the physiological conclusion as to any substance which did actually interfere with the natural phenomena of disintegration and of life, would be that it would prove an embarrassment to health and promote those various degenerations which are so characteristic of the effects we see in chronic alcoholism. After careful search we have been unable to find any chemical or physiological facts which warrant the assumption that alcohol fortifies life by any such process.

It is not suspension of life processes that we want in any such emergency, but rather the most skilled use of the most available tonics, and the avoidance of excessive wastage by not calling upon the body to perform its usual service. Dr. B. W. Richardson, of London, so eminent as a physiologist and as a medical practitioner, in a recent note to me, in answer to an inquiry as to the effect of alcohol in this respect, says, "I have no reason to believe in delay of metamorphosis, or if there be such, I should consider it injurious." He adds, "I think in this country the appreciation of alcohol and its defense by leading practitioners, in regard to food value, has much decreased." We are aware that Dr. Binz, of Bonn, perhaps the ablest advocate for the medicinal use of alcohol, claims that it is an "economic factor." But it is worthy of note that he only speaks of it as "available on the sick-bed," and more than intimates that its use in any healthy subject is an abuse. If it is an "economic factor" in any food sense, it could only be so by being consumed in the

organism. If so consumed it should respond to the tests of other foods, which it does not. We know of no new light from physiology or chemistry on this hypothesis of delayed metabolism since we fully examined it in the little treatise on "Alcohol as a Food and Medicine," 1876, and so refer to the arguments and facts there contained. (Pages 49–56.) We are not aware that any one has brought out any chemical facts, or any facts, as to the physiological process of digestion, that at all substantiate this view. Indeed, most of those who propound such a view are fair enough to offer it only as a plausible explanation. Thus, Hammond, in his plea for regressive metamorphosis, says, "It is not at all improbable that alcohol furnishes the force directly by entering into combination with the products of tissue decay, when they are again formed into tissue without being excreted as urea, uric acid, &c."

Prof. Bartholow, who also refers to delayed metamorphosis of tissue as a probable use of alcohol, sees the chemical and physiological dilemma, and so, without the needed explanation, adds the ominous sentence, "As alcohol checks tissue metamorphosis, and thus diminishes the evolution of heat and force, it might be expected that the products of its own oxidation would supply the deficiency, but this is not the case." If such is not the case, why not? How does alcohol do this strange work of arresting tissue metamorphosis and so conserving health, without the usual relation to oxygen?

We have a recent opinion (March, 1891) from Prof. A. B. Prescott, of the University of Michigan, who has perhaps studied the alcohol series with more thoroughness than any chemist in this country. He says, "In my decided judgment alcohol is not a food. To lessen tissue metamorphosis is not to serve as a food, but is more commonly to antagonize the service of food. If alcohol had no other action than to suffer oxidation it would be a food. But the chief action of alcohol is always that of a neurotic. Its total action is to lessen the total of oxidation in the system. So its service is not that of a food, but that of a neurotic." The fact is, that since we have come to know through physiological chemistry more definitely what chemists understand by "metabolism," the phrase "regressive metamorphosis," or "delayed metamorphosis of tissue," is retired from service. If any argument is to be made on that basis it must now be called arrest of or interference with vital metabolism, and so chemistry and physiology are rightly called upon to furnish the facts and

experiments illustrating this process. This is something that no one has yet done.

The trend of scientific research, therefore, up to the present moment, is more and more against assigning any definite food value, direct or incidental, to alcohol. We know neither the calorimeter nor chemical laboratory nor physiological experiment that shows any such a result.

We are not disposed, in this discussion, to minimize the import of any facts as to alcohol in its relation to man, or even to discard testimony which claims the basis of experience, even though it has no scientific facts to confirm its findings.

We will not even press the criticism that so many physicians have become prejudiced through the force of habit or through their own moderate indulgence in table appetizers, although many of them are not slow to insinuate that medical temperance testimony is prejudiced because of abstinence.

We, therefore, next inquire what is the present testimony as to alcohol, of those who study it as clinicians and who consider it with reference to its actual effect in disease.

Our reply to this is that the result of the last fifteen years has been greatly to constrict the sphere of alcohol as a medicine, but, nevertheless, to insist upon its value and availability in the class of cases to which it is adapted.

Just here we beg to say that, in our judgment, some advocates of total abstinence have felt themselves called upon to dispute the possible value of alcohol as a medicine to a degree not at all necessary to sustain the doctrine of total abstinence.

The claim that the value of alcohol as a medicine depends upon its availability as a food would need to be dealt with, because arguments as to that might, by implication, refer also to a state of health. But it is all gratuitous to assume that, because to a restricted degree alcohol may be used as a medicine, its value depends upon any such principle.

We accept ethers, aldehyde and other products allied to alcohol, as well as digitaline, morphine, strychnine, quinine, &c., as having medicinal value, without any insistance upon indirect food value, and, indeed, have often to accept substances as of apparent medicinal value when we do not know the "modus operandi," and which we know to be inimical in health. We at once grant that there are states in

which small doses of opium, of strychnine, of quinine and many other substances, when skillfully prescribed, help invalid life over some of its hard places.

So there can be no doubt that a little alcohol, amid the acids, the ethers and the aroma of some liquors, or with the combined fruit-juice, malt, &c., may carry the system over some temporary infirmity, as the whip may cause the horse to leap forward when he cannot trust to his life forces.

If the hospital ambulance picks up a man well-nigh pulseless, the physician may fill his hypodermic syringe with brandy and digitaline without any discussion of food values or total abstinence, if so be statistical facts and clinical experience have shown this the most available substance for well-nigh mortal heart failure.

The scientific basis is that a chemical substance that is shown to be a toxic, a poison, a neurotic, is never needed in the healthy human body, and is not to the slightest degree indorsed for any use other than medicinal, by the fact that it may be available as a medicine. So far from that, the legitimate contention is that any such substance, because thus available, is all the more to be guarded against any use except that which is specifically prescribed in skillful adaptation to the symptoms in hand.

It is one of the satisfactions of modern medicine that amid much that must ever be empirical, it seeks to define more closely the indications and the limits of medicines and of alcohol among them. While there will ever be a host of promiscuous doctors, hypothetical doctors, experimental doctors, and "follow the fashion" doctors, and now and then one of these among the lights of the profession, there is nevertheless a prevailing tendency to precision. There is also in some respects, both in the light of science and clinical record, ground for closer definitions of the real availability of medicines.

The debate in the fall of 1888, in the Pathological Society of London, representing some of its best medical talent, led Dr. J. F. Payne, Dr. Lionel Beale and Dr. George Hay, to express very significant opinions on this subject.

Dr. Payne spoke of alcohol in its terrible effects on the functions of organs, its poisonous and destructive work on tissue and its interference with oxidation. He was fully supported by Dr. Harley, who claimed that "very moderate drinkers were in reality the most numerous class of alcoholic victims." Dr. Lionel Beale repeated and

emphasized his well-known views. Since then Dr. Harley has given a series of lectures on the subject, which well represents the most thorough recent clinical beliefs as to the very restricted availability of alcohol in disease.

While exact clinical experiment and experience now narrow the sphere of alcohol, these regard it as available in sudden shock from injury, chiefly in the form of hypodermic injection with digitalis, as also for temporary use in sudden prostration until nutrients and other restoratives become preferable in its place, as is quickly the case. There is a narrow stage of fever and debility in which alcohol may be available. But it is to be borne in mind always that the stimulant effect is short and apt to be followed by depression, and that its chief effect is that of a neurotic. Since we have come to know the value of the various peptonoids and of their combination with beef, gluten, milk and flavoring oils or condiments, there is far less need for alcoholics. The appetizing effects of wines, &c., result full as much from flavors, such as ænanthic ethers, developed in them from the acidity, as from the alcohol itself. The fattening effect of beer to some results from the malt, &c., which now has an excellent substitute in the syrupy malt extracts. Alcohol, as it comes to derange organs, especially the liver, has much the same effect as is produced by a forcing process upon the livers of geese, which become abnormal. The more such geese weigh and the better they look so much the worse for the geese. No doubt by the clogging of organs there may be retention of materials and pent-up secretions which add slightly to bulk or weight, but it is only a storage tending to disease and not a storage of health.

The day is passed when, upon dietetic and medicinal grounds, there is any indispensable call for the moderate or habitual use of alcoholic beverages.

In the midst of the various alcohols and of all the manufactured and concocted mixtures which are now sold as if they were the real and pure product of the grape or of alcoholic distillation, we have better-known tonics and nutrients which effectually take their place, except to those who use them as pleasure-giving drinks.

The only design of this paper has been to state the findings of scientific and clinical research as to the dietetic value of alcohol. It cannot be overlooked that alcoholic beverages have most important bearings in their relation to the public health. Our desire is to give

information to those who resort to the moderate use of alcoholic beverages with the idea that they have a food value. We need not argue here against intemperance as affecting health. It speaks for itself, and makes a record too palpable and commonplace to need argument. We rather desire that those who habitually and moderately use these beverages should know that they are not in the interests of good health. They tend to disturb function and to make organic changes in such organs as the brain, heart, liver and kidneys.

We need quote but three testimonies as fairly presenting the real view.

B. W. Richardson, M.D., F.R.S., of London, a leading physiological and chemical scientist, and an experienoed practitioner, speaks thus:

"I have learned purely by experimental observation that, in its actions on the living body, this chemical substance, alcohol, deranges the constitution of the blood; unduly excites the heart and respiration; paralyzes the minute blood-vessels; increases and decreases according to the degree of its application, the functions of the digestive organs, of the liver and of the kidneys; disturbs the regularity of nervous action; lowers the animal temperature, and lessens the muscular power. Such, independently of any prejudice of party, or influence of sentiment, are the unanswerable teachings of the sternest of all evidences, the evidence of experiment, of natural fact revealed to man by experimental testing of natural phenomena."

Dr. N. S. Davis, an ex-President of an International Medical Congress, and for forty years an active practitioner in Chicago, says:

"There is no greater or more destructive error existing in the public mind than the belief that the use of fermented and distilled drinks does no harm so long as they do not intoxicate. 'It is not the *temperate use*, but the *abuse* of alcoholic drinks that does harm,' is the often-repeated popular phrase that embodies the error which helps to rob more than 100,000 persons of from five to twenty years of life in the United States, through the gradual development of chronic structural diseases induced by the daily use of beer, ale, wine, or distilled spirits, in quantities so *moderate* as at no time to produce intoxication. No more true or important remark was made in the noted discussion in the London Pathological Society, than the one by Dr. George Harley, that 'for every drunkard there were *fifty* others who suffered from the effects of alcohol in one form or other.'"

Prof. William H. Draper, a leading practitioner of New York, in an address on alcohol, before the New York Academy of Medicine,

Nov. 1886, says, "That the effects of alcohols on nutrition are harmful and deteriorating to such a degree as to constitute the most powerful cause of physical degeneration at the present day, there can, I think, be no question. The drift of professional opinion in this country and in Europe is surely tending toward the restriction of their use as articles of diet, and simply for the reason that they are the determining cause of many functional derangements and structural degenerations."

The debate before the Pathological Society of London, 1888, expressed a general professional view in accord with what has been quoted. Since then the exhaustive clinical lectures of Dr. Harley, of London, have shown most fully the evil effects of moderate drinking and how much the public and individual health is involved in the habit. The subject is therefore worthy of the study of all sanitarians and of all who have been wont to regard such drinks as a source of vigor and as not involving any impairment of health.

SUMMARY OF REPORTS FROM LOCAL BOARDS,

AND LISTS OF MEMBERS AND HEALTH INSPECTORS, WITH ABSTRACTS FROM MOST OF THE REPORTS.

BY THE SECRETARY.

In October in each year, as required by law, a printed schedule of inquiries is sent to each Local Board of Health, also containing a blank for the names and post-office address of members of Local Boards and Sanitary Inspectors. The following is the schedule:

SUBJECTS FOR REPORTS.

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

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.

If details on some of the subjects named have been furnished in former reports, these do not need to be repeated. But each item should be carefully examined, and full information given under R. It is always best to state what the Board has actually done. Under

W no disease should be reported as having been prevalent, unless the writer knows of at least ten cases during the whole year. The medical member of the Board should, if possible, give facts as to any epidemic that has occurred, and should note any special needs or defects in sanitary administration.

The following circular, which is also of use to draw the attention of Local Boards to the subjects committed to their care, accompanies each report:

CIRCULAR LXXIV.

OF THE

NEW JERSEY STATE BOARD OF HEALTH.

TRENTON, October 1st.

To Local Boards of Health:

Enclosed herewith please find an outline for the Annual Report for the year ending with this date.

In addition to the name and post-office address of each member of the Board, give also the same as to the Sanitary Inspector. The law now requires that each city, town or borough of over two thousand inhabitants shall have a *competent* Sanitary Inspector. In all the larger *townships*, or in those which have villages of several hundred persons it is provided by law that the State Board may require a Sanitary Inspector to be appointed, if in its judgment such an appointment is needed. In a township, if the Local Board fails to appoint, the State Board appoints the medical member of the Board of Health. Where there is a Township Physician he is not, by virtue of that position, the medical member of the Board of Health, but he or any other physician resident in the township may be appointed.

Under the schedules of subjects for report, in the case of cities and townships which have had Boards of Health and reported in previous years, it will not be necessary to repeat as to *A*, *B*, *E*, *G*, *I*, *O* and *P*, as most of the facts are on file.

In every case of report from a township, the name of any city, town or borough *in it* which has a separate Health Board should be given.

Under *A*, in the case of all cities, towns or boroughs, it is desirable to give the number of acres included in the incorporation and population per acre if known.

Under *C*, state exact source of water-supply, and when introduced. If a public supply, is it by the city or a private company? How many houses take it? Is the water ever discolored? Has it an iron

or other taste? Is it hard or soft? Is it bad at any one season of the year? Are reservoirs or water-pipes cleaned? Does the source or stream from which it is taken receive any sewage above the point of supply? If from a stream, is there any examination made each year, or oftener, as to modes of pollution? Any other facts as to source, quantity or quality. How many depend on wells? How many on cisterns? Has the Health Board a list of houses that do not use the public water-supply?

D. As to drainage, state whether any system of drainage for the ground is used as distinct from sewerage. Is the usual water-level such as to secure dry cellars? If there are swamps near you, or malaria is frequent, give particulars.

As to *sewers*, state their construction, their grade or fall per one hundred feet, their size, their outfall, their flushing and ventilation, and whole length, and when introduced.

F. State whether houses generally have basements or cellars. If a city, whether the basements are occupied; if country, whether largely used for storage of vegetables. How many tenement-houses of more than two families? Is there a yearly house-to-house inspection?

H. State how far sewers are used, and what proportion of houses connect with them. Does your record show this? If cesspools, state whether they are cemented, or whether built with open bottom or sides. How are they emptied? What is done with the contents?

J. State any known or prevalent disease this year, and what month. Does the Assessor inquire each year as to losses of animals, and as to contagious diseases? If a city, is there a register of all persons keeping horses, cows, hogs, &c.?

K. Are slaughter-houses inspected, so as not to be a nuisance to neighbors?

L. Mention any new manufactories, and any nuisances from any factories.

R. Has your Board passed ordinances?

S. State who neglect returns and their post-office address.

Look carefully at each heading and state what you know.

Under *W*, do not put down a disease as prevalent unless you have personally known of at least ten cases. Under *X*, state what your Board has done the past year, and any sanitary investigations and improvements. Often the Physician of the Board should make out or aid in the report, and add such suggestions as occur to him; but let there be no delay to make return during October. We must trust chiefly to the Assessor, the Physician and the Inspector to keep the other members of the Board acquainted with health conditions, and with the rights and duties of the Board. Any neglects reported to us will be inquired into. Refer to Circulars XXXIX. and LX., and to Book of Circulars, for further information. Have on hand, also, Inspectors' Guide (Circular LXXV.), as furnished by State

Board. Your Board should each fall look carefully over all health conditions, as the winter is a good time for the cleansing of outbuildings and much other sanitary work.

We send occasionally, blanks for lists of physicians or undertakers, to be carefully corrected and promptly returned to this office. Cross off any deceased or removed, or who have ceased to practice. Add all new ones who have settled for practice within the city or township for which you make return. *Give name and post-office address plainly,* and only those residing in your city or township.

Keep informed as to the laws, and distribute the various reports and circulars of the Board. One or more members of your Local Board should attend the Annual Fall Meeting of the New Jersey Sanitary Association. Local Boards now have nearly or quite all necessary power. Even in small and very healthy townships, the Local Board should confer at the time the Township Committee meets, and keep so informed as to prevent nuisances or deal with any outbreak of epidemic. On receipt of postal, a copy of laws and references, or other circulars, is sent to each member of the Local Board whose post-office address is given.

Let the schedule, carefully filled out, be mailed to us in envelope herewith sent, not later than November 1st.

E. M. HUNT, M.D.,
Secretary.

We do not find it necessary to publish all of each report, and even those from which we publish nothing are of value for reference in the office. Our space permits us only to select such parts as are new, or as are of special interest to the locality and to this Board. Reports are in general promptly received, but a few Boards are dilatory, or seem to regard the report as a formality. They are so important that we must insist upon exact conformity to the law. Those who will examine the abstracts will not fail to get valuable information, and have opportunity to compare the work and methods of the various Boards.

We are not able to give always the names of all members of Boards, and sometimes, when they have not been formally organized, we give the name of the Township Committee and Assessor, who are members, and are responsible for local health conditions.

The law constitutes these as a Board, even before formal organization.

REPORTS OF LOCAL BOARDS OF HEALTH BY TOWNSHIPS AND COUNTIES.

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

ATLANTIC COUNTY.

ABSECON.

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

Jeremiah Hand, M.D., Clayton L. Higbee, Japhet Adams, Towers Townsend, James Townsend, Joseph Madden. E. H. Madden, M.D., Health Inspector. Post-office address of all, Absecon.

The health of Absecon town in the past year has, uninterruptedly, been excellent.

ATLANTIC CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Borton, President; Henry S. Scull, George W. Shepherd, Julius Coty, William D. Hoopes, Jacob Leedom; M. D. Youngman, M.D., Secretary. Alfred T. Glenn, Inspector. Post-office address of all, Atlantic City.

The water-supply is from two sources—springs on the mainland and driven wells, 1,600 feet deep, on the island. Sewerage system consists of iron pipes, lead jointed, emptying into a cistern at Central Station, from which sewage is pumped to filtering-beds. The system, which, for a few years, was somewhat experimental, is now so perfect that all new buildings are connected with it, and seventy-five per cent. of the old buildings, or those existing at the time of its introduction, are connected therewith. During the last year large and commodious manholes, at convenient locations, have been built to enable frequent inspection and prevent clogging of pipes. All the school-houses were enlarged during the past summer to prevent overcrowding and keep pace with the phenomenal growth of the city.

All school buildings are provided with the most approved and carefully-constructed sanitary arrangements and plumbing. No burials are permitted on the island. During the year the city acquired by purchase a property, consisting of a house and several acres of ground, on the outskirts of the city, to be used as a place for the quarantine of contagious disease. One case of small-pox was cared for there during the year. Vaccination is compulsory upon all children entering the public schools. City Council appropriated $5,000 for the use of the Board for the current year. The Board has devoted itself especially, during the past year, to securing the filling of low lots and alleys to grade. Members have been active and faithful in their attendance at meetings and much good work has been accomplished.

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

BUENA VISTA TOWNSHIP.

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

George B. Cake, Buena Vista; J. H. Smith, Richland; Jacob Blair, Buena Vista; Earnest A. Pierce, Secretary, Richland. C. W. Jones, Assessor, Richland, N. J.

EGG HARBOR CITY.

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

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

In consequence of the excessive rains during the last winter and spring a number of complaints as to accumulation of water in the public streets and obstructed drainage were received and the same referred to the Common Council for removal. These requests have in some instances been attended to, although somewhat tardily. The chief cause of complaint, the obstruction of a public drain, has not been attended to, owing to the inactivity of the Council. No change in the present water-supply system of open and driven wells can be reported. The streets, public grounds and buildings are in good condition. A number of streets have been regraded and

thoroughly graveled. Two cases of glanders were reported during the year; upon examination and report of veterinary surgeons, we ordered the owner to kill the infected animals, which request was immediately attended to and the premises disinfected. No diseases of cattle were reported. Lately parties lost a number of pigs by an unknown malady. The reports of vital statistics have generally been sent in promptly. Since my last report fourteen cases of diphtheria, four of scarlet fever, and one of typhoid fever have been reported; of these, three cases of diphtheria resulted fatally. The Board is at present engaged in revising and remodeling a code of health ordinances.

V. P. HOFFMAN,
Secretary.

EGG HARBOR TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. C. Fifield, Bakersville; Samuel A. Smith, English Creek; John J. Corson, Bargaintown.

GALLOWAY TOWNSHIP.

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

George Hansalman, Chairman, Egg Harbor City; Isaac Strickland, Oceanville; Israel Conover, Absecon; A. H. Higbee, Secretary, Leeds Point; E. H. Madden, M.D., Absecon.

All depend on wells; cellars generally dry. Malaria comparatively unknown. The Board has organized and adopted ordinances and ordered the same printed. We have no Sanitary Inspector.

A. H. HIGBEE,
Secretary.

HAMILTON TOWNSHIP.

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

James A. Blaisdell, John V. Beckett, Thomas A. Kean, Lewis W. Cranmer. H. C. James, M.D., Health Inspector. Post-office address of all, Mays Landing.

The Board of Health met April 6th, 1890, and organized. The Board decided to meet once every month, and publish the time and the place of meeting in the newspaper circulating in the town. There have been very few reports of nuisances made and no contagious disease occurred epidemically. The present water-supply is still procured from open wells, which are rapidly diminishing and driven wells taking their place. Some of the houses near the cotton mills derive their water-supply through pipes. This water being obtained from the Great Egg Harbor river. There have been about fifty new houses built since our last report, most of them to be occupied by the owners. Three horses have been afflicted with glanders and ordered killed, which order was promptly obeyed.

H. C. JAMES,
Health Inspector.

HAMMONTON TOWNSHIP.

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

James H. Seely, Curtis S. Newcomb, Samuel R. Howland, Edward North, M.D.; A. J. Smith, Clerk. Post-office address of all, Hammonton.

The Board of Health have had no occasion for meetings this past year. No complaints of any kind have come to any of the members, to our knowledge. We have trouble in getting accurate returns from our Italian population. We fear that in the matter of births we fail to get the full quota. We have a population of between 500 and 600 of these people.

A. J. SMITH,
Clerk.

MULLICA TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William B. Oliver, Pleasant Mills; Charles Saalaman, Egg Harbor City; George Huntsman, Nesco; W. S. Miller, Assessor.

WEYMOUTH TOWNSHIP.

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

Anderson Bourgeois, Estellville; Anderson Campbell, Tuckahoe; Anthony I. Parker, Sr., Tuckahoe. W. H. Campbell, Assessor, English Creek.

BOROUGH OF SOMERS POINT.

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

H. H. Vansant, Allen Atkinson, George H. Cook, Mark S. Somers, William H. Keates. N. D. Vaughan, Borough Clerk. Post-office address of all, Somers Point.

Somers Point is situated on the west side of Great Egg Harbor inlet, bay and river; population 400; climate mild; water soft and clear, from springs and wells; drainage from surface. No malaria; no swamps near by. Houses with cellars used for storage. Cesspools and half surface. No slaughter-houses; no manufactories. One school-house, two rooms; canvas fire escapes to hotels. Two cemeteries. Law regulated by Council. No prevalent diseases.

N. D. VAUGHAN,
Borough Clerk.

BERGEN COUNTY.

BOILING SPRING TOWNSHIP.

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

Wm. McKenzie, Carton Hill; James W. Roden, Rutherford; James P. Edwards, Rutherford. Geo. W. Sturges, Assessor.

ENGLEWOOD.

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

Abraham Tallman, President; James Harris, Henry J. Brinkerhoff, Hardy M. Banks, M.D.; Gilbert W. Chamberlain, Secretary. John T. Post, Health Inspector. Post-office address of all, Englewood.

Lies between Hackensack and Hudson rivers. Population 5,000; climate temperate. Water-supply from Hackensack and Hoboken Water Company; reservoirs at New Milford. Drainage by Citizen Sewage Company; emptying into Overpeck creek. Streets wide, with excellent macadamized roads. No public grounds. Two cases of typhoid fever latter half of October. No contagious disease. The

town is divided into districts, over which the Inspector travels in search of any violation of the Local Health Board ordinances and reports the same at monthly meetings of the Board, when action is immediately taken to bring delinquents to a strict account for any violation of said ordinances. The deepening of Overpeck creek (at a cost of $4,000) is a recent improvement in the interest of health.

G. W. CHAMBERLAIN,
Secretary.

FRANKLIN TOWNSHIP.

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

John Ramsey, Oakland; Uriah Quackenbush, Wyckoff; Peter S. Winters, Wyckoff. John W. Ackerman, Oakland, Assessor. E. H. Hamilton, Oakland, Inspector.

The health of the township has been fair; we have had but one complaint. The Inspector looked after it and it was abated.

JOHN W. ACKERMAN,
Assessor.

HARRINGTON TOWNSHIP.

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

C. L. Du Bois, Northvale; Isaac Kipp, Closter; R. B. Harring, Tappan, N. Y. C. N. Durie, Assessor.

HOHOKUS TOWNSHIP.

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

William Murray, Assessor; Charles Young; Joseph Terwilleger, Inspector; William Thurston, John Ackerman, Charles P. Devoe, M.D. Post-office address of all, Ramseys.

LODI TOWNSHIP.

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

Adolph Kruger, Chairman, Carlstadt; Francis Feitner, Carlstadt; John Burke, Lodi; John Van Bussum, Secretary, Hasbrouck Heights. Oliver Soper, M.D., Inspector, Lodi.

The water-supply for that portion of the town embracing Hasbrouck Heights, Woodridge and Carlstadt, is furnished by the Hackensack Water Company, and is pure. This is a great improvement, as the water was, in some instances, of inferior quality. In the village of Lodi there are some wells that are in questionable condition, owing to the close proximity of vaults, and to improper drainage of surface-water, &c. There have been a number of complaints concerning drainage. This matter is being attended to. A sewer system has not been adopted, but with the proper opening of ditches, already excavated, drainage would be in fair condition. There has been no systematic inspection from house to house to ascertain the condition as to tenancy, &c. There might be improvement in respect to disposal of refuse and excreta in some portions of the township. The health of the township has been good, except during winter and early spring, when we had our quota of influenza and the sequellæ arising therefrom. All complaints brought before the Board have been immediately investigated and acted upon as far as the power of the Board would warrant.

OLIVER SOPER, M.D.,
Health Inspector.

MIDLAND TOWNSHIP.

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

Albert J. Bogert, Chairman, River Edge; John G. Zabriskie, Rochelle Park; C. T. Zabriskie, Ridgewood. Nicholas G. Hopper, Assessor, Ridgewood, N. J.

HACKENSACK.

NEW BARBADOES TOWNSHIP.

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

J. S. C. Wells, President; D. G. Jeffers, Secretary; C. E. Ekerson, C. F. Adams, M.D., F. H. White, M.D., E. B. Barkman, C. Conklin. M. W. Heath, Health Inspector. Post-office address of all, Hackensack.

Several miles of sewers, both brick and pipe, built during the year. The macadamizing of the streets is in progress; the past season several miles have been completed. The public grounds are kept in good condition. There is no house-to-house inspection. The Board

adopted an ordinance concerning the business of cleaning cesspools. Markets are kept in clean condition; no complaints of any nuisance therefrom. One slaughter-house, well conducted; refuse carried off by tide-water. There are three public and one parochial school, ably managed; buildings well suited for the purpose. Hackensack Hospital is a worthy institution ably conducted. The sanitary condition of the jail is looked after by our Inspector. One old cemetery in the town, in which there are about six burials per year. Our ordinances have been printed in pamphlet form and a copy given to each householder. Expenses about $300 per annum.

D. G. JEFFERS,
Secretary.

ORVIL TOWNSHIP.

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

O. O. Blenis, Saddle River; O. W. Jennings, Saddle River; E. D. Leary, Hohokus. Charles W. Badeau, Allendale, Inspector.

There is nothing to report except we had a number of cases of la grippe last spring, and some of them fatal. There were also two cases of diphtheria that were brought from Paterson, but by careful quarantine the disease was prevented from spreading.

A. H. ACKERMAN,
Assessor.

PALISADE TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Alfred Jarvis, Tenafly; M. Mackentire, Tenafly; C. J. Westervelt, Schraalenburg.

RIDGEFIELD TOWNSHIP.

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

Joseph Schlosser, Fort Lee; John S. Edsall, Leonia; Albert Ravekes, Ridgefield Park; Thomas F. Malloz, Nordhoff, Secretary; Joseph Huger, M.D., Fort Lee.

We are pleased to report that the past year has been remarkably free from epidemics of any kind. No contagious disease, with the

exception of a few cases of diphtheria, from which no fatal results occurred. A great many complaints were acted on during the year, and the nuisances promptly abated under direction of the Board. The most dangerous case reported was an open cribbage on the Hudson river front, three or four acres in area, into which the New York city offal and garbage was being dumped. The Board took such action that the dumpage was stopped, and the place is now being filled with healthy clay material. The Board has passed ordinances.

THOMAS F. MALLON,
Secretary.

RIDGEWOOD TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. A. Marinus, President, Ridgewood; Thomas Terheun, Secretary, Hohokus; E. Nickerson, Ridgewood; M. T. Richardson, Inspector, Ridgewood; J. T. Demund, M. D., Ridgewood.

The health of the township has been about the same as in previous years. The principal work of the Board has been to impress upon the people the importance of keeping the township healthful. We have adopted the usual code and published and circulated the following:

"In adopting a code of regulations for the better preservation of the health of this township, the Board of Health does not wish to be understood as desiring to impose any onerous rules.

"Where houses in country villages are built close together, unless cesspools are constructed on sanitary principles, contamination of the soil is sure to result sooner or later, by which drinking-water is poisoned more or less, and such diseases as typhoid fever, malaria, diphtheria and kindred maladies are superinduced. With care in the construction of cesspools, and proper attention to them afterwards, little difficulty need be experienced in the direction indicated.

"For obvious reasons the *leaching cesspool* (simply a hole in the ground into which sink-water or other sewage is emptied) is the favorite form of construction. All sanitarians agree that this (from the standpoint of healthfulness) is the very worst plan ever devised for the disposition of house drainage.

"Until Ridgewood shall have grown to such proportions that it can afford to introduce a sewerage system, there would seem to be but one safe course for the people to pursue, and that is to abandon all leaching cesspools and build tight cesspools of brick, properly cemented. A tight cesspool carefully constructed and ventilated, and emptied periodically, may be regarded as comparatively safe.

"In localities where the ground slopes gradually rearward from the house for a distance of 150 feet or more, it is possible to introduce what is known as the 'Waring System' of house drainage. Where the conditions are favorable this is probably the best form of independent drainage for country houses. It is necessary, however, to have a certain fall from the house to employ this system successfully.

"If individuals in building houses will endeavor, in the arrangement of cesspools, to conform closely to the suggestions contained in this circular, and try to have wells located at least seventy-five to a hundred feet from cesspools (no matter how constructed), there will be little danger of coming in conflict with any of the regulations of this Board.

"In some cases it may be that a well located comparatively near to a leaching cesspool may apparently remain uncontaminated for a series of years, but it is well known that in many cases wells so located are fruitful breeders of disease.

"The Board would like particularly to dwell upon the necessity for properly testing all new pipes connecting the house with cesspool before using. Unless joints are very carefully made, leaks are liable to occur, which, being underground, cannot easily be detected. No drainage-pipe should ever run near a well or cistern. Pipes running from house to cesspool should be placed at least three feet underground, in order to avoid frost.

"It is suggested that those having improperly-constructed cesspools at present on their premises, would lessen their chances of contracting disease by reconstructing such cesspools in accordance with the above suggestions.

"It should be borne in mind that the Board of Health has full power at its discretion to enforce any of the regulations contained in the code adopted by them.

"In adopting this code and in presenting these suggestions the Board is influenced solely by a desire to improve the healthfulness of the village, and it is to be hoped that property-holders will endeavor, so far as possible, to conform to these regulations."

THOMAS TERHEUN,
Secretary.

SADDLE RIVER TOWNSHIP.

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

Henry A. Hopper, Fair Lawn; Isaac A. Hopper, Fair Lawn; Peter Alyea, Dundee Lake; Albert Conklin, Garfield; Dr. Moak, Garfield.

No prevalent diseases during the year.

ISAAC A. HOPPER,
Secretary.

UNION TOWNSHIP.

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

V. E. Downer, Lyndhurst; C. F. Harrington, Lyndhurst; John Kehoe, Lyndhurst; Alexander J. Davison, Kingsland; Dr. Trautwein, Inspector, Lyndhurst, N. J.

Water-supply from wells. Houses mostly frame, with one tenant. There have been no prevalent diseases this year. There have been several places where water has lodged, but upon notice to the owners the nuisance was abated.

WASHINGTON TOWNSHIP.

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

No report received.

BURLINGTON COUNTY.

BASS RIVER TOWNSHIP.

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

C. Garrabrant, M D., New Gretna; M. W. Adams, Assessor, New Gretna; John W. Harris, Harrisia; H. E. French, New Gretna; Levi French, New Gretna.

Located between Bass and Wading rivers. Population about 900. Climate mild. Consists of a sandy loam adjoining the salt marsh on the south, which extends to the Mullica river. Water is obtained from dug and driven wells, which are from ten to thirty-five feet deep. Drainage is natural and complete. Houses are in good repair. We have no slaughter-houses in town. There are five school districts in the township. The school-houses are in good repair. There are four cemeteries located back on the hill. Precautions are used on the part of the citizens to prevent the spreading of disease. If any one dies from a contagious disease the funeral is private. Vaccination is partly attended to. There have been no cases of contagious disease outside of one family having diphtheria.

BEVERLY CITY.

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

J. J. Currie, M.D., D. V. Soby, M.D., Hugh B. Ely, William K. Vansciver, George A. Smith, Joseph L. Simon. Charles F. Richardson, Inspector. Post-Office address of all, Beverly.

During the year ending October 1st, 1891, twenty meetings were held, at sixteen of which a quorum was present and business transacted. Over thirty complaints were received and investigated by the Inspector, and the causes removed or abated more or less permanently. Some could not be permanently abated until the grading and gutters were improved. On March 26th a supplement to our ordinances was passed in reference to the cleaning of cesspools and vaults by permit only, which resulted in over 100 permits being issued, 51 of which were from April 1st to May 11th. The Board was thus enabled to keep informed of how well such work was done and by whom. On March 26th a resolution was passed requesting City Council to have the gutters flushed during the summer months. On May 14th the President was appointed to confer with Beverly Township Board of Health regarding the bad odor from a fertilizer factory just outside the city limits. On July 9th the first case of diphtheria was reported to the Board and the family promptly quarantined. Since that date twenty-one cases have been reported, and the same course pursued as in the first case. Six cases having been reported to the Board on September 10th, the schools were ordered not to be opened until the disease seemed to be abated. They were re-opened September 21st with a diminished attendance. On September 29th a meeting was held to investigate the purity of the city water-supply, which is drawn from the Delaware river on the north side of this place. There were several members from City Council and others present. Three samples were taken from the pipes at different points and referred to Shippen Wallace, Esq., for analysis. There having been some fifteen cases of typhoid fever in Philadelphia (persons who were at the Grove House here in August), and it being thought by some that they became diseased while here, a thorough inspection was made of the boarding-house and such suggestions made to the owners as would put the place in good sanitary condition. These suggestions have been complied with in most instances. There was not sufficient

ground, however, to warrant belief that the parties referred to were affected on account of their residence here. Three cases only of typhoid fever were reported to the Board as occurring in their jurisdiction up to October 1st. It should be said that there have been several other cases of allied fevers, but not positively declared to be typhoid. Since October 1st some three or four cases are known to have existed. The city needs a thorough system of scientific sewerage, and is favorably located therefor, but the expense attending the same will prevent its adoption until forced by circumstances and public demand. A system of water-supply by a pipe from city works, and no means of removing the liquid impurities, cannot long be a healthful combination.

CHARLES F. RICHARDSON,
Inspector.

BEVERLY TOWNSHIP.

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

L. R. Hibbard, Edgewater Park; George Conover, Bridgeboro; Chas. Russ, Beverly; Joseph B. Carter, Delanco. H. K. Weiler, M.D, Inspector, Delanco.

There is nothing special to report from Beverly township, except the prevalence of diphtheria during the months of August and September. A number of cases were reported to the Board, of which three proved fatal. All necessary precautions were taken to prevent the disease from spreading, such as having wells and cesspools cleaned and the houses thoroughly fumigated and disinfected. There are now no cases within this jurisdiction.

JOSEPH B. CARTER,
Secretary.

BORDENTOWN CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. J. B. Woodward, President; Clinton Mendenhall; William H. Shipps, M.D., Secretary; William McFarland, Dr. I. D. Young, Hugh Newell, F. G. Wiese. H. N. Jobes, Inspector. Post-office address of all, Bordentown.

The past year has been one of activity in our Board of Health. Many subjects have occupied the attention of the Board at various

times, some easy of solution, others requiring much time and careful study for their elucidation. The most difficult problem with which we have had to deal is the question of a "safe source of water-supply." I say safe, because under existing conditions it is physically impossible to secure perfectly wholesome water for domestic purposes. So long as the stream from whence we obtain our supply of drinking water is made a common receptacle or outlet for the sewage of a greater portion of the city, including several large manufacturing industries, employing in the aggregate some eight or nine hundred hands, to say nothing of other equally unsafe sources of contamination in close proximity to the pumping station, will the health of the citizens be placed in jeopardy. It is true our water company, with commendable zeal, recently introduced an excellent system of filtration that has made radical changes in the character of the water, as determined by Professors Leeds and Shippen Wallace, to whom specimens were sent for analysis, and who pronounced the same as fully up to the standard required for wholesome water. Nevertheless, the fact the pollution of the water continues and is likely to increase in direct ratio to increase of population, causes apprehension in the minds of many, lest the power of the filters will be unequal to the emergency. Sooner or later it will become necessary either to eliminate from the stream the present sources of contamination, or select some new point of water-supply, and the sooner either one or the other of these conditions is realized the better it will be for the health of the community. Recently the Board issued an order forbidding all persons contaminating the creek by human excretal matters, believing that if this element of danger were shut off a most deadly source of pollution would be eliminated. At different periods during the year some forty cases of diphtheria came under our notice, distributed over different sections of the city. Of this number nine died. As illustrating the contagious nature of this disease and the necessity for prompt action in dealing with its first approach, I will detail the following: During the month of July a family consisting of Mr. A., wife and eight children, living on the northwestern border of the city, remote from other buildings, was attacked with the disease. Just how it originated could not positively be determined, although the sanitary arrangements outside of the building were such as to invite rather than repel disease. The first child attacked with the disease died before the family was made

aware of its nature, and before any steps had been taken to protect other members of the household. As a result, one after another of the family suffered from the disease, with a loss of three members of the household. When the first child died, a neighbor, Mrs. D., ignorant of the cause of death, agreed to prepare the body for burial. On leaving the house for her own home no precautions were taken, none being deemed necessary. In the course of a week or ten days two of her children were attacked with the disease, and one died. Across the road from Mrs. B. lived Mrs. C., with a family of six children, some of which had mingled with the B. children a few days prior to their being confined to the house. In consequence of this exposure, one after another of C.'s family were affected, with the result of the death of three children. About one-half a mile from A.'s lived farmer D., in whose home one of A.'s sons was a guest several weeks after recovery from the disease. During this visit he slept with the hired boy. Within one week the latter was attacked, and after a few days' sickness died. About this time another son of A.'s visited Philadelphia, spending the time with friends or relatives. In a few days after his advent a child in one of the families visited was taken with the disease and died. Thus, it would appear that A.'s family, directly or indirectly, was responsible for no less than six deaths. In the opinion of the writer, the disease should not have extended beyond the point first attacked, and doubtless would not, had proper precautions been taken at the start. When the Board of Health was notified, every precaution was taken to provide against further spread of the disease, but too late, it seems, to prevent the unnecessary loss of life. The other cases, for the most part mild in character, were located in remote sections of the city, and so far as could be ascertained had no connection with the cases before referred to. As a rule, physicians make prompt returns of contagious diseases, but in this instance, either from failure to recognize the character of the disease, or neglect, the Board was not apprised until the disease had made considerable headway. During August and September eight cases of typhoid fever were reported, two of which died.

An interesting fact in connection with these cases is, that one came from Canada with the disease, four used city water exclusively, and three depended upon wells for their supply of drinkng-water.

Our meetings are well attended, and frequently papers upon sanitary

matters are read and discussed, and an effort made to keep alive an interest in all matters pertaining to the public health.

WILLIAM H. SHIPPS,
Secretary.

BURLINGTON CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

No report received.

CHESTER TOWNSHIP.

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

Edward Perkins, Samuel S. Dager, George Brock. J. R. Mason, Assessor. Post-office address of all, Moorestown.

CHESTERFIELD TOWNSHIP.

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

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

Water-supply is entirely from wells. Mostly dry cellars and good drainage. No swamps. Houses have no basements, with two exceptions. No houses with more than two families. No contagious diseases either among men or animals. Only one slaughter-house. No places of nuisance. No complaints to the Board of Health.

CINNAMINSON TOWNSHIP.

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

William R. Lippincott, Chairman, Cinnaminson; E. H. Ogden, Riverton; Isaac Evaul, Palmyra. Timothy Morton, Assessor, Parry. J. D. Janey, M.D., Inspector, Cinnaminson.

Cinnaminson township is in the northwestern corner of Burlington county; contains a population approximating 6,000, and has a temperate climate. The surface is sufficiently rolling to rapidly and

efficiently carry off all surface-water. The water-supply in Riverton and Palmyra is in part from the water-works and the balance by wells and cisterns; in the farming district it is entirely by wells and cisterns, except at Cinnaminson, where an extension of the Riverton and Palmyra system exists. The water from the various sources is excellent. The supply from the system is from a large spring. In Riverton a sewer has been placed on Main street, which will form the trunk by which to drain a large portion of the village. The balance of the township is drained by natural slope. The streets and roads of the township are kept in good condition. Telford roads are gradually replacing the old form of road-bed. There are no houses with more than two families. The refuse is collected in the villages by scavengers and carried into the country. Excreta are removed to the farms and utilized for fertilizing purposes. There have been no contagious diseases among animals. There is one slaughter-house in Palmyra, which is properly cared for. Schools are good and the school-houses sufficient for our needs. There is a children's country work home at Cinnaminson. There are five burial-places in the township, and but one which is objectionable, namely, the Methodist yard, near the church in Palmyra. The public health is properly cared for by the Township Board of Health, and we believe a better state of health has prevailed since the existence and use of the law. Cases of contagious diseases are quarantined to the best of our ability, and children are required to be vaccinated before they can attend school. There have been a few cases of scarlet fever in the township. There have been no sanitary improvements with the exception of the sewer above mentioned, and possibly better attention to duties than formerly by the Local Board of Health. We realize that conditions grow better every year as people see the advantage in observing the requirements of the law as exercised by the Board of Health.

J. D. JANEY, M.D.

DELRAN TOWNSHIP.

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

Edward Yearly, Riverside; Thomas Fairbrother, Riverside; Henry Freck, Riverside; Abraham E. Conrow, Bridgeboro; Dr. Thomas P. Lippincott, Riverside.

Water-supply is all by wells. Houses in good order; no basements. Refuse and excreta carted away by farmers. Swamps near by. Malaria frequent. No rules or ordinances made by the Board. The Board has only been organized this year and has not done much as yet. There are several nuisances that should be abated, but as yet no action has been taken.

EDWARD YEARLY,
Assessor.

EASTAMPTON.

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

Jos. Parker, Mount Holly; Isaac Uncles, Smithville; Aaron Willetts, Smithville; Richard M. Hall, Assessor.

EVESHAM TOWNSHIP.

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

David T. Ballinger, Richard H. Leeds, John J. Mitchel, P. V. B. Stround, M.D. William L. Brown, Assessor. Post-office address of all, Marlton.

The Local Board of Health have nothing of any importance to report differing from former reports. There have been no prevalent diseases. There are two slaughter-houses in the village of Marlton, and one of them has been inspected and the Board did not think it necessary to pronounce it a nuisance, as it was in as good order as circumstances would admit.

FLORENCE TOWNSHIP.

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

John Kale, Assessor; Joseph West, Earl Gray, John Peacock. Charles A. Baker, M.D., Inspector. Post-office address of all, Florence.

Complaints made by members of the Board to those in authority at the iron works located here result only in promises in too many instances. Through the fear, apparently, of incurring their displeasure, some of the members hesitate to force them by law to abate

existing nuisances. The streets and alleys of "Foundrytown" are unkempt and sometimes filthy. The drainage is poor, and on account of the topography, cesspools are mostly used. A slight epidemic of scarlet fever visited here in July, but no fatal result followed. Some typhoid fever occurred in "Foundrytown" during the summer (an unusual occurrence for Florence). There have been twenty cases of sporadic diphtheria during the year, none of which were fatal. Florence is an unusually healthy place, and, with proper sanitary precautions and fearlessness in carrying out the law, should be kept so.

CHARLES A. BAKER, M.D.

LUMBERTON TOWNSHIP.

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

No report received.

MANSFIELD TOWNSHIP.

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

John R. Nayler, William A. Townsend, David Sharp, Howard W. Parker, E. G. Van Marter, M.D. Post-office address of all, Columbus.

The health of this community for the past year has been good. We have suffered from no epidemics or contagious disease.

E. G. VAN MARTER, M.D.

MEDFORD TOWNSHIP.

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

Henry Garwood, B. E. Wilkens, Edward Kirkbride. J. Reeve, M.D., Inspector. Post-office address of all, Medford.

The only epidemic diseases have been two distinct epidemics of influenza, one in January, lasting five weeks, and one commencing April 1st and lasting three weeks, covering nearly the same ground

each time, and very similar to the epidemics of the year previous, except that the nervous prostration was not so great. For the past two months there has been a mild epidemic of catarrhal jaundice and a few sporadic cases of scarlet fever. As a whole, it has been a healthy year.

J. REEVE.

MOUNT LAUREL TOWNSHIP.

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

Chas. Andrews, Fellowship; Chas. H. Sordon, Mount Laurel; Samuel B. Lippincott, Hartford. Jos. K. Matlack, Assessor, Hartford.

NEW HANOVER TOWNSHIP.

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

Benjamin Remine, Assessor, Wrightstown; L. D. Woodward, Cookstown; Thomas Platt, Wrightstown; M. V. Pullen, Cookstown.

Diphtheria has been reported in different parts of New Hanover township, but with no fatal cases. There have been no diseases of any kind existing among the cattle.

BENJAMIN REMINE,
Secretary.

NORTHAMPTON TOWNSHIP.

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

J. C. Kingdon, Mount Holly; Isaac Huff, Secretary, Mount Holly; J. B. Longstreet, Mount Holly; R. L. Nixon, Mount Holly. R. H. Parsons, M.D., Inspector, Mount Holly.

The water-supply is taken from the Rancocas creek, and is furnished by a private company. The stream receives no drainage from the town above the point of supply. The water is soft and somewhat discolored. The reservoirs are cleaned twice a year. There is a system of drainage with a public sewer, which has been fully described in our previous report. We have an ordinance regulating the cleaning of cesspools. The general health of the town has

been very good, with a few cases of diphtheria during the year. The hospital, children's home and schools are in good sanitary condition. The Board of Health meets regularly every month, and has abated many nuisances during the past year, in one case having the benefit of advice from the State Board.

PEMBERTON TOWNSHIP.

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

Jos. S. Budd, Pemberton; Andrew H. Fort, Pemberton; Ivins Davis, Assessor, Pemberton; John N. Smith, Brown's Mills.

RANDOLPH TOWNSHIP.

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

C. C. Adams, Lower Bank; William A. Maxwell, Wading River; Thomas R. Holloway, Harrisia; J. E. Carey, M.D., Lower Bank.

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

WILLIAM JOHNSON,
Assessor.

SHAMONG TOWNSHIP.

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

George W. Haines, Tabernacle; Henry Wright, Indian Mills; J. C. Buckage, Atsion. Winfield S. Haines, Assessor, Tabernacle.

With the exception of a few cases of diphtheria there is nothing to report.

SOUTHAMPTON TOWNSHIP.

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

Charles L. Rogers, Charles H. Haines, John W. Haines. John C. Brown, M.D., Inspector. Charles G. Naylor, Assessor. Post-office address of all, Vincentown.

The population is about 750. The Board met and passed ordinances, and there has been no necessity for further action.

CHARLES G. NAYLOR,
Assessor.

SPRINGFIELD TOWNSHIP.

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

David Stockton, Jobestown; Isaac G. King, Jacksonville; Dr. Van Marter, Columbus; Samuel Emmons, Jobestown. Albert Evans, Assessor, Jobestown.

Water-supply from wells; drainage is good; houses well cared for, but one family occupying a house. There is one slaughter-house one-half a mile from the village, in the best of condition. The three school-houses are in good sanitary condition. There are three burial-grounds within one-half a mile of the village. There have been no prevalent diseases during the year; in fact, there have been very few cases of any one disease during the year.

ALBERT B. EVANS,
Assessor.

WASHINGTON TOWNSHIP.

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

George Wright, Batsto; Frederick Meiners, Green Bank; Albert A. Sooy, Green Bank. A. E. Koster, Assessor, Green Bank.

The township has been especially healthy, and there is nothing new to report.

A. E. KOSTER,
Assessor.

WESTAMPTON TOWNSHIP.

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

R. S Haines, Rancocas; C. Frank Gaskill, Rancocas; Japhet B. Deacon, Mount Holly; William L. Martin, M.D., Rancocas.

WILLINGBORO TOWNSHIP.

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

No report received.

WOODLAND TOWNSHIP.

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

John A. Bozarth, Vincentown; John S. Haines, Woodmansie; Samuel Lee, Shamong. Patrick Rowe, Assessor, Shamong.

The health of the people in this township for the past year has been excellent; there has been scarcely any sickness of any kind.

PATRICK ROWE,
Assessor.

CAMDEN COUNTY.

CAMDEN CITY.

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

George S. Hammond, H. W. Miller, Charles Watson, Frank B. Delaplaine, John W. Donges, M.D., George R. Fortiner, M.D., Frank Burdsall. Eugene B. Roberts, Inspector.

Water-supply from the Delaware river and supplied by the city. Nearly all houses, with the exception of some in the outskirts, are supplied from the above source. The city has a good sewerage system. All premises abutting a street upon which a sewer is laid are compelled to connect therewith. In all, there are about thirty-five miles of constructed culverts or sewers in the city. Along the river front there are a few cellars which are troubled with water, especially at high tide. All swampy or low ground in the lower portion of the city is being gradually filled up. We do not have a house-to-house inspection. All cesspools are constructed of brick, with cemented sides and bottoms, and are emptied by means of an odorless excavating wagon, and the contents are taken out into the

country. There have been no contagious diseases among animals during the year. All slaughter-houses are regularly inspected and are kept in good condition. There have been several factories or mills built during the year in the lower part of the city. We received a complaint in reference to an ammonia manufacturing establishment, but upon investigation the Board could not find anything prejudicial to good health. There have been two new school-houses built during the year, both of which are fitted up with all sanitary improvements. We have one hospital and two dispensaries, both being well-managed institutions. During the past year there have been about 600 cases of scarlet fever and diphtheria in this city.

CENTER TOWNSHIP

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

Ezra C. Bell, Westville; Jos. M. Haines, Mount Ephraim; George H. Thomas, Haddonfield; J. H. Jackson, Secretary, Haddonfield; William B. Jennings, M.D., Haddonfield.

We are glad to say that there has been good health in our township with the exception of a few cases of typhoid fever, which have occurred this fall. These were traceable to contaminated wells. Our Board has not been called out during the year for the abatement of any nuisances.

J. H. JACKSON,
Secretary.

DELAWARE TOWNSHIP.

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

John A. Meridith, Haddonfield; G. Evans, Haddonfield; William T. Lippincott, Moorestown; William Graff, Ellisburg; W. D. Jennings, M.D., Haddonfield.

The general health of the township has been remarkably good. There have been no contagious diseases or typhoid fever. There were several cases of gastric fever in cattle in the upper part of the township, two of which proved fatal.

JOHN A. MERIDITH,
Chairman.

GLOUCESTER CITY.

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

Duncan W. Blake; President; Daniel F. Lane, Secretary; Patrick Mealey, John K. Bennett, Inspector; S. S. Steer, H. M. Harley, John C. Stineson, Wm. Gerry. Post-office address of all, Gloucester City.

GLOUCESTER TOWNSHIP.

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

George Brewer, Blackwood; Charles Jenkins, Kirkwood; Joshua V. Sickler, Chew's Landing; Robert Yaggard, Clementon; Dr. Jos. E. Hurff, Blackwood.

The Board of Health has convened from time to time as deemed necessary for the health of the township. At the last meeting a great nuisance was removed by the draining of a slough-hole along the public road, which had become very unhealthy. The township had been generally healthy up to the last of August, when quite an epidemic of diphtheria broke out in our midst, there being eighteen cases in this vicinity. The public schools were closed for three weeks. The Camden County Almshouse, Hospital and Insane Asylum, located here, are in a most excellent sanitary condition. There have been no contagious diseases during the year.

JOSEPH E. HURFF, M.D.

HADDON TOWNSHIP.

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

John Stoy, Haddonfield; George B. Haines, Haddonfield; Samuel Wood, Haddonfield; R. T. Collings, Collingswood. Dr. William B. Jennings, Inspector, Haddonfield.

Water-supply from wells; never discolored; no iron or other taste. No sewer system; cellars generally dry. No swamps or malaria of any account. No tenement-houses with more than two families. La grippe was prevalent last winter. A few cases of typhoid fever have occurred. There are no slaughter-houses. There are five

school-houses in the township. The children, with possibly rare exceptions, are vaccinated. There have been no contagious diseases requiring quarantine. The prevalent diseases have been la grippe, bronchitis, pneumonia and several cases of diphtheria and scarlet fever.

GEORGE T. HAINES,
Secretary.

HADDONFIELD BOROUGH.

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

Mr. Stewart, Mr. Roberts, Mr. Hillman, Mr. Ludlow and W. C. Nicholson, Secretary. Post-office address of all, Haddonfield.

Our Board has been recently appointed, and as yet there has been no cause for action. We anticipate trouble from the emptying of waste-water into the streets.

W. C. NICHOLSON,
Secretary.

STOCKTON TOWNSHIP.

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

Wm. Merser, Pensaukin; Jos. Whitaker, Cramer Hill; Chas Pedigree, Fish House.

WATERFORD TOWNSHIP.

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

B. W. Bennett, Berlin; Jacob S. Bates, Berlin; William Haines, Marlton; Eayre Shark, Berlin.

This neighborhood is called a healthy one, as we are on the highest point between the Delaware river and the Atlantic ocean. There has been no complaint of any disease more than common. There have been a few fatal cases of typhoid fever.

EAYRE SHARK,
Assessor.

WINSLOW TOWNSHIP.

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

H. M. Jewett, Winslow; Charles Albright, Elm; Ferman Peacock, Wilton; George Blatherwick, Ancora. M. G. Burdsall, Wilton, Assessor.

The health of the township has been generally good.

CAPE MAY COUNTY.

CAPE MAY CITY.

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

E. H. Phillips, President; W. F. Cassidy, Secretary; C. P. Foster, W. G. Essen, Jos. Hand. George Young, Inspector. Post-office address of all, Cape May City.

Our water-supply is the same as before reported. The water is clear and soft; there is no sediment and no taste. We have no list of houses that are not supplied; most all of them use the city water. We have a regular system of sewerage. Our cellars are, as a rule, dry. During the wet time of the past spring the water-level came within three feet of the surface almost everywhere, and few cellars escaped having water in them, something unknown for many years. Houses have no basements, as a rule. There is no house-to-house inspection, only when they are reported in bad order. Sewers run through most of the streets, and houses are generally connected with them. Cesspools, when used, are opened at the bottom, and the contents are removed and composted on neighboring farms. There have been no prevailing diseases. Slaughter-houses are not allowed in the incorporation. The Board has a code of ordinances. Our Sanitary Inspector is constantly on the alert in the spring, summer and fall looking after the sanitary condition of the city. New sewers are being added every year as needed, and our city is very free from any prevailing sickness; we have no malaria, and no swamps, but salt meadows, which are not considered unhealthy.

E. H. PHILLIPS, M.D.,
President.

DENNIS TOWNSHIP.

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

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

The Board has been called on to act officially in but one case, that being to investigate the cause of nauseating odors arising from the so-called laboratory of a "nerve doctor." The laboratory was found in the second story of a tenement-house, and in it a quantity of herbs (saturated with urine) decomposing, the odor of which permeated the whole house. A number of bottles and jugs containing a foul, vile-smelling liquid were also found, and the whole house was damp and filthy. The nuisance was abated and the offending parties soon after left the village.

EUGENE WAY, M.D.,
Inspector.

LOWER TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH IMSPECTOR.

William L. Cummings, Fishing Creek; William C. Town, Cold Spring; George Dickerson, Cold Spring; William L. Ewing, Secretary, Cold Spring. Dr. James Mecray, Inspector, Cape May City.

Water-supply from wells and generally good. Houses are frame and mostly occupied by owners. Cesspools usually cleaned twice a year. Slaughter-houses are in good condition. We have four school-houses. Three are nearly new. The fourth is a poor concern, not fit to teach in. Our cemeteries are kept in good order. Our Board has not been called out to abate any nuisance or for any other cause. Upon the whole, we consider it a very healthy year.

W. L. EWING,
Secretary.

MIDDLE TOWNSHIP.

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

Andrew J. Tomlin, Goshen; Howard C. Buck, Rio Grande; T. W. Garretson, Cape May Court House; Julius Way, M.D., Cape May Court House; S. H. Townsend, Burleigh.

The water-supply is from dug or driven wells. Most of the cellars have water in them in the wet time of the year. Houses do not generally have cellars. Cesspools are cleaned in winter, and the contents are used for fertilizing purposes. We have been very much favored during the past year; while there have been a few cases of typhoid fever and scarlet fever, the general health of the people of this township has been excellent. There have been a few cases of disease among horses, some ten or twelve having died from it. The people have come to know that the Board of Health is on the alert, therefore they do not think of dragging an animal off to the woods, but bury it immediately. We have an ordinance imposing a fine of $50 for neglect of this kind.

S. H. TOWNSEND,
Secretary.

UPPER TOWNSHIP.

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

Belford E. Smith, Tuckahoe; Griffith Corson, Petersburg; Sylvanus Corson, Seaville; R. S. Robinson, Tuckahoe; Randolph Marshal, Tuckahoe.

The Board of Health has had, during the past year, no occasion to complain of the sanitary condition of this district. Since our last report there have been a few isolated cases of true diphtheria, membranous croup, typhoid fever and la grippe. But the attacks were limited in number and widely separated, there being no means of communication. A canine disorder, almost universally fatal, prevailed here during the dog days; the animal was attacked with fever, great weakness, cough, and an eruption, most profuse about the abdomen, appeared during the second week of the disorder; if the dog survived this stage, nervous symptoms began to manifest themselves, subsultus, paralysis, convulsions, terminating in death. A few cases of cerebro-spinal meningitis in horses were noted along the coast.

RANDOPH MARSHAL,
Inspector.

OCEAN CITY.

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

Jacob Steelman, Peter Murdoch, Sr., Jesse Conver, J. S. Waggoner, M.D. Post-office address of all, Ocean City.

A few cases of scarlet fever and one case of diphtheria are the only contagious diseases we have had. There seemed to be no necessity for making an inspection, therefore no officer was appointed for that purpose.

J. S. WAGGONER, M.D.,
President.

SEA ISLE CITY.

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

Charles H. Clouting, James I. Scull, D. Harland, W. H. Rotan. Post-office address of all, Sea Isle City.

Population, 683; climate, temperate. Water from cisterns. The drainage naturally is carried to the meadows adjoining. Refuse and excreta are taken from the island once each week, outside of the borough limits. Sanitary expenses, $1,000. The Board of Health use this money mostly in removing excreta and filling up low lots. There is no disease that has taken any hold of the citizens. The Board has filled up under five dwellings where there was dampness, and also has filled several vacant lots, and has notified all property-owners to fill in where it is necessary. There are several damp cellars which the Board are taking action upon at the present time.

C. H. CLOUTING,
Assessor.

CUMBERLAND COUNTY.

BRIDGETON CITY.

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

Maskell W. Applegate, Alfred Sharp, Dr. J. R. C. Thompson, Samuel W. Wells, Joseph H. Powell, P. Kennedy Reeves, William H. McGear, Charles P. McGear. Post-office address of all, Bridgeton.

The water-supply of the city is derived from Elmer's mill-pond. Improvements have been made during the past year. The water-works are owned by the city. The city authorities are about to establish a system of drainage and sewerage, their attention having been called to the matter by the Board of Health, and it is now being considered by them. Our houses are mostly owned by their occupants. Our Inspector gives a good deal of time watching the few tenement-houses there are in our city. The refuse and excreta are removed by regular licensed scavengers and garbage collectors, the scavengers doing their work at night and removing the refuse beyond the city limits. We have three slaughter-houses within the city limits, which are visited at least once in two weeks by the Inspector, and are kept in a clean condition. All public buildings are provided with fire-escapes. There are two cemeteries located just outside the city, and the laws relating to burial are strictly adhered to. The Board Physician pays particular attention and sees that all persons suffering from any contagious disease are quarantined, and in the case of persons dying from the same a public funeral is prohibited by the Board. The subject of vaccination of the school children was discussed at the last meeting of the Board, and the matter will receive immediate attention. The health of the city is good. Some few cases of diphtheria and typhoid fever have been reported during the year, and while the diphtheria was prevailing the Board instructed its Physician to visit the schools of the city and examine all scholars complaining of sore throat, and by this system an epidemic was avoided. The Board of this city is active, and bend all their energies to keep the city in a good sanitary condition. They have also gained the confidence of the people, who now work with and give all the assistance they can to the Board.

S. W. WELLS,
Secretary.

COMMERCIAL TOWNSHIP.

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

Seth Bowen, Mauricetown; E. J. Cook, Port Norris; N. P. Lore, Jr., Mauricetown; David McElwee, Haleyville; Henry C. Mayhew, Mauricetown. Samuel Butcher, M.D., Inspector, Mauricetown.

Location, southern part of Cumberland county; population, about 3,500; climate, temperate; natural water-ways, such as found in all

country places, carry the surface-water into the Maurice river and Delaware bay. General health has been good. The Board of Health has not been called upon during the year.

DAVID MCELWEE,
Secretary.

DEERFIELD TOWNSHIP.

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

Elijah R. Parven, Deerfield Station; Phineas Hires, Deerfield Station; Henry Dare, Rosenhayn; George Davis, Seeley. Charles C. Phillips, M.D., Inspector, Deerfield Station.

The supply of water is altogether from wells, and, with very few exceptions, its quality is excellent. Drainage is of the best, very little stagnant water being found anywhere in the township. The refuse and excreta are generally composted and used for fertilizing purposes. All animals have been remarkably free from disease during the past year. The slaughter-houses are managed so carefully as not to prove an annoyance to the community or detrimental to the public health. All the school-houses are conducted with obedience to the laws relating to such. The cemeteries and all burial-places are well managed. Vaccination is well attended to, both by the people themselves and by those whose duty it is to press the subject to their notice. There has been no epidemic during the past year, nor is there any cause for any, as the natural condition of the township is such as to be conducive to health.

CHARLES C. PHILLIPS,
Inspector.

DOWNE TOWNSHIP.

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

Charles M. Joslin, Newport; R. H. Leeming, Newport; Nathaniel Lore, Dividing Creek; P. C. Henderson, Newport; Shepherd Campbell, Newport. Dr. A. P. Glanden, Inspector, Newport.

Population 2,000. Water from wells. Refuse and excreta used as fertilizer. Public health laws enforced by the Board. Throat diseases have prevailed during the year.

CHARLES M. JOSLIN,
Secretary.

FAIRFIELD TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. O. Davis, J. H. Elmer, Wm. M. Sheppard. H. B. Bamford, Assessor. Post-office address of all, Fairton.

GREENWICH TOWNSHIP.

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

Samuel R. Mills, William P. Test, John Tyler, Jr., John N. Glaspell. Post-office address of all, Greenwich.

The Board of Health met the first of June and organized. Our town has been in a very healthy condition during the year, the Board having not been called out. There has been no epidemic, and everything seems to be in a good, healthy condition.

JOHN N. GLASPELL,
Secretary.

HOPEWELL TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alfred Stathen, Bridgeton; Cornelius Sharp, Bridgeton; James F. Glaspey, Bridgeton; Walter Minch, Bridgeton; J. G. Swinney, M.D., Shiloh.

Slaughter-houses compelled to remove from Bridgeton city limits have located just over the line in this township. One of these is objectionable. A bone and fat-boiling establishment, likewise expelled from Bridgeton, became a nuisance and was abated. The Township Board of Health is well organized. Vital statistics are well attended to. During the year there have been frequent cases of diphtheria and scarlet fever of a mild type. Fumigation and isolation are promptly attended to, and even the families are now becoming familiar with the requirements, and beginning to realize the importance and advantages accruing from such a course. Vaccination has been

neglected for years, and is not looked after by the Board. There has been an increase of malarial fever. Digestive and bowel troubles were prevalent among adults and children. Individual members of the Board of Health have occasionally been called to look after sanitary matters in the township. The sanitary laws are being respected by prompt abatement and removal of nuisances when pointed out by members of the Board.

J. G. SWINNEY, M.D.
Secretary.

LANDIS TOWNSHIP.

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

J. L. Beck, M.D., James Chance, O. F. Recroth, Samuel Woolford, Sr. William W. Whiting, Inspector. Post office address of all, Vineland.

The sanitary condition and health of this township are excellent. Two slaughter-houses regularly inspected. The condition of the State Home for Feeble-Minded Women and Home for Feeble-Minded Children is excellent.

WILLIAM W. WHITING,
Inspector.

LAWRENCE TOWNSHIP.

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

Lorenzo D. Paynter, Harbert O. Newcomb, Peter Johnson, Henry Long, Charles C. Foster. Ephraim Bateman, Inspector. Post-office address of all, Cedarville.

Our water-supply is almost entirely from wells, ranging from a few feet to thirty or forty in depth. Driven wells are getting to be quite common in this section. We consider them preferable to the old surface well, and that in the end they are cheaper and more satisfactory. The outlet of our surplus water is Cedar creek, which has its origin near the center of the town. Our cellars are mostly dry. We do not suffer to any extent from malarial diseases. The rise and fall of the tide carries away any stagnant or polluted water. Cellars are mostly kept clean, whitewashed and free from impurities. Our citizens pride themselves in making our town neat and attractive. Cesspool material is used for fertilizing purposes. There have been no epidemics for the past year, and we have been remarkably exempt from the various summer affections. We have no slaughter-houses. Our Board of Health has not passed ordinances.

EPHRAIM BATEMAN, M.D.,
Inspector.

MAURICE RIVER TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

No report received.

MILLVILLE CITY.

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

Edwin Conover, President; T. C. Wheaton, M.D., Secretary; S. C. Smith, Richard Radcliffe, Samuel Misskelly, L. H. Hogate. Post-office address of all, Millville.

The Board of Health has been quite active during the year and no epidemics have occurred; in the early fall there seemed to be a run of scarlet rash, but it was soon checked. The Inspector and the Board have been very watchful of cesspools, slaughter-houses and other disease-breeding places, and have insisted upon cleanliness. Alleys and lanes have also received attention, and every effort made to have all nuisances abated. The water-supply remains the same as in former years, and no complaints have been received. All manufactories are well ventilated and provided with necessaries for the comfort and convenience of the employes. The Mount Pleasant Cemetery, being under a new management, shows a marked improvement in many respects. The Board is endeavoring to prevent any more burials in what is known as the "Church-yard" because of increasing population. A system of sewers is badly needed in this city 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.

L. H. HOGATE,
Secretary.

STOE CREEK TOWNSHIP.

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

Charles B. Bowen, Shiloh; Edward Sheppard, Roadstown; James R. Rainear, Shiloh; Joseph Tomlinson, Roadstown. Ephraim Mulford, Assessor, Roadstown.

No tenement-houses of more than two families. There has never been a house-to-house inspection. Cesspool contents used for fertilizer. Nothing further to report.

EPHRAIM MULFORD,
Assessor.

ESSEX COUNTY.

BELLEVILLE TOWNSHIP.

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

John F. Wisscheesen, Charles Course, Daniel McMahon, Patrick McCoy, Richard Scaim, William Connelly, D. M. Skinner, M.D. James Dieghan, Inspector. Post-office address of all, Belleville.

There is nothing to add to former report, except that during the past year there have been three deaths from typhoid fever. The noticeable fact connected with these cases is that they all occurred in one family and were undoubtedly due to local causes. An inspection of the premises revealed the fact that the well from which this family obtained drinking-water had its capstone level with the flagging just outside the kitchen door and not more than thirty feet from the privy-vault, from which there was a slight descent. The vault was merely a slight depression in the earth, and it was the custom of the owner to draw out the contents from day to day, mix them with earth and scatter them over his garden as a fertilizer. The well has been closed. Three months have elapsed since the last case, and thus far no new cases have occurred.

D. M. SKINNER, M.D.

BLOOMFIELD TOWNSHIP.

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

Seymore P. Gilbert, President; Charles L. Seibert, R. S. Rudd, Lewis Cockefair, Martin Hummel, Charles H. Halfpenny, E. A. Rayner; Samuel H. Baxter, Secretary. William B. Corby, Inspector. Post-office address of all, Bloomfield.

Bloomfield is located at the base of the Orange mountains and is upon a coarse, gravelly soil. Population about 8,000 and steadily growing. The town is supplied with pure water from wells dug in the rock in the neighborhood of springs. A system of sewerage is under consideration, and natural drainage is good. The streets are being rapidly laid with Telford pavement. Cesspools are used for the waste from the houses, while garbage and other refuse are carted to regular dumping-grounds. There are no slaughter-houses in our limits, and no epidemics among animals have occurred. Our school buildings are large, well lighted and modern in every respect. A small hospital, with a board of lady managers, has been established for the use of this township and also Montclair township. The cemetery is well regulated. Vital statistics are collected promptly. During the months of January and February we had a second visitation of la grippe, though in a somewhat milder form than the previous one. With this exception, we have had a year of good health. Some cases of diphtheria have occurred and several cases of typhoid fever.

WILLIAM H. WHITE, M.D.

CALDWELL TOWNSHIP.

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

A. G. Jacobus, Secretary, Verona; M. W. Jenkins, Cedar Grove; C. A. Harrison, Caldwell; E. H. Baldwin, Fairfield; Samuel Dey, Fairfield; Edward E. Peck, M.D., Inspector, Caldwell; G. M. Canfield, Caldwell.

There have been no epidemics during the past year. Minor nuisances, when reported, have been promptly abated. The health of the township has been good.

CLINTON TOWNSHIP—IRVINGTON BOROUGH.

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

Dr. M. O. Christian, President; Joseph Wolf, Ira Meeker, John B. Casing, Mahlon S. Drake. Dr. Joseph L. Wade, Inspector. Post-office address of all, Irvington.

The health of the village of Irvington during the past year has been good. Two or three cases of scarlet fever have occurred, with one death. No extension of the disease. The Board has given close attention to the sanitary condition of the village. No provision has been made for a scavenger, although it has been urged as a sanitary measure. The accumulated debris on small lots, occupied by tenants, is one of the nuisances requiring that some provision be made for its removal. Two wells were condemned; the close proximity of privy-vaults and cesspool-drainage contaminated the water. Both wells have been cleaned, but a driven well is the only remedy. There is no sewer system at present, but some plan must be devised at an early date for sanitary drainage.

JOSEPH L. WADE, M.D.,
Inspector.

CLINTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. H. Goldsmith, Lyons Farm; John T. Hunter, Secretary, Waverly Park; David G Knight, Irvington; Lewis E. Voorhees, Irvington; William F. Heegan, Manhattan Park; Abraham Voorhees, Irvington. M. O. Christian, M.D., Irvington, Inspector.

During the past year the sanitary condition of the township has been very good. No epidemics have invaded our township. Very few complaints have been brought to the notice of the Board, and very little work has been done. The total expenses of the Board have not exceeded $25. Our only business so far has been the suppression of night-soil dumping by Newark scavengers, and two or three offensive piggeries and cow stables.

DR. M. O. CHRISTIAN,
Inspector.

EAST ORANGE TOWNSHIP.

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

H. E. Jepson, President; D S. Rice, A. H. Ryan, J. W. Ellor, A. Hibbins, F. Lang, C. E. Jerolomon, W. T. Bowman, F. A. Nott. I. L. Dodd, Assessor. Henry Blaurock, Inspector. T. R. Chambers, M D., Secretary. Post-office address of all, East Orange.

The population has increased in all wards of the township. Many new houses have been built. The sewer-disposal system of the town continues to work successfully. Gravel and charcoal filter-beds being continually added. The Town Committee intend employing a crematory for the destruction of all garbage gathered by the public scavengers. The public school system of the town is excellent. We have four grammar graded schools and a high school. A new building for the high school has just been erected, with the Fuller-Warren system of warming and ventilating. There have been no epidemics, and the year has been an unusually healthy one. The Board has done active duty during the summer.

T. R. CHAMBERS, M.D.,
Secretary.

FRANKLIN TOWNSHIP.

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

Joseph Foster, Avondale; John H. White, Avondale; J. Bez. Freeman, Nutley; Joseph Searles, Nutley; James W. Sargent, Nutley; Amzi Coeyman, Nutley. J. B. Philhower, M.D., Inspector.

We have made several investigations and abated nuisances. The water-supply is from a private company. Eighty houses take it.

LIVINGSTON TOWNSHIP.

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

David Flynn, Livingston; Peter S. Meeker, Roseland; William Deicks, Livingston; Anderson P. Squire, Livingston; George L. Smith, Livingston; George E. De Camp, Roseland; Dr. E. E. Peck, Caldwell.

There have been no prevalent diseases of any kind in the township for the past year. Health has been generally good. No complaints have been made to the Board during the year.

GEORGE E. DE CAMP,
Assessor.

MILLBURN TOWNSHIP.

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

George H. Richmond, Short Hills; E. B. Renwick, Millburn; J. D. Parkhurst, Millburn; A. V. Oakes, Millburn; Bertram Young, Secretary, Millburn. Isaiah Williams, Assessor, Millburn. John D. Polhemus, Inspector.

Population, 2,300. Since last report, ponds are in process of being drained. Nothing further to report.

BERTRAM YOUNG,
Secretary.

MONTCLAIR TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Wilson, W. W. Underhill, Dr. M. W. Ayres, A. A. Sigler, J. B. Pier; Charles B. Morris, Secretary. Richard P. Francis, M.D., Inspector.

The water-supply is drawn from nine artesian wells. Two hundred and thirty thousand gallons per day are supplied to 934 consumers, which means that nearly half the houses in town now use city water. Arrangements have been made whereby the new main of the East Jersey Water Company will be tapped, and from this it is calculated that an additional supply of 2,500,000 gallons per day will be obtained. Negotiations have been practically concluded at Orange that connection be made with the new trunk sewer that is being constructed. Work will probably be begun here in the spring. The carrying capacity of the new sewer is to be 4,200,000 gallons per diem, and the contents are to be carried to tide-water. The general health of the town has been excellent. There has been no epidemic.

RICHARD P. FRANCIS, M.D.,
Inspector.

NEWARK CITY.

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

Tyler Parmley, President, 161 Roseville avenue; Edward Dunn, 104 Market street; William B. Guild, 3 Lagrange Place; Dr. Herman C. H. Herold, 75 Congress street; Alex. H. Johnson, 1000 Broad street; Dr. Fred'k B. Mandeville, 1021 Broad street; Samuel S. Sargeant, 84 Mount Pleasant avenue; Moses Straus, 1085 Broad street; Dr. Charles M. Zeh, 481 Broad street. William Titus, M.D., Health Officer and Secretary, Seventh and Orange streets. Chauncey G. Parker, Attorney for Board, 802 Broad street.

On account of recent changes, and special duties as to small-pox since coming into office, the usual report was not received from Newark. The newly appointed Health Officer is Charles Lehlbach, M.D.

ORANGE CITY.

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

Henry H. Truman, President; Augustus Eichhorn, Francis Treault. Charles Buttner, M.D., Inspector. Post-office address of all, Orange.

The problem of sewerage in Orange has received attention for a long term of years, and several reports have been made to the Common Council in reference to it. The Legislature of 1890 passed a law authorizing the Common Council, under certain restrictions, to provide a system of sewers and drains for the whole city by a gravity outlet to the Passaic river. Work was begun early in the summer and has progressed very favorably up to the present time, and it is expected that before the end of two years Orange will be blessed with a complete sewer system.

CHARLES BUTTNER, M.D.,
Secretary.

NOTE.—With this report there was added a full description of the different portions of the town to be sewered, with the sizes of pipes, &c.

SOUTH ORANGE VILLAGE.

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

E. F. Church, William J. Nevius, Arthur Babson, H. A. Mandeville, M.D., William F. Allen, Isaiah Ball, Frank A. Wright. William J. Chandler, Inspector.

The water is pumped from driven wells, near Summit, into a stand-pipe, at an elevation sufficient to force water by gravity to a point 250 feet above the lowest parts of the village. This supply was introduced during the present year. About one-third of the population are thus supplied, and two-thirds still use wells and cisterns. The water is clear and is uniformly good. The wells are in an unpopulated district, and for many years will remain free from sewage pollution. The quantity for the present is limited to 1,000,000 gallons daily, which is more than ten times our present consumption. We have no system of drainage or sewerage, but one is under advisement. No house inspection, excepting upon some complaint. The work of the Board has been chiefly in abating nuisances arising from imperfect cesspools or foul privy vaults.

WILLIAM J. CHANDLER,
Inspector.

WEST ORANGE TOWNSHIP.

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

No report received.

GLOUCESTER COUNTY.

CLAYTON BOROUGH.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH IMSPECTOR.

William Moore, George Tomson, Robert M. Warner. H. G. Buckingham, M.D., Inspector. Post-office address of all, Clayton.

There has not been any epidemic during the year and health has been universally good. The rainfall during the spring months was very heavy and a large number of cellars contained water for weeks at a time, but no case of sicknees was traced to such cellars as the cause. The Health Board urged the importance that nothing rotten or offensive be left in the cellars; also, that excreta should be covered

with earth and not left on the surface. Hogs are allowed to be kept in the borough. 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 entirely from wells. Probably in the near future the soil will be so saturated with sewage that the water of many wells will become impure. There is need of a more thorough system to prevent the accumulation of garbage and refuse in back-yards and streets. While the Board of Health has been on the alert for the removal of nuisances, the members have been desirous to do more in the way of their prevention.

H. G. BUCKINGHAM, M.D.,
Inspector.

CLAYTON TOWNSHIP.

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

William A. Williamson, Samuel C. Newkirk, Francis M. Pierce, Samuel S. Fisler, M.D. Dr. H. G. Buckingham, Inspector. Post-office address of all, Clayton.

DEPTFORD TOWNSHIP.

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

E. P. Steward, Westville; H. M Leap, Wenonah; Jos. Noblit, Wenonah; William C. Cattell, Secretary, Wenonah; Dr. H. A. Stout, Wenonah.

Deptford township is located at the north end of Gloucester county. It includes the town of Westville, borough of Wenonah, village of Almonesson and what is known as Woodbury Park. The rest of the township is farming district. The soil is loamy with streaks of sandy and gravelly soil through it. The water-supply is from wells, excepting Wenonah, where they have water-works. The water is generally very good. The drainage of the meadows at Westville is very poor, causing more or less malaria in August and September, the cause of poor drainage being due to the fact that the meadows are lower than the high-water mark of the creek and river. There are very few cesspools except in Westville and Wenonah, and these are emptied

by carts. We have had no prevalent disease among stock of any kind this year. There is but one slaughter-house in the township, of which there has been no complaint. The Board passed health ordinances this year. The Board was required to meet in September to investigate the cause of several cases of typhoid fever and malaria at Westville. A careful inspection of the town was made and a few cesspools and a gutter were ordered cleaned, and the ditches and the meadows adjoining the town were ordered opened. These orders were very cheerfully obeyed and the disease gave the inhabitants of that vicinity no further trouble.

WILLIAM C. CATTELL,
Secretary.

EAST GREENWICH TOWNSHIP.

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

Charles E. Haines, Mickleton; William Dorson, Mickleton; E. H. Steward, Clarksboro. H. L. Haines, Assessor, Clarksville.

FRANKLIN TOWNSHIP.

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

William Tyler, Newfield; Samuel Lowder, Newfield; Charles D. Smith, Munsonville; Joshua C. Richman, Malaga; A. A. Smith, M.D., Malaga.

GLASSBORO TOWNSHIP.

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

No report received.

GREENWICH TOWNSHIP.

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

R. A. Jester, Paulsboro; H. W. Miller, Paulsboro; Eli B. Allen, Gibbstown; Jacob Ballinger, Paulsboro.

Water-supply from open wells principally; some few driven wells. After continued rains, the water in the surface wells becomes discolored. Cesspools not cemented; contents used on farms. No prevalent diseases.

JACOB BALLINGER,
Assessor.

HARRISON TOWNSHIP.

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

Christopher Knisell, Mullica Hill; Joseph Kirkbride, Richwood; Jonathan Foster, Jefferson. Dr. E. E. De Groff, Mullica Hill, Secretary. Eli Heritage, Assessor.

LOGAN TOWNSHIP.

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

Hans Helms, Repaupo; Joseph R. Beckett, Bridgeport; Smith Shoemaker, Bridgeport; J. C. Helms, Repaupo. E. T. Oliphant, M.D., Inspector, Bridgeport.

MANTUA TOWNSHIP.

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

Peter P. Watson, Pitman Grove; Charles H. Ferris, Pitman Grove; John Sharp, Barnsboro; Franklin Denn, Mantua. Dr. E. Z. Hilegass, Inspector, Mantua.

We derive our water-supply from wells; occasionally discolored; no taste. Our cellars are dry. Occasionally we have malaria, but nothing serious. No tenement-houses of more than two families. Cesspools are not cemented; they are built with open sides, and their contents are carted onto the truck farms. We have had an epidemic of scarlet fever during the months of April and May. Our slaughter-houses are inspected thoroughly. Our Board has passed ordinances. Our public schools as well as houses are in excellent condition. Our cemeteries and burials are conducted strictly in accord with the instruc-

tions laid down by the Board of Health. Contagious diseases are isolated, disinfected, &c. Vaccination is very much neglected. The prevailing disease of the year has been scarlet fever in a mild form; a few cases have succumbed to the disease. Our Board has met at the usual appointed time for consultation over matters connected therewith. The Inspector was ordered to inspect slaughter-houses, out-houses, pig-pens, &c., with instructions to the owners to keep everything in proper order, as required by the Board of Health.

DR. E. Z. HILEGASS,
Inspector.

MONROE TOWNSHIP.

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

J. B. Sickler, Chairman; D. S. Champion, H. K. Bugbee; John W. McClure, Secretary. J. Gaunt Edwards, M.D., Inspector. Post-office address of all, Williamstown.

There is a population in the town of 1,600; in the rural district, 400. Climate is inland or continental, but owing to the numerous cedar swamps and level, flat surface, it is very damp, and heavy mists and fogs occur. The water-supply is wholly from wells. These average from fifteen to twenty feet in depth. While the water is hard, it is of excellent quality. The refuse of the slaughter-houses is removed from the town. Contents of cesspools are used for fertilizing purposes. There are two slaughter-houses in the town, and these are carefully looked after by the Health Inspector. But little butchering is done in summer. There are three cemeteries in the heart of the village. A code of laws was adopted and the requirements are vigorously carried out. An epidemic of diphtheria broke out in four or five families, but by prompt action of the Board in isolation, disinfection and destruction of clothing, the disease was soon arrested. The prevalent diseases have been malaria and la grippe. Diphtheria and German measles also prevailed. The Board at once investigates all complaints, chief of which was the unloading of car-loads of manure in the town limits. This was ordered stopped by the Board.

J. GAUNT EDWARDS, M.D.,
Inspector.

SOUTH HARRISON TOWNSHIP.

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

Alfred Lippincott, Joseph Cheeseman, Charles K. Horner, Harry Lefferty. Post-office address of all, Harrisonville.

This is strictly an agricultural township, with one village of about 100 inhabitants. The Board has not been called upon to investigate any nuisances.

WASHINGTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas H. Hurff, Hurffville; B. Frank Allen, Hurffville; Evan Davis, Hurffville; Charles D. Nicholson, Turnerville; O. B. Phillips, M.D., Hurffville.

Our Board met last spring, as usual, and organized. No nuisances reported to the Board. The township is in a healthy condition.

CHARLES B. NICHOLSON.

WEST DEPTFORD TOWNSHIP.

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

John C. Budd, Joseph A. Moore, John W. Leonard; Dr. H. A. Wilson, Inspector; Mark Clement. Post-office address of all, Woodbury.

There has been complaint about one of our slaughter-houses. The Board notified the owner, who has endeavored to remedy the nuisance, but owing to the location it is impossible to remedy it entirely.

MARK CLEMENT.

WOODBURY CITY.

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

Charles Walton, William M. Carter, George K. Carroll, Warner Underwood, John C. Tatum. T. E. Parker, M.D., Inspecter. Post-office address of all, Woodbury.

City water has been introduced into nearly every house, and wells and cisterns are being rapidly filled up and abandoned. The water has been very pure during the last year, great care having been used by the Water Committee to get reservoir and pipes clean. There has been no system of sewerage adopted, water-closets and sinks being emptied into ventilated, open-bottomed cesspools, which are emptied by bucket and the contents carted away and used as a fertilizer. Cellars are generally dry, but the unusual rainfall has caused many to be damp; but water does not remain long after a storm, and most of them are supplied with drains. The health of the city has been good, the only contagious disease reported being a few isolated cases of scarlet fever. There is one slaughter-house, which the proprietor endeavors to keep in good condition. No hog-pens are allowed. The Board of Health has endeavored to abate all nuisances and encourage residents to keep yards and surroundings clear of all rubbish and decaying fruit and vegetables.

T. E. PARKER, M.D.,
Inspector.

WOOLWICH TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Howard V. Locke, Charles P. Batten, George Meley, Samuel Avis. Benj. F. Buzby, M D., Inspector. Post-office address of all, Swedesboro.

The Board met in April and organized. The laws relating to Boards of Health were discussed and each member instructed to report to the Board any complaint of any nuisance that might be brought to his notice. A meeting was held again in August to take some action on several complaints made concerning the unsanitary condition of various hog-pens in Swedesboro, which, upon investigation, it was found had been caused by excessively wet weather, and upon notice being served upon the owners the nuisance was, in every case, abated at once.

SAMUEL AVIS,
Secretary.

HUDSON COUNTY.

HUDSON COUNTY BOARD OF HEALTH REPORT.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Leonard J. Gordon, M.D., President; Charles B. Converse, M.D., C. Holmes McNeil, M.D.; H. W. Winfield, Counsel; C. J. Rooney, Jr., Clerk. Post-office address of all, Jersey City.

In the following may be found a brief summary of certain matters of sanitary interest which have come before the Board of Health and Vital Statistics of Hudson County since our last report. The question of building a pest-house for the reception of cases of contagious diseases other than small-pox, has been under consideration, and all that is necessary is a sufficient fund, which in time will be forthcoming. This Board had expected to have the structure almost completed by this time, but it was found that such a building as was absolutely necessary could not be erected with the sum in hand, so it was determined to wait until a sufficient capital had been accumulated. Complaint against the asphalt factory on west side of Jersey City had been received. The Board took a census of the opinions of the residents immediately surrounding. The conclusion was arrived at that the odors did not constitute a nuisance. Numbers of sunken lots in various parts of the cities of the county have been filled up by order of the Board. There are large sections, however, which are more or less covered with water, to which owners have apparently abandoned claim, by reason of taxes unpaid. No plan has yet been found to compel the filling up of such land. The Board discovered encroachments upon the Mill creek, which drains a portion of Jersey City, and the Board of Street and Water Commissioners were requested to prevent such obstructions. The manure piles that were situated on the northern end of Jersey avenue, Jersey City, have been removed. No more storing is allowed there. After much trouble, certain scavengers were caught dumping night-soil on certain of the roads of the outlying towns of the county. Suits were brought, and judgment obtained. The extension of the Jersey City Grand street sewer across Mill creek, has been urged by this Board. Unsanitary plumbing, &c., in several schools was rectified by the Board; directly in one case, and by request in others. The need of

a sewer from Central avenue to Oakland avenue, Jersey City, on St. Paul's avenue, having been shown by petition to this Board under the statute, the Board inspected the region, and certified the facts to the Mayor and Aldermen. Nothing has been done in the matter of building the sewer. The practice of drying hog-hair on the Hackensack meadows has been curtailed, and very little is now being dried there, and that only in cold weather. Several uninhabitable houses have been ordered vacated by the Board. A large number of houses was connected with sewers by the Board's direction. The attention of the Board of Water and Street Commissioners was called to the needs of drainage to choked sewers, and generally with good results. The subject of stagnant ponds in the northern section of the county, received the attention of the Board. An inspection of the sewers of Belmont avenue, Astor place and other adjoining streets of Jersey City, was made in endeavoring to account for certain typhoid fever cases which occurred in that section. Suit against the Board to compel the recognition of diplomas issued by the New Jersey Medical College of Medicine and Surgery, was decided in the Board's favor. Supervision of contagious diseases occurring among school children, is still kept up by the Inspectors. The condition of School No. 10 was declared by the Board to be detrimental to health, and finally the closing of the school was urged. The Board of Education made certain indicated improvements which obviated the trouble. The Lehigh Valley Railroad Company was directed by the Board to at once re-open all natural water-courses, closed by them in constructing additional road-bed running southwest of the line of Central railroad, in the vicinity of Claremont station. The filling of certain sections with ill-smelling refuse was stopped, and the use of clean earth top-dressing ordered. The President of this Board was invited, in March, to serve on a committee to consult with the Governor in regard to plans for improving the sewerage of Jersey City. These are a few of the more-easily recollected matters that have engaged the attention of this Board during the past year.

C. J. ROONEY,
Clerk.

BAYONNE CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William C. Farr, John W. Goddard, William Boroughs, F. F. Martinez, Jr., Dr. B. V. Morris, James Reilly, George Schmidt.

The Passaic water has undoubtedly been worse this year than it was last. It was reported, and I am inclined to think correctly, that the Montclair Water Company referred to last year will be supplying the city with good water before the summer of '92. Sewer construction has been fairly active. There have been about three and one-half miles of sewers constructed, and numerous applications to City Council for sewers are now pending. There is no yearly house-to-house inspection. The garbarge contractor's work since May has been much less satisfactory than for the year previous. This is owing to the contract being awarded to the lowest bidder, and the lowest bidder, through insufficient comprehension of what was required of him, having made a contract at figures which do not enable him to do the work properly. The same conditions as to disposal of garbage prevail as last year, and complaints as to it have been made again this summer. Privies and cesspools are emptied by licensed scavengers and in a fairly satisfactory manner, as described in our last report. The new Board of Health has passed a code of ordinances which is now being published. Prevalent diseases have been—In the fall and early winter, rubeola; in the winter and spring, rothëln and la grippe; this summer, intermittent fever, &c., and typhoid fever. Both the latter diseases, but especially the former, have been especially prevalent during the past three months.

F. F. MARTINEZ,
Secretary.

HOBOKEN CITY.

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

Palmer Campbell, W. H. Wall, John Tallon, Stephen Isola, Lewis V. Hengstler, Dr. C. R Simon, Antonio Grenelli. Post-office address of all, Hoboken.

Water-supply from Hackensack river and New Milford. Drainage insufficient and imperfect. Streets and public grounds are kept in fair condition. Houses are largely tenements and flats and a number of small one-family houses. The Board is looking into the enforcing of the cleaning of closets, up to this time very improperly attended to. No disease of animals reported. One hospital; in good condition. All new buildings have fire-escapes. A sanitary code has been passed in accordance with the law. Collection of vital statistics

just started in October. All houses where there is contagious disease are ticketed. The children dwelling in them are quarantined.

PALMER CAMPBELL,
President.

WEST HOBOKEN.

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

Wm. Righter, W. H. Lann, John W. Tanner, John Lane. Louis Michael, M.D., Inspector. Address of all, West Hoboken.

HUNTERDON COUNTY.

ALEXANDRIA TOWNSHIP.

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

No report received.

BETHLEHEM TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

P. T. Hoffman, Bloomsbury; Stewart Rodenbaugh, Norton; Joseph Mayberry, Junction; George A. Hackett, Bloomsbury.

CLINTON BOROUGH.

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

Erastus Runyon, Chester Wolverton, Samuel Voorhees, William Knight, M.D. James R. Kline, Inspector. Post-office address of all, Clinton.

Depend for water-supply on wells and cisterns. Nothing but natural drainage. Cellars are dry. No yearly house-to-house inspection. Cesspools are not in common use. No slaughter-houses in the borough limits. We have had a malignant form of diphtheria, but not prevalent to any great degree. Our Board has caused the abandonment of slaughtering stock in the borough and the sanitary inspection of all places where diphtheria prevails. All means were used to prevent the spread of the disease.

JAMES R. KLINE,
Inspector.

CLINTON TOWNSHIP.

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

John C. Cramer, Annandale; Jacob S. Hulsizer, Annandale; Luther Hoffman, Lebanon; B. B. Berkaw, Annandale; W. E. Berkaw, Annandale.

In reference to schools, the Board begs to report the unusually large number of children who have not been vaccinated. This is due to the absence of a "small-pox scare" for several years and may lead to trouble in the future. Expenses of the Board have been very small during the past year, owing to absence of complaints, and also by reason of an increased observation of the general laws of hygiene. The early months of 1891 were attended with the development of many cases of the pandemic influenza—"la grippe"—but very few deaths resulted and they were in the aged and infirm, being complicated by bronchitis or marked inanition, from which paralysis resulted. Measles were epidemic during the winter and spring of 1891, but not in a severe form. Whooping-cough also prevailed to some extent. The Board have had but two meetings during the past year.

WILLIAM E. BERKAW, M.D.,
Inspector.

DELAWARE TOWNSHIP.

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

Dr. George N. Best, Inspector, Rosemont; Nelson Lambert, Sergeantsville; Isaac Lake, Sergeantsville; John F. Sherwood, President, Stockton. Jacob H. Holcombe, Lambertville, Assessor.

Had four meetings. Have attended to complaints as to bad drainage, hog-pens, &c. One fatal case of diphtheria and scarlet fever; a few other cases beside.

JACOB H. HOLCOMBE,
Clerk.

EAST AMWELL TOWNSHIP.

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

Joseph Van Marter, Ringoes; Van Doren Locey, Ringoes; Theodore Craft, Wertsville; Levi Holcomb, Ringoes. Dr. P. C. Young, Inspector, Ringoes.

The health of East Amwell township has been comparatively good for the past year. No zymotic diseases have invaded our border except two or three cases of measles and about as many of scarlet fever. The last was confined to one family only. Epidemic influenza prevailed about as the year previous. A great many old people succumbed to the disease and its complications. The sanitary condition throughout the township is excellent.

P. C. YOUNG, M.D.,
Inspector.

FRANKLIN TOWNSHIP.

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

Dr. Q. E. Snyder, Quakertown; E. B. Suydam, Pittstown; J. K. Robertson, Quakertown; J. A. Snarer, Cherryville; George W. Snyder, Quakertown.

FRENCHTOWN BOROUGH.

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

A. B. Nash, M.D., President; Robert McIntyre, Thomas Able, George F. Bloom, O. R. Kugler, Secretary. Post-office address of all, Frenchtown.

Source of water-supply, wells and cisterns; drainage by public highways. The water-level is such as to secure generally dry cellars. We have no system of sewerage. Do not know of any prevalent disease. The Assessor does not inquire as to the diseases of animals. We have passed no ordinances this year.

O. R. KUGLER,
Secretary.

HIGH BRIDGE TOWNSHIP.

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

T. O. Aller, High Bridge; D. M. Sharp, Annandale; S. Apgar, Cokesbury. S. W. Dorland, Assessor, High Bridge.

HOLLAND TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jordan Shafer, Milford; John Weider, Finesville; E. D. Huff, Warren Paper Mill; Dr. J. N. Lowe, Milford. Matthias Wean, Mount Pleasant, Assessor.

The health of the township has been good the past year, no fatal diseases prevailing.

KINGWOOD TOWNSHIP.

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

George W. Kugler, Tumble; Augustus Field, Baptisttown; George A. Stryker, Baptisttown; E. D. Leidy, M.D., Baptisttown; George E. Dalrymple, Secretary, Baptisttown.

LAMBERTVILLE CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Gervas Ely, President; Dr. G. H. Larison, I. L. Coryell, W. A. Cole, G. L. Swallow; W. H. Wilmot, Clerk. Post-office address of all, Lambertville.

Water-supply is by a private company organized about ten or twelve years ago. No record of houses using it. Water discolored for a short time after a rain. Has no bad taste, but sometimes, in summer, has a bad odor. Soft enough to be used for all kinds of work.

Reservoir has just been enlarged and cleaned. The supply is obtained from what is known as Swan's creek, and no sewage can

enter it, excepting what may come from the farms lying on its borders.

No record of how many houses depend upon wells, but they are very few, as the most of the houses depend upon their cisterns. The Board has no record of the water used at each house.

No sewers. Natural drainage toward the Delaware river.

Streets macadamized and dirt, principally the latter. A systematic plan is now being pursued to do so much macadamizing each year.

Very few houses have basements; almost all, if not all, have good cellars, and the houses are occupied by only one family. No house-to-house inspection has been made this year.

As we have no sewers, cesspools are used, and the contents removed from the premises in air-tight casks by the scavenger, under the direction of the Board.

Board has no record of horses or cows. Hogs are prohibited by ordinance.

Slaughter-houses are not allowed in the city limits.

A rubber reclaiming factory has been built, with not a particularly agreeable odor, but so located as to cause no complaint so far.

Appropriation made every year by the Common Council, who never fail to grant all we ask for. Expenses for the past year about $75.

Measles, scarlet fever and diphtheria have been the prevalent diseases.

The work done has been as follows:

Caused a number of cesspools to be cleaned. Thoroughly quarantined families having contagious diseases. Preventing public funerals of persons dying of any contagious disease. When a case of contagious disease is known to exist in any family, the Board immediately sends the Inspector to put up a card in large letters on the door, announcing the kind of disease there.

W. H. WILMOT,
Clerk.

LEBANON TOWNSHIP.

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

Jacob Hipp, Glen Gardner; Joseph Fritts, Glen Gardner; Andrew C. Cregar, Califon; A. R. Banghart, Secretary, Glen Gardner.

RARITAN TOWNSHIP.

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

Wm. L. Thatcher, President; E. S. Wyckoff, Wilson Moore; A. J. Green, Secretary; John H. Ewing, M.D. Post-office address of all, Flemington.

The water-supply is from springs on the hills west of the town of Flemington and from the South branch of the Raritan. About ten years ago the supply from springs was not sufficient and the branch of the Raritan was used. The water is pumped two miles to a reservoir west of the town. About 200 houses take the water. The water is soft and with no bad taste. It is occasionally discolored during rains. The reservoir is occasionally cleaned. The stream does not receive any sewage above the point of intake for the supply. The stream has never been officially inspected, to the knowledge of the Local Board. Those who do not use the water-supply use cisterns. The water-level is low enough to secure dry cellars. No swamps; no malaria. We have no system of sewerage. There are a few cesspools, but the greater amount of sewerage is carried by private pipes that either empty into a small stream to the west of Flemington or is carried by a system of pipes to the east of the town and spread over a field, the outlet being about 100 yards from the nearest house. These pipes are flushed by surface-water during rains, and the fall is sufficient to keep the pipes clean at all times. No system of ventilation is used. Every house has a cellar used for storage. No yearly house-to-house inspections. No epidemic this year. The slaughter-houses are inspected and every effort made to keep them clean. The Board has passed ordinances. The Board has received a number of complaints of minor nuisances and has ordered them abated.

ANDREW J. GREEN,
Secretary.

READINGTON TOWNSHIP.

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

George W. Cole, Pleasant Run; D. T. Stryker, White House Station; James Lane, Readington; Dr. W. W. Pursell, White House Station.

It has been generally healthy the past year. Diphtheria has prevailed, of which there were probably twenty-five cases last winter. Three of these proved fatal. The Board has met but once since last year.

D. T. STRYKER,
Secretary.

TEWKSBURY TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David C. Farley, Secretary, Mountainville; Austin Clark, New Germantown; Hannon Sutton, Califon; Abraham A. Alpaugh, Cokesbury; Henry H. Miller, M.D., Mountainville.

Tewksbury township is situated in the northern part of Hunterdon county; population of about 2,500. Our supply of water is mostly from wells and cisterns, and is generally of a good quality. Very few houses have two families in them. Refuse is generally buried, so that there is no accumulation. Our public schools are well ventilated, and are in good condition. We have four cemeteries in our township. The health of the township has been very good for the past year. No epidemics have prevailed. Malaria quite prevalent, as might be surmised from the contour of the country. Local Health Board passed health ordinances last spring. The Board is in good working order and well organized. Our last meeting was September 12th; up to that date there had not been anything before the Board for consideration.

D. C. FARLEY,
Secretary.

UNION TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

N. B. Boileau, M.D., Jutland; H. A. Dalrymple, Pattenburg; Joseph H. Exton, High Bridge; Sylvester Taylor, Pittstown; Morris Stockton, Pattenburg.

The health of the township is at present good. No contagious disease of any kind has existed during the year. Our Board is well organized.

MORRIS STOCKTON,
Clerk.

WEST AMWELL TOWNSHIP.

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

J. B. Drake, Chairman, Lambertville; R. H. Fisher, Lambertville; Joseph K. Leigh, Lambertville; George E. Van Buskirk, Secretary, Lambertville; Dr. William Radcliff, Woodsville.

MERCER COUNTY.

EAST WINDSOR TOWNSHIP.

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

D. Hart Cunningham, John D. Whittick, Levi Updike. Walter C. Black, Secretary and Assessor. Post-office address of all, Hightstown.

EWING TOWNSHIP.

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

John R. Hendrickson, Ewingville; Jacob Maple, Ewingville; James F. Herbert Trenton Junction; Henry L. Cornell, Ewingville.

Water is obtained from springs and wells. No malaria, and cellars mostly dry. We have but very few sewers. Cesspools generally built with open bottoms; cleaned about twice a year; contents carted out upon the land and turned under. No prevalent diseases. No contagious diseases so far this year. The Board has been called upon but twice this year, and in both cases no nuisance could be found.

HAMILTON TOWNSHIP.

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

Dr. George R. Robbins, Hamilton Square; John B. Kirby, Yardville; Richard Hunt, Trenton; David Lee, Hamilton Square. William A. Blake, Assessor, Allentown.

The Board has held two meetings this year to consider the alleged nuisance of the soap-house of O. F. Niedt & Co., situated in Hamilton township. After examining the premises they directed him to procure the most approved method of burning the odors, which having been done, no further complaint has been made. An epidemic of typhoid fever, which caused a number of deaths, raged for a time in Hamilton Square, the cause of which was unknown. At present there are no cases. With this exception the general health of the inhabitants has been good the past year.

HIGHTSTOWN BOROUGH.

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

Lewis G. Wessler, David Cole, William J. Warrick, J. Walter Pullen. A. M. Taylor, Inspector. Post-office address of all, Hightstown.

Borough of Hightstown contains about 200 acres. Population, 1,800. The water-supply is taken from wells and is of good quality. There is no system of drainage. Some parts of the town are subject to water in the cellars, especially in the spring. We have no malaria and no swamps. Houses all have cellars used for general purposes. We have no large tenement-houses. No yearly house-to-house inspection seems to be necessary. The town has been very healthy during the year. Slaughter-houses have been examined and properly kept. We have received several complaints from our people in reference to the Hightstown canning factory. We recommend better drainage, and the lessees have promised to have the matter attended to next year. We have made the usual inspection of the town and promptly attended to any complaint.

A. M. TAYLOR,
Inspector.

HOPEWELL TOWNSHIP.

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

J. G. Howell, Hopewell; T. R. Voorhees, Harbourton; J. R. Bergen, Pennington. Wm. D. Hill, Assessor, Glenmore.

LAWRENCE TOWNSHIP.

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

James W. Phillips, Chairman, Trenton; Clark Flock, Lawrence Station; Samuel Van Cleve, Lawrenceville; Isaac B. Baker, Assessor, Lawrence Station; Dr. Edmond Dewitt, Lawrenceville.

PRINCETON BOROUGH.

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

Dr. E. H. Bergen; J. K. Brown, Inspector; Prof. H. B. Cornwall, A. L. Rowland, J. D. Wolfe; C. E. Seger, Clerk; Prof. W. F. Magie. Address of all, Princeton.

PRINCETON TOWNSHIP.

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

Dr. E. H. Bergen, H. B. Bayles, E G. Warren, J. K. Brown, W. M. Wright. Post-office address of all, Princeton.

The Township Board meets regularly the first Monday in each month, and attends promptly to any business that may come before it outside the borough limits.

DR. E. H. BERGEN,
Inspector.

CITY OF TRENTON.

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

G. D. W. Vroom, President; Wm. Cloke, Secretary; Thos. S. Chambers, Treasurer; Dr. Cornelius Shepherd, Carroll Robbins, Albert Clayton, Samuel Walker. Alfred W. Packer, Inspector.

The Board of Health of the city of Trenton has labored with zeal, fidelity and success to promote the sanitary welfare of the city 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 several outbreaks of disease. It has compelled

slaughter-houses to lay asphalt floors, and connect with the sewers; improved the sanitary condition of public schools; compelled the correction of much defective plumbing; put a stop to the dumping of garbage in places where it created nuisances; abated the much-complained-of nuisance of the public hay market on West Hanover street, and had it established on North Montgomery street; induced the Police Commissioners to greatly improve the condition of the tramps' lodging-house, which is now one of the cleanest and best managed in the State; persuaded the State authorities to connect the sewerage of the Capitol with the city sewer, and to put a stop to the dumping of foul garbage on the river bank on the State House property; had traps put in a number of sewer openings; brought about the cleaning of numerous alleys, the filling up of sunken lots and the abatement of similar nuisances of a public character; corrected the bad condition of Washington Market, and abated numerous other sanitary evils.

During the year the Health Inspector and his assistant have made 3,374 house inspections; sent 890 notices by mail; served 508 notices in person, and issued 2,394 scavenger permits. There have been 228 cases of diphtheria, 182 cases of scarlet fever, 36 cases of typhoid, 25 of scarlatina and 51 cases of measles. There have also been 53 cases of small-pox. Of these, 4 have proved fatal, 33 have fully recovered, 16 are still sick, from 8 of whom the quarantine will be removed this week. The Board has had chemical analyses made of 23 wells of water by Dr. H. M. Beatty, Analytical Chemist to the Board. Upon examination the water was proven to be totally unfit for domestic use, and the Board ordered the wells closed. The Board also had nine samples of the city drinking-water tested, three by Prof. H. B. Cornwall, the Analytical Chemist of the John C. Green School of Science, College of New Jersey; three by Prof. Clarence L. Spiers, of Rutgers College, New Brunswick, and also three samples by Dr. H. M. Beatty, Chemist of the Board of Health of this city. The nine analyses made by these three chemists—Profs. Cornwall and Spiers and Dr. Beatty—were all nearly uniform in their results with very slight exceptions. The water of the city was by all pronounced good, there being no contamination.

Through the persistent efforts of the Board of Health we have succeeded finally in having a channel cut from the mouth of Petty's run to the river. Before that time it emptied all of its filth on the

flats, and for many years it was a bad nuisance. Mr. Anderson, the City Engineer, had a canal cut from the mouth to the river, a distance of between three and four hundred feet, and now it is in a good sanitary condition, better than it has been for the last twenty-five years. There have also been laid about eight miles of sewers and there have been made one thousand house-connections.

WILLIAM CLOKE,
Secretary.

WASHINGTON TOWNSHIP.

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

William Coleman, Windsor; Forman Hutchinson, Windsor; Harrison Yard, Robbinsville; Dr. George Silvers, Windsor. G. D. Robbins. Assessor, Windsor.

WEST WINDSOR TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH IKSPECTOR.

Jacob R. Wicoff, Dutch Neck; D. D. Bergen, Princeton Junction; W. J. Tindell, Edinburg; G. H. Franklin, M. D., Hightstown; S. Judson Allen, Lawrence Station.

MIDDLESEX COUNTY.

CRANBURY TOWNSHIP.

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

David Farr, Cranbury; Sylvanus Grover, Plainsboro; W. Elmer Bergen, Cranbury; Frank A. Brown, Cranbury.

The people depend upon wells almost entirely. Where cisterns are used the water is filtered. A small water-course running through the lots on the west side of Main street in the village of Cranbury was found to be in bad condition. Several closets emptied into the stream,

and the fall was such as to cause the water to lie stagnant in several places. The Board immediately notified the owners of such closets that they should be removed from off the stream, and the request was promptly complied with. The Board then had the stream properly cleaned and graded. Only one slaughter-house and that is isolated in the country and is not a nuisance to neighbors. The pumace from the cider-press and distillery was allowed to lie in heaps and decay until it became a nuisance and the Board had to order its removal, which was promptly done. Most of the school-houses have been renovated and repaired during the past summer. The ventilation is not, however, what it should be. Cemeteries are in good condition and properly cared for, except the old Baptist cemetery, which is neglected, but it is so located that no evil can come from it. Our Board has passed no ordinances. Have had no contagious disease. The Board has had two meetings, has carefully considered and inquired into the sanitary condition of the township, and has attended to such matters as have required their attention. General health throughout the township very good.

F. A. BROWN,
Assessor.

EAST BRUNSWICK TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edwin Allan, New Brunswick; Howard De Hart, Milltown; F. E. Riva, M.D., Milltown; J. W. Bodine, Franklin Park; H. Demison, New Brunswick.

Population about 1,200. Climate, temperate; soil, sandy shale and clay. Houses in good condition. Tenanted by their owners, mostly. Two slaughter-houses. Four school-houses; in good condition. The New Brunswick City Almshouse is situated in the township. Scarlet fever and measles have prevailed to a slight degree. The Board has visited the slaughter-houses and has had no cause to make sanitary improvements.

MADISON TOWNSHIP.

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

No report received.

MONROE TOWNSHIP.

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

Samuel F. Butcher, Hightstown; James H. Bodine, Prospect Plains; S. C. Young, Jamesburg; Charles G. Hoffman, Jamesburg. J. M. Suydam, M.D., Inspector, Jamesburg.

NEW BRUNSWICK CITY.

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

Henry R. Baldwin, M. D, President; A. Vannest Baldwin, Secretary; H. Brewster Willis, Charles H. Voorhees; George J. Litterest, City Clerk; Edward Tindall. Post-office address of all, New Brunswick.

The Board of Health of the city of New Brunswick respectfully reports as follows: There are no markets in our town, but the citizens procure their supplies from the stores. There is no regular inspection of animals by the Health Board. Several of our factories are furnished with fire-escapes. The returns of births are badly reported. The Board of Health of this city has framed and passed to a second reading an ordinance relating to the legalizing of scavengers, and imposing a penalty for infraction of the ordinance. Our sanitary expenses are about $1,000. The past year has furnished no epidemic disease, save measles, which has been widespread, but mild in its nature. The Board has industriously and persistently used disinfection in the public streets and at the corner basins of sewers, and, in fact, in all places emitting foul and offensive odors; and wherever sources of disease have been suspected, energetic measures have been used for their prompt suppression.

A. V. N. BALDWIN,
Inspector.

NORTH BRUNSWICK TOWNSHIP.

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

John N. Bodine, Franklin Park; H. E. B. Dennison, New Brunswick; Howard S. Dehart, Millburn. Edwin Allen, Assessor, New Brunswick.

PERTH AMBOY CITY.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

No report received.

PISCATAWAY TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alvah Gray, Dunellen; Warren Smalley, Stelton; Firman R. Walker, New Market; Abner S. Coriell, New Market; W. J. Nelson, M.D, New Market.

The prevalent disease of the year has been la grippe. We have had no other epidemic. Our Board has made some sanitary improvements at South Plainfield in opening ditches and drains to facilitate surface-drainage. No other business of importance has been done by the Board during the past year.

W. J. NELSON, M.D.

RARITAN TOWNSHIP.

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

Mr. Moss, Chairman, Metuchen; Luther Tappen, Metuchen; E. W. McGann, Highland Park; A. Clark Hunt, M.D., Metuchen. Theodore A. Wood, Assessor, Metuchen.

The Board has been notified of but one nuisance, namely, the damp condition of the cellar of the public school. The cellar has since been thoroughly underdrained and cemented.

SAYREVILLE TOWNSHIP.

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

Lefferts Smith, Assessor; John S. Heston, J. N. Blair, Eugene Forman, J. H. Beekman, M.D. A. L. Rue, Inspector. Post-office address of all, Sayreville.

The general health of the township is good. There has not been as much malarial fever as in former years, and no epidemic of any kind. Some small nuisances were reported to the Board, and these were immediately removed.

J. H. BEEKMAN, M.D.

SOUTH AMBOY BOROUGH.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. C. Chase, President; John Scully, Ward C. Perrine, Patrick Campion, Stephen Martin, J. H. Green. E. E. Haines, M.D., Inspector.

Population of the borough, 4,000. The surface-water runs naturally to the bay. The Board has made great improvement in the streets, so that the natural flow is not obstructed. Very little fever is ever reported. Houses mostly have cellars, used for storage. We have only two blocks of sewers. Very few houses connect with them. No prevalent diseases this year. We have three slaughter-houses, and they are kept in the best of order. A great many improvements have been instituted during the past year.

A. V. APPLEGATE,
Assessor.

SOUTH BRUNSWICK TOWNSHIP.

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

George W. Mount, Kingston; D. C. Griggs, Dayton; A. D. Butler, Plainsboro; F. G. Stevenson, Assessor, Dayton; Edgar Carroll, M.D., Dayton.

We have nothing new to report, as everything in the township seems to be in good condition. There have been no contagious diseases and no complaints of any kind.

F. G. STEVENSON,
Assessor.

WOODBRIDGE TOWNSHIP.

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

A. D. Brown, President; Jonas H. Coddington, Franklin Moore, S. Harned. All of Woodbridge.

MONMOUTH COUNTY.

ASBURY PARK.

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

William D. Pennypacker, President; J. A. Bradley, David Harvey, Jr., E. F. Appleby, John Rockafeller, N. E. Buchanon. E. Wright, Inspector. P. L. Lippencott, Assistant Inspector. Randolph Ross, Clerk. Henry L. Ogden, Chemist. H. Mitchell, M.D., Advising Physician. Post-office address of all, Asbury Park.

Asbury Park is located on the Atlantic coast, about two miles south of Elberon, and is separated from Ocean Grove, on the south, by Wesley lake. The climate in summer is much cooler than in inland cities, and averages much warmer in winter. Our population varies so that an exact census can scarcely be given, but if a monthly census was taken during the year of the permanent and transient population and divided by twelve, it would make our population average over 15,000. The public artesian water-supply has been satisfactory both in quantity and quality, as our late analysis has proved. There have been 81 water connections made this year, making a total of 825. The water from 112 surface wells has been analyzed this season, 26 of which were found polluted and ordered closed. During the past year we have taken the water-level at different points throughout the borough, and had a map made showing the depth below the curb of the water at all the given points, thus giving us a guide as to how deep a builder at a given point can dig a cellar with safety from dampness. The sewers have continued to do their work satisfactorily; no annoyance has been caused by them. During the year 22 connections have been made, making a total of 805. The contract for the removal of garbage and refuse amounted to $2,790. The contractors have given good service, causing but few complaints. The usual work of inspecting the premises has been continued. Two additional Inspectors were employed from June 1st until the close of the summer, during which time several house-to-house inspections were made, also new diagrams, with the required remarks, have been entered upon our street-books, showing the condition of all premises in our borough. These books are open to the public. The borough is well lighted by electricity. Little or no annoyance is given by the plumbers, as they have learned our requirements, and therefore inferior plumbing is a thing of the past. Fifty-two plans of plumbing-work have been examined, tested and approved during the year. Twenty-four samples of milk were analyzed, only one of which was found to contain less than 12 per cent. of solids. Eighteen samples of oil were analyzed, all of which stood the required test. Nine cases of contagious diseases have been reported, *i. e.* five cases of scarlet fever, two cases of measles, one case of diphtheria and one case of typhoid fever (which was imported, the patient being sick upon arriving here). No deaths have occurred from contagious diseases. Of the fifty-four deaths recorded during the year ending October 1st, 1891, twenty-nine were of transient visitors and twenty-five of the resident population.

WILLIAM D. PENNYPACKER,
President.

ATLANTIC HIGHLANDS.

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

Rev. Dr. Edward C. Curtis, President; Dr. John H. Van Marter, Dr. George D. Fay, Dr. H. A. Clark, Jacob S. Stout, John B. Givan; James H. Leonard, Secretary; John B. Swan, Inspector. Post-office address of all, Atlantic Highlands.

Located on Sandy Hook bay, from 10 to 150 feet above the ocean level, sloping gradually toward the west and south. The borough covers between 500 and 600 acres. Water is taken from wells, and is of a very good quality except in a few instances where a well is located in a vein of black marl. On the western boundaries the best of water can be obtained from springs running from the hills. A reservoir located on these hills would furnish every house in town with a water-supply, and the matter is now under consideration. Cesspools are now used, but, as there is constant trouble on account of leakage from them and they are often overflowing, a system of sewerage will no doubt be introduced at an early day. A committee has already been appointed by the Board of Trade to gather the necessary information. Streets are fifty feet in width, except some important ones, which are from sixty to one hundred feet. About one-quarter of our houses are occupied and owned by residents in New York City, who reside here from four to six months in each year.

Some few remain the year round, as the railroad communication is much improved. Garbage is removed by persons employed for that purpose. There is but one school building, accommodating about two hundred. Other accommodation will have to be found at an early day. A large cemetery is located just a short distance from the borough limit. The Board of Health has experienced some difficulty in fully carrying out the health laws. Measles at the commencement of the year were prevalent, and a few cases of whooping-cough. This is considered a very healthy locality. The Board of Health has taken pains to have the town kept in a healthy condition as far as possible, by having every cesspool constructed according to the ordinance. Have had property drained so as to prevent standing pools of water. Have removed dead animals, have had cesspools and privies cleaned with as little offense to the citizens as possible, but there is still room for activity in many directions.

JAMES H. LEONARD,
Secretary.

ATLANTIC TOWNSHIP.

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

No report received.

BELMAR.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James S. Huyler, President; C. S. Wolverton, Joab Titus, William M. Bergen, C. G. Clayton, F. B. Philbrick, W. L. Kinmouth. C. S. Wolverton, Inspector. Post-office address of all, Belmar.

Permanent population, 700 or 800. Summer not estimated. Part of borough is sewered into the Atlantic ocean. Water-level is generally such as to secure dry cellars, except in the rainy season. No swamps and no malaria. A majority of the houses have cellars. The sewer system has been working about a year and there are only a few connections as yet made with it. Cesspools are supposed to be cemented tightly. They are emptied by scavengers and contents taken outside the borough.

EATONTOWN TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. E. Corliss, Ocean Port; D. Vannote, West Long Branch; R. F. Hopper, Eatontown; W. R. Stevens, Secretary, Eatontown.

The growth of our township is slow, and there being no massing of people in cities, towns or boroughs, we are, consequently, free from epidemic diseases. We have had a few complaints regarding nuisances, which have been promptly abated. We have had a few scattering cases of scarlet fever, some followed by diphtheria, but in a comparatively mild form, and no deaths have occurred from these diseases. There is a neglect upon the part of physicians practicing in our township in regard to reporting cases of contagious disease. I propose to have the ordinance enforced or repealed in the near future. The population of the township is about 2,800. I do not think fifty per cent. of our population have been vaccinated, and the measure is rarely recommended by our physicians. Many people are strongly opposed to it, but were small-pox to appear we should vaccinate through the schools or forbid attendance by those not protected.

E. W. CRATER, M.D.,
Inspector.

FREEHOLD TOWN.

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

John Bawden, Aaron C. Hart, O. R. Freeman, M. D., J. O. Burke, Jr., John Enright, Theodore Fields. William J. McClure, Inspector. Post-office address of all, Freehold.

Our water-supply has proved a success. The introduction into the houses is very gradual, about 160 to 175 connections having been made with the main. The water is occasionally discolored. Some sanitary improvements have been made about the county buildings, the jail in particular. The graded-school grounds have been extended, affording more play room. The general state of health has been good, and there have been no epidemic diseases.

W. J. MCCLURE,
Inspector.

HOLMDEL TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James W. Hoff, William Morrell, Van Dike Polhemus; Aaron Longstreet, Secretary. Henry D. Cook, M.D., Inspector. Post-office address of all, Holmdel.

Holmdel township is situated in the north part of Monmouth county. The land is generally level and used wholly for agricultural purposes, some of the best marl-bottom farms in the county being in the township. There is but one cemetery, which is kept in good condition. There has been no contagious disease prevalent during the last year, and the Board of Health had no complaints of any kind brought to their notice.

AARON LONGSTREET,
President.

HOWELL TOWNSHIP.

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

Dr. S. M. Disbrow, Farmingdale; Jacob Lutz, Farmingdale; Charles Lafetra, Squankum; Charles Donahay, Turkey; James H. Butcher, Ardena.

The Township Board have held regular meetings and all matters referred to us have been arranged and cleared up.

JAMES H. BUTCHER,
Secretary.

LONG BRANCH CITY.

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

George W. Brown, Jr., M.D., James P. Connelly, J. W. Taylor, M.D., William J. Smyth, Jr., J. Goldey, N. N. Pemberton, M.D., E. B. Blaisdell, Hugh R. Herbert. Post-office address of all, Long Branch.

Public water-supply is by private company. Majority use wells. The Health Board has no list of houses that do not use the public supply. A portion of the city is sewered. Cellars are generally dry except a few in very wet seasons. About twelve tenement-houses have more than two families. We do not have a yearly house-to-house

inspection. About one-tenth of the houses are connected with the sewer. We have no record of sewer connections. A number of cesspools are used, with cemented bottoms and sides. They are emptied with odorless excavators and the contents are carried out of town for fertilizing purposes. No prevalent diseases this year. No slaughter-houses. The Health Board has had charge of the garbage this year and had it carted out of the town during the summer months, and had everything done that was possible to make the place in a healthy condition. The Sanitary Inspector does all in his power to keep everything in good shape. Our Sanitary Committee have also made many investigations and suggested improvements, which in most cases have been made.

MANALAPAN TOWNSHIP.

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

William H. Reid, Chairman, Tennent; David L. Applegate, Tennent; Daniel S. Aumack, Englishtown. S. Craig Brown, Assessor, Englishtown. Asher T. Applegate, Physician, Englishtown.

MARLBORO TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. Carson, Holmdel; P. C. Vanderveer, Wickatunk; Tennent Quackenbush, Wickatunk.

MATAWAN BOROUGH.

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

J. William Maggs, President; Peter C. Disbrow, Inspector; Dr. Cyrus Knecht; William Rodgers, Secretary; William Hardwick, Isaac W. Bedle, William A. Fountain. Post-office address of all, Matawan.

The Board and Inspector have used every precaution against any cause for epidemic or disease of any kind. They have ordered dead

animals buried. Pigs removed out of the borough and pens cleaned. Have also ordered cesspools and sewers cleaned and water-closets moved and cleaned. The carting of night-soil and other offensive fertilizers through the borough, when it would be an injury to the public health, has been prohibited.

MATAWAN TOWNSHIP.

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

John F. Lisk, President; Charles E. Close, Edward Tarry; Francis C. Bedle, Assessor; William Rodgers. Dr. C. Knecht, Inspector. Post-office address of all, Matawan.

Every officer does his duty and the township is in a good, healthy condition. No disease of a prevalent or dangerous nature exists and no cause for any, as everything is carefully watched by the Board.

MIDDLETOWN TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Swan, Atlantic Highlands; R S Snyder, Atlantic Highlands; H. A. Hendrickson, M.D., Atlantic Highlands; J. H. Van Mater, M.D., Atlantic Highlands; Geo Morford, New Monmouth.

MILLSTONE TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hon. George J. Ely, Perrineville; George Hartman, Perrineville; Albert Thompson, Clarksburg; Curtis Foreman, Clarksburg; William T. MacMillan, M.D., Perrineville

Farming is the leading industry in this section. The greater part of the township consists of rolling land and good drainage, and the absence of ponds and swamps makes the township remarkably free from any prevailing disease. The school-houses are well taken care of. Cemeteries are in good condition. Slaughter-houses situated in

the township are well kept. The township has been remarkably free from any contagious diseases the past year. Some twenty-eight cases of pneumonia occurred in the southern part of the township during March and April. During July and August some sixteen cases of dysentery were reported to the Inspector. The sanitary condition of the township is good, the people recognizing the importance of pure air and water and of clean surroundings.

GEORGE J. ELY,
Secretary.

NEPTUNE TOWNSHIP.

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

S. W. Kirkbride, Asbury Park; Dr. A. Williamson, Asbury Park; L. E. Watson, Asbury Park; Lewis Ramearn Ocean Grove; J. Newman, Avon.

Neptune township has been very healthy for the last season. Last fall there were three cases of typhoid fever and three of diphtheria reported to the Board. This season only two cases of diphtheria have been reported so far. Our Assistant Inspector has made a very thorough inspection of the township. The lowlands west of Asbury Park and Ocean Grove are being drained, which is a great improvement. West Park is soon to have a water-supply from springs, which it is hoped will be very satisfactory.

L. E. WATSON,
Clerk.

OCEAN GROVE.

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

Rev. E. H. Stokes, D.D., President, Ocean Grove; Rev. A. E. Ballard, Ocean Grove; Hon. James L. Hayes, Newark; Hon. Holmes W. Murphy, Freehold. J. H. Alday, M.D., Inspector, Ocean Grove.

The sanitary condition of Ocean Grove is excellent. We have had a remarkably healthy summer, notwithstanding the presence of several contagious diseases in our midst, the subjects of which were strangers visiting the place. Yet because of the healthy sanitary condition of the town, in connection with the rigid quarantine of the sick and a thorough disinfection of the premises, these diseases were confined to

the narrow limits of their first appearance, and thus prevented from spreading. The early spring inspection of the town, the cleansing and disinfection of the homes of the people and their surroundings, with the necessary instruction in proper sanitation given to the occupants thereof, is self-evidently a wise and important proceeding, for thereby the town is put in a safe and healthy sanitary condition, preparing it for the influx of the multitudes of the summer season, and also exempting it from being the receptacle of disease. We regard our sewer system as being commensurate with the requirements of the town. It embraces, with its mains and laterals, about thirteen miles, all of which convey the sewage matter into one large main pipe, which extends into the ocean five hundred feet, at which point it discharges its contents. This main pipe is covered and protected with a most substantial and ornate pier, extending out into the ocean five hundred feet, thereby preserving and protecting it from being injured by the winter storms and wreckage matter. Our artesian water system, with its mains and laterals, covers at least thirteen miles, furnishing as pure water as can be obtained. The Board is continually on the alert, making and enforcing all needful ordinances for the proper sanitation of the town, especially in reference to the connection of all premises with the sewer and water systems. In the last six months there have been 33 sewer connections and 38 water connections made. This makes in all to October 1st, 965 sewer connections and 952 water connections. In conclusion, I may add that at this date Ocean Grove is very healthy, and its sanitary condition carefully guarded.

J. H. ALDAY, M.D.,
Inspector.

OCEAN TOWNSHIP.

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

Thomas R. Wooley, Long Branch; Levi G. Irvin, Seabright; James Daugh, Deal; Howard A. Branley, Clerk, Long Branch. George W. Brown, M.D., Inspector.

The boroughs of Long Branch and Seabright cover such a large portion of our township that our Board has had very little work to do the past year, consequently I have nothing of interest to report.

HOWARD H. BRANLEY,
Inspector.

RARITAN TOWNSHIP.

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

T. S. R. Brown, John W. Keough, Asbury Walling. T. V. Arrowsmith, Assessor. Address of all, Keyport.

SHREWSBURY TOWNSHIP.

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

John Wm. Koeng, M D, President, Red Bank; Charles B. Parsons, Red Bank; William Tabor Parker, Little Silver; Thomas Brown, Red Bank; Borden Hance, Red Bank. William Henry Smith, Inspector.

We frequently find houses in an unsanitary condition on account of the neglect of owners. The Board has kept strict watch over all refuse, and excreta, and matters have been wonderfully improved. A few cases of hog cholera have occurred. Slaughter-houses have been kept in good condition, owing to the close scrutiny of this Board. I think that both the Fair Haven and especially the Oceanic school should be in a better condition. Water-closets of both are extremely bad. The physicians are somewhat neglectful in sending in reports, but the Board has been more exact in reference to this matter during the past year. Ten cases of scarlet fever occurred during the year. Each member of the Board has considered it his duty to help to keep the good health of the public. Whenever complaints were made, both the Inspector and the physician would see that everything was made right. Every person is satisfied with our work, and that is sufficient proof that we have done our duty.

THOMAS BROWN,
Assessor

UPPER FREEHOLD TOWNSHIP.

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

Charles C. Wyckoff, Allentown; I. S. Dawes, Imlaystown; Edward Hyers, Red Valley; Thomas Quicksell, Assessor, Hornerstown; F. C. Price, M. D. Imlaystown.

Wells furnish the water-supply. Laws and regulations are well observed by this Board. La grippe and influenza were very prevalent in their season. German measles were prevalent in May and June. Seven cases of scarlet fever, with no deaths, occurred in the autumn. We have had several cases of typhoid fever in the township. Have had some continued fevers of a malarial type since August.

WALL TOWNSHIP.

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

James L. Allgor, New Bedford; P. F. Philbrick, Belmar; Henry Wainwright; Brielle; John M. Allen, Manasquan; Dr. A. A. Higgins, Manasquan. John M. Allen, Inspector, Manasquan.

The Board has had regular monthly meetings. The Inspector has closely watched for any nuisance, and at its first appearance had it abated. The people are willing to comply with the requirements of the law when they become acquainted with them. The health of the township has been fairly good during the past year. A few cases of dysentery and typhoid fever have occurred. The Board has had no aggravated cases to deal with.

JOHN M. ALLEN,
Secretary.

MORRIS COUNTY.

BOONTON TOWNSHIP.

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

Horace Ford, Ellis G. Myers, Thomas Bayard; Gilbert D. Evans, Clerk. Joseph Steventon, Assessor. Post-office address of all, Boonton.

As nine-tenths of the township is within the corporation limits of the city of Boonton, and there being so little to do, our Board has never organized.

JOSEPH STEVENTON.
Assessor.

CHATHAM TOWNSHIP.

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

Dayton Baldwin, New Providence; Eugene Hopping, Afton; George S. McDougal, Chatham; Edward P. Miller, Chatham; W. J. Wolf, M.D., Chatham.

Since the incorporation of the town of Madison the township contains three towns—Chatham, Stanley and Afton. The eastern part of the township is the beginning of the flooded meadows of the Passaic valley. The balance of the township is high and dry and very healthful, including Long hill, which rises abruptly at Chatham to an elevation of 300 feet, and forms the left bank of the Passaic. The Board passed an ordinance relating to nuisances, imposing a fine of $25 upon any person or persons who allow any waste-water from sinks, closets, cesspools or privies to run into any street, alley or public place. Similar sections were passed imposing fines for the commission of various similar nuisances. A number of complaints coming under the sections of this ordinance were made during the year and were promptly abated upon notice. It was not found necessary to impose the fine in any instance. The most important matter for this Board of Health to look after is the emptying of sewage into the Passaic by the town of Summit. For the past four years a private sewer has been allowed to empty into the mill-pond of the Franklin flour-mill at Stanley. This sewer has simply been allowed to pour its contents, solid and liquid, into this mill-pond, without any attempt at filtration, until it has become one gigantic cesspool, and during the latter months of summer and in early autumn, whenever the pond is drawn low, leaving much of the surface uncovered and seething under the sun, there arises a stench the effects of which can result in nothing but the direst disease. The foulness of the water may be imagined when I state that on a hot day in August last, when the water in this mill-pond was drawn very low, the Inspector saw bushels of dead fish in the pond at this point. Thus far nothing has been done by the Summit Township Board of Health to stop this private sewer, much less to cleanse the pond, which it should force the owner to do. The Chatham Township Board have strongly urged these facts upon the attention of the Summit Township Board. Thanks to an enterprising public, a new and extensive public sewer is being constructed,

with a filtration system. The objection, if any, to this is that the filtration plant is situated so as to empty the filtrate into the river, above all the mill-ponds, four in number.

CHESTER TOWNSHIP.

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

Elias M. Patrey, President; Charles H. Ming, Treasurer; Spafford H. Leek; Henry P. Drake, Assessor; W. A. Green, M.D., Secretary. Post-office address of all, Chester.

The past year has been one of unusual health. During the spring we had an epidemic of rubeola in a very light form, and a few cases of scarlet fever. In July and August we had an epidemic of whooping-cough, unusually severe. Whether the long dry spell that preceded its outbreak had anything to do with it or not I am not prepared to say, although I am inclined to believe it was a factor in the case. Within the past two weeks, several cases of diphtheria have developed. The first case was a little boy ten years of age, who came from Trenton on a visit. He was here several days before he was taken ill, and during that time he played with quite a number of children here, but as yet none that he was with have contracted the disease. The case was a severe one and he only lived about three days. The other cases are widely separated from each other, and therefore could not depend upon a common local cause. No diseases of animals have been reported. What few complaints there were of nuisances were quickly disposed of in a satisfactory manner.

W. A. GREEN, M.D.,
Inspector.

HANOVER TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. E. P. Cooper, Troy Hills; George W. Bates, Morris Plains; Walter H. Mitchell, Whippany; George Cook, Hanover. Joseph H. Bastedo, Assessor, Boonton.

Water-supply from wells and cisterns; public health is good. There have been no prevalent diseases. There has been no occasion for the Board to act. Where nuisances have existed a notification from the Board is always effective.

JOSEPH H. BASTEDO,
Assessor.

JEFFERSON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dennis M. Duffy, Woodport; Charles H. Jennings, Milton; Jacob Tallman, Oak Ridge; S. Utter, M.D., Woodport.

This township is situated in the mountains of the northern part of Morris county. Water-supply from springs and wells. There have been a few cases of whooping-cough in the township during the past year. No general epidemic. Health Board has little to do. Reports of vital statistics are returned regularly every thirty days.

S. UTTER, M.D.,
Assessor.

MADISON BOROUGH.

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

Dr. C. Anderson, Dr. J. N. Vandewater, Henry M. Sacks, William S. Brown, Samuel Brant. F. E. Day, Inspector. Post-office address of all, Madison.

Population 2,000; sand and gravel soil; ground high and rolling. Water-supply from a well thirty by thirty-two feet, pumped to a stand-pipe seventy-five feet high. Pressure at the center of the town eighty-five pounds to the square inch. Capacity of well 1,000,000 gallons daily. Consumers to date number eighty-five. Nine miles of pipe. No sewerage system. No swamps and no malaria. Roads gravel and in good condition. Few tenements. Cesspools emptied on farms outside borough limits. No slaughter-houses. Rose culture is the principal industry. All nuisances complained of are inspected and notification is immediately forwarded to abate them. These are generally complied with.

F. E. DAY,
Inspector.

MENDHAM TOWNSHIP.

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

John S. Stiger, M.D, M. Robinson, J. W. Swackhammer, F. H. Garabrant. Post-office address of all, Mendham.

Mendham is a very healthy country town situated in the hills of Morris county. There is no necessity for a system of sewers, as the country is descending in all directions. There are no slaughter-houses to amount to anything. No stagnant water or marshes to generate disease and mosquitoes. We have no contagious diseases.

M. ROBINSON,
Chairman.

MONTVILLE TOWNSHIP.

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

John Husk, Montville; John H. Capstick, Montville; Walter A. Young, Boonton. J. H. Van Duyne, Assessor, Montville.

MORRISTOWN CITY.

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

James P. Sullivan, President; Stephen Breese, Secretary; Robert C. Walsh, H. A. Freeman, A. L. Revere, James Douglas, M.D. Daniel H. Leek, Inspector. Post-office address of all, Morristown.

Population is about 9,000. An intervening range of hills cuts off the worst effect of easterly winds from the sea. The climate is considered very favorable to persons affected with throat and lung troubles. Water is collected from springs on surrounding hills into reservoirs, which are all on high levels. One spring, known as the Sand spring, is on rather low ground, requiring pumping to the distributing reservoir in the city. The supply is abundant for all ordinary uses. There are only three or four wells now in use for drinking purposes. There is no sewerage system, cesspools and vaults being used. Refuse, ashes, &c., are removed at private contract by scavengers. Excreta are carried outside the city limits by odorless excavators and there mixed with sand. All public school buildings

are of brick, comparatively new and well arranged as to sanitary matters. Very few burials are now made in the city; permits for burial are issued by the Secretary of the Board of Health. No slaughter-houses or abattoirs in the city limits. Some years ago the Board of Health established a code of regulations, concerning all matters of public health, which is rigidly enforced. Any cases of contagious disease are at once reported by the physician in charge and the Health Inspector sees that proper care is taken. This city has been quite free from diseases of a contagious nature during the past year, except a few cases of diphtheria, cerebro-spinal meningitis and typhoid fever, due in some instances to local causes. Steps to do away with these were immediately taken. The Board of Health meets every month for the transaction of whatever business may come before it and to hear the reports of the Health Physician and Inspector. The latter is now engaged in making a complete inspection and report of the sanitary condition of every building in the city, the same being recorded in a book gotten up for the purpose and which will serve as a permanent record and will be open to the inspection of any one wishing information on the subject. The Inspector has been provided with a neat badge to wear while engaged in his official duties. A considerable number of written notices to abate nuisances have been served during the year by the Inspector, in most instances with good effect, though in one or two cases legal measures have been resorted to with good result.

MOUNT OLIVE TOWNSHIP.

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

Benjamin A. Howell, Chairman, Flanders; Samuel S. Wills, Treasurer, Stanhope; W. L. Thomas, Drakestown; Dr. C. N. Miller, Physician, Flanders; A. H. Bartley, Recorder, Bartley.

Health of the township generally good. No prevalent diseases during the year. No complaints have come before the Board except complaint of the drainage from the kitchen of the Forest House, at Budd's Lake. That the Board may be able to abate such nuisances and any others detrimental to the health of the inhabitants, a set of ordinances has been adopted, which will hereafter be enforced.

B. A. HOWELL,
Chairman.

PASSAIC TOWNSHIP.

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

Andrew S. Bird, Long Hill; Jacob T. Ogden, New Vernon; J. Frank Miller, New Vernon; F. Leo Hendrickson, Madison.

Our township enjoys a good degree of health. The water-supply from wells and springs is satisfactory. There has been no particular disease within a year.

F. LEO HENDRICKSON.

PEQUANNOCK TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Albert Van Voorhees, Pompton Plains; B C. Demarest, Pompton Plains; T. Lincoln, Lincoln Park; F. L. Levi, Butler; J. Rogers, Butler.

Water-supply from wells; soft in character. Cellars usually dry. There are three or four houses with more than two tenants. Slaughter-houses are so far out from the town that they are not troublesome. There have been no complaints made to the Board.

J. ROGERS,
Assessor.

RANDOLPH TOWNSHIP.

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

B. L. Hedden, Dover; John Downey, Port Oram; E. M. Headden, Dover; Isaac Hance, Dover.

ROCKAWAY TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James B. Tonking, Chairman, Mount Hope; Edward Fox, Rockaway; M. Hoagland, Rockaway. C. L. Beach, Assessor, Rockaway.

The township is in a very healthy condition, and there is nothing special to report.

C. L. BEACH,
Assessor.

ROXBURY TOWNSHIP.

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

No report received.

WASHINGTON TOWNSHIP.

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

Steward Neighbor, German Valley; Henry Wiley, Drakestown; Elijah Dufford, Middle Valley; Philip Schuyler, Naughright. Elmer E. Hoffman, Assessor, Middle Valley. Edward Sutton, M.D, Inspector, Middle Valley.

The main water-supply is from wells and springs, generally salt and with a slight iron taste. The drainage is natural. Swamps and malaria quite frequent. The prevailing disease this year was measles. Slaughter-houses are inspected. The Board has passed no ordinances. The mill-dam at Naughright during last winter's freshet was washed away and remained until this last summer without being repaired, when a complaint was made to the Health Physician. He made an inspection and found that it was necessary to repair it at once to prevent vegetable decomposition. The Board by prompt action was able to effect this result without any delay. The Board takes an active interest in the sanitary condition of our township.

ELMER E. HOFFMAN,
Secretary.

OCEAN COUNTY.

BERKELEY TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH IMSPECTOR.

No report received.

BRICK TOWNSHIP.

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

Luke Johnson, Lakewood; C. C. Pearce, Burrsville; John L. Darsett, Point Pleasant. A. W. Downey, Assessor, Burrsville.

DOVER TOWNSHIP.

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

Adolph Ernst, Chairman, Toms River; James J. McKelvey, Toms River; John Tilton, Toms River; A. V. Irons, Clerk, Toms River.

Number of inhabitants, 2,000. Climate is good. Water-supply by wells and springs. No sewer system. No swamps near the town. All slaughter-houses have been inspected by the Board and found in good condition. All school-houses have been inspected and found satisfactory. Jail has also been inspected; found everything in good shape. No ordinances have been passed. The Board has made personal investigation of various matters, and all persons who have been notified of any neglect have taken prompt action.

A. V. IRONS,
Clerk.

EAGLESWOOD TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. McCunney, F. A. Hardt, S. Ashhurst, M.D., R. B. Engle. Post-office address of all, Beach Haven.

JACKSON TOWNSHIP.

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

Johnson Biles, Vanhiseville; Joseph S. Clayton, Jackson Mills; Harrie Applegate, Bennett's Mills; Wright De Bow, Clarksburg.

LACEY TOWNSHIP.

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

Dr. O. A. Wood, Forked River; A. G. Wilber, Forked River; B. F. Mathews, Forked River; B. F. Holmes, Forked River; T. C. Van Arsdale, Cedar Creek.

The water-supply is from running streams, springs and wells. The water from wells here, when cleaned, is very healthy as a rule, but it is to be feared that many wells become foul from toads and

vermin, and thus become sources of disease. The natural drainage is good, and very little stagnant water remains on the surface. Much more care is used than formerly to destroy and bury refuse. Disease among animals occurred on one farm. A call on the State Board of Health was promptly responded to, and the disease was quickly stamped out. Our Board of Health is completely organized, and always ready for action. A health code was passed about four years ago, and a number of copies printed. Each year the same code is re-adopted, and copies posted in the most public places. Some years ago it was the common practice to throw dead fish and other refuse in the streams used for water-supply, but the Board took a decided stand against it, and now we are happy to say this and some other nuisances have been abated.

B. F. MATHEWS.

LITTLE EGG HARBOR TOWNSHIP.

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

Jacob L. Cowperthwait, President; C. M. Berry, Eph. Berry, Alex. Cowperthwaite, Theophilus T. Price, M.D., Secretary. Post-office address of all, Tuckerton.

The climate and soil are exceedingly healthy, and there is but little necessity for sanitary regulation or official interference. The Board of Health has little else to do in an official capacity, except to organize.

T. T. PRICE,
Secretary.

MANCHESTER TOWNSHIP.

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

Michael McCallion, William Montgomery, Curlis Wilbur, T. Dowd, Jr. Post-office address of all, Manchester.

There is no prevalent disease in the township this year. Our streets have been improved since last year. In other respects our town remains about the same.

T. DOWD, JR.,
Assessor.

OCEAN TOWNSHIP.

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

William Gray, Wyckoff Letts. J. H. Wilkins, Assessor. Post-office address of all, Waretown.

Drainage very good, but room for improvement. Most of the houses have cellars. No contagious diseases during the year. I am sorry to say that our Board of Health has never regularly organized.

J. H. WILKINS,
Assessor.

PLUMSTEAD TOWNSHIP.

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

Louis J. Davis, W. S. Chapey, William B. Coward. Aaron S. Bronson, Assessor. Howard Allen, M.D., Inspector. Post-office address of all, New Egypt.

Each dwelling has its well of water. The refuse and excreta are carted away by farmers. No infectious disease of animals. Two slaughter-houses in the village, but no bad effects from them. No cemeteries in New Egypt. Three school-houses in the township. There have been a few cases of typhoid fever and diphtheria.

STAFFORD TOWNSHIP.

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

Charles H. Cranmer, Manahawkin; John Letts, Manahawkin; Lewis A. Cranmer, Mayeta; Samuel B. Irwin, M.D., Manahawkin; John B. Courtney, Manahawkin.

The township has a scattered population. No yearly house-to-house inspection. Cesspools with open bottoms and sides are used. No particular disease of animals. One slaughter-house; in good condition. Four cemeteries in the township. Have not passed any health ordinances. Some malarial fever and scarlet fever have existed. But little investigation has been necessary.

UNION TOWNSHIP.

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

Joseph A. Pharo, George H. Vannotte, Ira S. Cranmer, Dr. Edmund Bennett, E. R. Wills. Post-office address of all, Barnegat.

PASSAIC COUNTY.

ACQUACKANONK TOWNSHIP.

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

No report received.

LITTLE FALLS TOWNSHIP.

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

Charles Crane, Chairman; Eugene Shire, David Hawthorne. Walter Bott, Assessor. E. A. Keeler, M.D., Inspector. Post-office address of all, Little Falls.

Water-supply from wells and cisterns. Cesspools usually have open bottoms and sides; seldom emptied. No prevalent diseases among cattle. Slaughter-houses frequently inspected. Three public schools in the township. The Board has held monthly meetings to hear complaints. Complaints have been few and nuisances easily abated.

MANCHESTER TOWNSHIP.

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

Doras W. Warren, Jr., Hawthorn; S. Cyrus Townsend, M.D., Paterson; George Van Houten, Paterson; John Reinhardt, Paterson; William D. Berdan, Secretary, Paterson.

Cesspools are built in various ways, some with open bottoms and sides, others are cemented. There are eight houses in the township of more than two families. We have no yearly house-to-house

inspection. In the months of May and June measles were quite prevalent through the township. In the month of August there were five cases of diphtheria and one death therefrom. There have been five or six cases of scarlet fever during the year, one of which proved fatal. Chicken-pox in a light form existed in the township in September. At present the health of the inhabitants of the township is good. There are no slaughter-houses in the township. There has been a fat-rendering establishment started in the township within the last year. There was a complaint made to the Board about the offensive odor arising therefrom; the proprietor was ordered to abate the nuisance, which he promised to do, and we have had no further complaints against the establishment. A notice was served on the Jewish Cemetery Association to have the graves dug as deep as the law required or suffer the penalty. The Board has brought to account those dumping offal and garbage in various places in the township, and also are endeavoring to secure the names of all those who have died in the township each month.

WILLIAM D. BERDAN,
Secretary.

PATERSON CITY.

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

Theo. Y. Kinne, M.D., President; Philander A. Harris, M.D., Frank E. Agnew, M.D., B. C. Magennis, M.D., James Mills, Esq., John T. Pollitt. J. L. Leal, M.D., Inspector and Secretary. Post-office address of all, Paterson.

I think the questions for the annual report can be answered best by forwarding a copy of our last annual report.

J. L. LEAL, M.D.,
Inspector.

[NOTE BY SECRETARY OF STATE BOARD.—We select from this report as follows, because here we have a showing of active and efficient work, which, although needing to be greatly extended, will serve as a guide or comparison for other cities.]

Condensed statement of contagious diseases reported to this Board for year beginning March 1st, 1890, and ending March 1st, 1891:

Scarlet fever	253	cases,	11 deaths.
Diphtheria	321	"	106 "
Typhoid fever	69	"	18 "
Small-pox	1	case,	no death.
Number of permits to attend school issued to children from premises where contagious diseases have existed			228
Number of premises where contagious diseases have existed, fumigated and disinfected			445

NUISANCES, COMPLAINTS AND INSPECTIONS.

Complaints of nuisances and violations of health laws made to this Board	835
NOTE.—All of these complaints have been investigated and proper steps taken to abate nuisances and secure obedience to health laws.	
Complaints well founded and nuisances existing	733
Nuisances abated and grounds of complaint removed	625
NOTE.—Of those not abated, the greater proportion are either in the process of abatement or laid over until the weather permits the necessary work to be done.	
Inspections of premises made	1,489
Number of notices served	785
Scavenger permits issued	1,033
Complaints made before the Recorder	14
Pursued to a successful termination	11

Licenses Granted.

During last fiscal year licenses were granted as follows:

Licenses to keep cows	11
Licenses to scavengers	2
License to Paterson Sanitary Co.	1
License to cut ice within city limits	1
Licenses to sell ice within the city limits	7
Licenses to manufacture and sell artificial ice	4

Licenses previously granted which are still in effect:

Licenses to keep domestic animals	787
Licenses to maintain slaughter-houses	2
Licenses to maintain glue factories	2
License to maintain feather-cleaning works	1
License to maintain smoke-house	1

Work accomplished during fiscal year with relation to the construction, plumbing and drainage of buildings:

Total number of permits granted	1,290
(*a*) For new buildings	374
(*b*) Extensions	916

Inspections	
(a) Final inspections	3,816
Number of complaints of old plumbing systems investigated	963
Number of old plumbing systems condemned	76
Total number of sewer connections made	57
(a) For old buildings	543
(b) For new buildings	341
Total number of feet of earthen and cement pipe used	202
Total number of feet of cast-iron soil and waste-pipe used	48,300
Total number of plumbers registered	61,600
	60

Markets and Foods.

Work accomplished during fiscal year as regards markets and foods.

During year there was condemned, seized and destroyed the following amount of food-stuffs:

MEATS.

"Bob" veal	24 carcasses.	Hams	100 lbs.
Beef	1,165 lbs.	Sausage	40 "
Corned beef	975 "	Pigs' feet	60 "
Beef livers	13	Mutton	235 "
Pork	1,435 lbs.	Lamb	85 "

FOWLS.

Turkeys	7	Chickens	25 pairs.

GAME.

Rabbits	21 pairs.

FISH.

Fish	6 barrels.	Clams	1 barrel.

EGGS.

Eggs	105 dozen.

BUTTER.

Butter	1 tub.

VEGETABLES.

Vegetables	6 barrels.

FRUITS.

Watermelons	200	Tomatoes	2 crates.
Fruit	2 lots.		

Report of the Treasurer

Of the Board of Health, City of Paterson, for the year ending with March 20th, 1891.

1890.

March 21st. Balance of cash on hand	$187 47

1890 and 1891.

Received of Treasurer city of Paterson	$3,500 00	
Received for plumbing permits during the past year, twelve hundred and ninety-two (at two dollars each)	2,584 00	
Received for fines imposed by the Recorder for violations of the sanitary and plumbing codes	140 00	
Received of John J. Doll, "scavenger's license"	30 00	
Henry T. L. Hillman for scavengers' permits	92 70	
Henry T. L. Hillman, license, 3 scavenger wagons,	45 00	
Total receipts for the year from all sources		$6,579 17

1891.

March 21st. Balance of cash on hand in the First National Bank of Paterson, to the credit of this Board	$73 25

1890 and 1891.

Paid John L. Leal, Health Inspector	$1,200 00	
John Hickman, Plumbing Inspector	1,325 00	
James W. Smith, Assistant Health Inspector	600 00	
Wm. Barnickel, Market Inspector	298 00	
Wm. Barnickel, Sanitary Policeman	200 00	
James Fitzpatrick, Sanitary Policeman	575 00	
Wm. I. Lewis, Counselor	499 94	
John J. Warren, Secretary and Treasurer	707 96	
Total salary account except that of the Treasurer, Philander A. Harris, which remains unpaid		$5,405 90
Paid various physicians for reporting contagious diseases		116 25
The N. Y. and N. J. Telephone Co., for telephone service		50 00
For the care and maintenance of the contagious disease hospital	$145 67	
For infected clothing destroyed	36 00	
For vaccine matter	20 00	
Total		205 67
For disinfectants		42 91
For horse hire for the Plumbing Inspector	$10 15	
In the purchase of a horse, wagon and harness for the use of the Plumbing Inspector	200 00	
For board of horse of the Plumbing Inspector	153 37	
For horseshoeing of the Plumbing Inspector's horse	9 77	
For repairs to wagon of Plumbing Inspector	9 85	
For printing and incidentals on account of plumbing inspection	13 45	
Total		396 59
For printing, advertising, stationery, stamps, horse-car tickets and incidentals		288 60
Total disbursements for the year		$6,505 92
Balance of cash on hand in the First National Bank of Paterson, to the credit of this Board		73 25
		$6,579 17

The above is intended simply as a synopsis of the work accomplished by this Board during the last year. Brief as it is, however, we congratulate ourselves that it shows good and earnest work on our part, and also shows that we are fully alive to the responsibilities resting upon us as guardians of the lives and health of the people of a city of nearly 80,000 inhabitants.

To the citizens in general we wish to express our indebtedness for the almost universal support which they have given us in the performance of our duties. As a rule, our requirements have met with a prompt and ready obedience, and seemingly, also, a full understanding of their necessity and importance. With the same or better support in the future we feel that we can safely promise to make our city the equal, from a sanitary point of view, of any of its class in the country, as it is to-day at least the equal of any city in our State.

JOHN L. LEAL, M.D.,
Health Inspector and Secretary.

PASSAIC CITY.

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

Dr. F. H. Rice, President; John H. Bowker, Secretary; R. A. Terhune, Frank Popple. William H. Carroll, Inspector. Post office address of all, Passaic.

Water-supply very good; furnished by Aquackanonk Water Company and Passaic Water Company, the former from Vreeland's lake, and the latter from Passaic river, above Passaic bridge, at Paterson. Sewers have been built in almost all the streets and all buildings have been or are being connected with them, cesspools being done away with. It is the Waring system. A public park has been purchased during the year. We have six public schools, but they are crowded, especially in the Fourth ward, the Board of Education having to hire halls for its use till the addition can be completed. The city, during the year, has bought a farm of ten acres, including a building which stood on it, for a poor-farm. Garbage and excreta, taken out of the city, are used by the farmers. Market inspection has been provided by the Board. Placarding houses in which contagious

diseases exist has been adopted. Public health laws and regulations are regulated by city ordinances. Quarantine over contagious diseases is promptly attended to.

JOHN H. BOWKER,
Secretary.

POMPTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. J. C. Morgan, Pompton; Lemuel Van Nees, Assessor, Pompton; Daniel A. White, Erskine; John J. Sisco, Butler; Silas Mead, Bloomingdale.

There have been no cases to require any action of the Health Board, and ordinances have been passed.

LEMUEL VAN NEES,
Assessor.

WAYNE TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George R. Berdan, Chairman, Mountain View; G. G. Jeffries, Mountain View; David F. Duncan, Paterson; John G Merselis, Paterson.

Good and abundant water is obtained from wells and springs. Refuse is mixed with the soil and used as a fertilizer. There are but two very small slaughter-houses in the township and they are properly taken care of. There are five school buildings, four of wood and one of concrete. All are in good condition. There is one burying-ground in the township, which is well cared for. It has not been necessary for our Board to do anything except to organize.

WEST MILFORD TOWNSHIP.

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

Joseph Henion, Echo Lake; David Vanderhoof, Oak Ridge; Sylvanus Gregory, West Milford. Joseph H. Schulster, Assessor, Echo Lake.

SALEM COUNTY.

ALLOWAY TOWNSHIP.

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

Richard Banks, Alloway; Daniel D. Hitchner, Cohansey; William Sickler, Yorktown; J. F. Ayers, Alloway; W. L. Ewen, M.D, Alloway.

Scarlet fever is existing at present, but not many cases. The members do not take much interest in these matters.

J. F. AYERS,
Assessor.

ELK TOWNSHIP.

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

Benj. Ferrill, Glassboro; Wm. Hamilton, Unionville; George Ulmer, Unionville; Kiersey Morgan, Assessor.

ELSINBORO TOWNSHIP.

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

A. Smith Reeves; Joseph B. Crispin, Samuel P. Smith, James W. Smith. Post-office address of all, Salem.

LOWER ALLOWAY CREEK TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Hood, Canton; Joseph Beaston, Harmersville; Wadington B. Ridgway, Hancock's Bridge; Dr. F. B. Harris, Canton; Mark T. Hilliard, Assessor, Hancock's Bridge; Dr. W. Scott Smith.

LOWER PENNS NECK TOWNSHIP.

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

Charles Lindsey, Salem; Charles Powers, Pennsville; Richard D. Batten, Pennsville. Ephraim Fowler, Assessor, Pennsville.

MANNINGTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David S. Fogg, Barclay Griscom, E. Smith Bassett, William H. Acton. Post-office address of all, Salem.

Township is supplied with water by wells and cisterns. Cellars mostly dry and used for storage. Very few houses are occupied by more than one family. No yearly house-to-house inspection. Cesspools mostly built with open bottoms; contents used for fertilizer. No sickness more than usual.

OLDMANS TOWNSHIP.

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

William F. Hunt, Assessor, Pedricktown; Frank Galventa, Pedricktown; Samuel Stanley, Pedricktown; Jacob J. Hunt, Auburn; Harry T. Johnson, M.D., Pedricktown.

PILESGROVE TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John G. Borton, Woodstown; George B. Grier, Woodstown; Charles Richman, Sharptown. C. H. Richman, Assessor, Woodstown. P. G. Sowder, M.D., Woodstown.

Have had no prevalent diseases among animals during the past year. Slaughter-houses in the township are kept in good condition and there have been no complaints in reference to them. We have had some complaints against several canning factories, owing to the custom of dumping refuse on exposed places, causing offensive odors. We have had a number of cases of scarlet fever. Have had no business of importance before the Board. General health of the township good.

C. H. RICHMAN,
Assessor.

PITTSGROVE TOWNSHIP.

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

R. M. Hitchner, Elmer; W. W. Golden, Centreton; J. M. Clark, Norma; J. W. Golden, Centreton.

There is nothing to report. The general health of the township has been good. The Board of Health has not been called together for any purpose.

J. W. GOLDEN,
Assessor.

QUINTON TOWNSHIP.

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

John F. Anderson, Chairman, Quinton; Dr. William T. Good, Quinton; C. L. Smith, Quinton; John G. Towsend, Quinton; Gilbert A. Ayers, Shiloh.

There are at the present time several cases of typhoid fever in the township, but the trouble has probably been caused by the hot and dry weather. It seems to be due I think in part to the drinking-water, for all the wells are surface-wells and there has always been sickness when they run low.

JOHN F. ANDERSON,
Assessor.

SALEM CITY.

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

Zaccheus B. Sickles, Clinton Bowen, Edwin Chew, Thomas Hewes, Josiah Wistar, C. M. Sherron, M.D., Harry Morrison. William Carney, Inspector. Post-office address of all, Salem.

We regret to say that the quality of the water furnished by the city pipes is not improved and is not considered fit for drinking purposes, except in winter. During the last year about 3,900 feet of sewer has been laid, consisting of eight and ten-inch terra-cotta pipe and provided with inspection openings and an automatic flush-tank at the head of the line. Numerous house-connections have already

been made with it, and it is regarded as another step in the direction of improved drainage. Some difficulty has been experienced during the year in having the excreta satisfactorily removed and cared for. We think that the proper plan is to have one or more persons licensed by the Board for this purpose. During the past few months the disease known as hog cholera has again made its appearance and many hogs have died from its effect, though no cause can be assigned for its existence. To have hog-pens kept in the proper condition during the hot months is one of the difficulties our Health Inspector has to contend with, and so long as hogs are allowed to be kept within the city limits this difficulty will continue. A large and well-organized building for the use of the public school has recently been completed, in which one of Smead & Willis' patent ventilating arrangements was placed. This is the second public school building in our city provided with this system. A sanitary code was adopted in 1882, to which additions have since been occasionally made. The general health of the city has been good, though at this time several mild cases of scarlet fever and a few of diphtheria are said to exist.

JOSIAH WISTAR,
Secretary.

UPPER PENNS NECK TOWNSHIP.

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

John M. Bevis, Joseph Sailor, Edward E. Smith, Dr. David Moore; Amos Norris, Secretary. Post-office address of all, Pennsgrove.

Water-supply by wells; some of it hard and not very good, sometimes discolored and a scum rises on it. As to drainage, it is very poor; some little improvement made every year. Prevalent diseases during the year have been malaria and remittent fever. There have been several complaints made to the Health Board of hog-pens, water-closets and stagnant pools. The Board was compelled to serve written notices on several parties to clean up their places, which some did, while others paid little attention to it. It seems as though the people have to be educated to respect the health laws, while some have to be driven to it. The Health Board is trying to get the people to keep things in proper condition without forcing them to it.

AMOS MORRIS,
Secretary.

UPPER PITTSGROVE TOWNSHIP.

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

Micajah B. Casseday, Elmer; Henry Coombs, Elmer; Hiram W. Smith, Whig Lane; M. J. Paulding, M.D., Daretown; Joseph N. Gray, Secretary, Pittsgrove.

The township has been remarkably free from any prevalent disease this year, and there have been no losses among animals. The Board of Health of the township organized in April, but no matter has been brought to their attention since organization.

JOSEPH N. GRAY,
Assessor.

SOMERSET COUNTY.

BEDMINSTER TOWNSHIP.

NAME AND POST-OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Randolph Davenport, Pluckamin; Erastus Randall, Pluckamin; Lewis Van Dorn, Peapack; E. F. Fawn, Gladstone; William P. Sutphin, Bedminister.

The health of the township has been generally good during the year. Scarlet fever prevailed in Peapack, Pluckamin and Bedminster. The advice of the Board and the physician was willingly and promptly concurred in, the quarantine observed and the spread of the disease was checked. The Board have found in all cases, when called upon, a ready compliance to their demands upon the part of those of whom complaints were made.

BERNARDS TOWNSHIP.

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

Malcom Thompson, Bernardsville; James E. Ballentine, Bernardsville; Freeman Stelle, Millington; John Layton, Liberty; Dr. A. F. Voorhees, Basking Ridge. Robert Hanna, Bernardsville, Inspector.

The Board has been called in session twice this year, once on account of carcasses being left unburied and once on account of some outbuildings needing attention. The nuisances were promptly abated. No epidemics prevailed during the year. We consider our township in good sanitary condition. A. F. VOORHEES, M.D.

BRANCHBURG TOWNSHIP.

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

Theo. Starner, North Branch; Ellsworth Brokaw, South Branch; Adonis Nelson, Neshanic; John N. Van Liew, Neshanic; William H. Dolliver, Neshanic.

No prevalent diseases during the year. This is a rural district and a healthy portion of the State, owing to high elevation and fresh running water. No complaints have been made to the Board.

E. BROKAW,
Secretary.

BRIDGEWATER TOWNSHIP.

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

A. H. Brokaw, Somerville; Wm. K. Hope, Raritan; A. L. Stillwell, M.D., Somerville; John H. Pattison, Bound Brook; C. L. Voorhees, Bound Brook.

Sewers have been built in Somerville, which are very satisfactory. A new male building is being constructed at the poor-farm. Bound Brook is now a separate borough. The health of the township is excellent.

C. L. VOORHEES,
Secretary.

FRANKLIN TOWNSHIP.

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

T. R. Hodge, Chairman, South Bound Brook; L. J. Suydam, Franklin Park; John L. Totten, Middlebush; J. W. Voorhees, East Millstone.

The Township Committee regularly organize as a Board of Health. Complaint being made to the Board as to a nuisance at East Mill-

stone, the parties in charge were duly notified and the nuisance abated at once. September 22d a complaint was made to the Board of several places in South Bound Brook where a nuisance was being caused by badly-kept hog and cattle-pens. The Board ordered all parties to clean up and abate the nuisances, which was promptly done.

T. R. HODGE,
Chairman.

HILLSBOROUGH TOWNSHIP.

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

Dr. William Merrell, South Branch; Peter J. Quick, South Branch; Joseph H. Van Clief, Hillsborough; John W. Oakey, Blackwell's Mills. George H. Miller, Inspector, Somerville.

Cellars mostly dry. No prevalent diseases this year. Almshouse inspected once a year; in good condition. We have made a thorough examination of the Slater House ponds and cesspools, and every place that would be likely to produce disease, and have found everything in good condition.

JOHN W. OAKEY,
Assessor.

MONTGOMERY TOWNSHIP.

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

Isaac Williamson, Rocky Hill; Jacob S. Hoagland, Harlingen; Stephen S. Voorhees, Blawenburg; Abram B. Mosher, Griggstown. William Oppie, Assessor, Harlingen.

During the summer I personally visited every house in the township, and I must say with few exceptions they are kept clean. We have three slaughter-houses in the township, which are neatly kept. The general health of the township has been good, no contagious diseases having prevailed.

NORTH PLAINFIELD BOROUGH AND TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Rev T. Logan Murphy, William E Honeyman, P. M French, B. S. Brader; J. H. Carman, M D., Secretary. Post office address of all, Plainfield.

Aside from an epidemic of measles which prevailed very generally in the spring, whole families, in some instances, being stricken at the same time, North Plainfield has enjoyed a healthy year. A threatened outbreak of diphtheria was averted in April by a strict quarantine and thorough fumigation of the premises where the disease occurred. In this instance the contagion was brought from New York, by a mother who had been nursing two of her grandchidren, both of whom died, and conveyed to her daughter, who also succumbed to the poison. As foretold in my last year's report, the borough is well lighted by electricity, and a system of water-supply which will give us pure water and adequate fire protection is being pushed rapidly to completion. In fact, we may now be said to have a water-supply, as the water is turned on in most of our streets, and not a few houses have made connection therewith.

J. H. CARMAN, M.D.,
Secretary.

WARREN TOWNSHIP.

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

No report received.

SUSSEX COUNTY.

ANDOVER TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Levi N. Space, Chairman, Newton; Charles Gardner, Secretary, Andover; George O. Young, Treasurer, Andover; J. C. Clark, M.D., Andover. Green C. Cook, Assessor, Andover.

Principal water-supply for domestic uses obtained from wells and springs. No contagious diseases, no losses of animals, during the last year. General health throughout our township is good. No slaughter-house nuisances. No ordinances passed.

G. C. COOK,
Assessor.

BYRAM TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John D. Lawrence, Chairman, Stanhope; Robert Slaght, Stanhope; David Stone, Andover. D. W. Goble, Assessor, Andover. C. H. Davisson, Inspector, Stanhope.

The water-supply is mostly from springs and wells. All impregnated more or less with iron. Two new school-houses have been built, and one repaired, and there will be now but one old school-house left in the township. Public health laws well observed. We have appointed a medical member to look after the sanitary condition of our township.

FRANKFORD TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Oscar Northrup, Jacob A. Coursen, J. C. Price, M.D., Geo. Phillips, Assessor; E. S. Dalrymple, M.D. Post-office address of all, Branchville.

The Board found the two slaughter-houses situated within the village of Branchville in a condition detrimental to the citizens. These were ordered removed beyond the limits of the town, and their former sites thoroughly disinfected.

GREEN TOWNSHIP.

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

David B. Stackhouse, Chairman; G. L. Laing, Tranquility; William C. Gray, Huntsburg.

HAMPTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John S Coursen, Newton; Abram S. Morris, Newton; Andrew J. Williams, Baleville; Moses Ackerson, Halsey.

There are but few cesspools, and those that do exist are built with open bottoms and have never been emptied. There have been no prevalent diseases. Our township is thinly populated and is very healthy. There has been nothing for our board to do during the year.

HARDYSTON TOWNSHIP.

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

John A. Paulison, Stockholm; Obadiah Bunn, Hamburg; Daniel D. Munson, Franklin Furnace. Horace E. Rude, Assessor, Hamburg.

General good health has prevailed throughout the township during the year. No complaints have been made, and nothing has come to the attention of our Board. But the increase of our population and manufacturing interests will soon make it necessary to have a more careful oversight of the public health.

HORACE E. RUDE,
Assessor.

LAFAYETTE TOWNSHIP.

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

Samuel Warbasse, Lafayette; John M. Hull, Lafayette; William R. Coal, Beaver Run; Nelson Ackerson, Lafayette.

MONTAGUE TOWNSHIP.

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

Joshua Cole, Montague; Joseph S. Hornbeck, Montague; Santford Nearpass, Tri-States, New York. William P. Hornbeck, Assessor, Montague.

There have been no special meetings of the Board the past year, it having been a year of universal good health. There have been no complaints.

WILLIAM P. HORNBECK,
Assessor.

NEWTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. B. Brickner, Chas. S. Steele, Patrick Devaney. George Hardin, Assessor. Post-office address of all, Newton.

SANDYSTON TOWNSHIP.

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

No report received.

SPARTA TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edgar Munson, Assessor, Sparta; T. H. Andress, M.D., Sparta; J. T. Dolan, Ogdenburg; J. H. Sutton, Monroe; C. H. Beatty, Sparta.

STILLWATER TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jesse Sherrad, Swartswood; David R. Swayze, Fredon; Obadiah Van Horn, Stillwater; John L. Updike, Stillwater; C. V. Moore, M.D., Stillwater.

No diseases of animals have occurred during the past year. As physician of the Board, I would report the continued good health and exemption from any prevalent disease among our inhabitants during the past year.

C. V. MOORE, M.D.

VERNON TOWNSHIP.

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

Dr. Carlos Allen, Vernon; A. S. Blanchard, Vernon; A. P. Shaw, Vernon; S. C. Wright, McAfee Valley.

WALPACK TOWNSHIP.

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

Elijah Gariss, Flatbrookville; Nathaniel Van Auken, Flatbrookville; Emmet H. Bell, Walpack.

WANTAGE TOWNSHIP.

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

Jonathan Coykendall, Jacob Swartwout, F. V. K. McCoy; Dr. Vangarsbeck, Physician; Newman Hall. Post-office address of all, Deckertown.

The health of the people in the township has been remarkably good for the past year. There have been no epidemics, and no contagious diseases, either among horses or cattle. The population being rural, there seems to be nothing to do except to abate a few nuisances. Our Board organized but has not passed ordinances.

N. HALL,
Assessor.

UNION COUNTY.

CLARK TOWNSHIP.

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

John A. Haliday, Marx Reufel, Andrew Gobson, Dr. W. E. Cladek; F. P. Bullman, Secretary. Post office address of all, Rahway.

CRANFORD TOWNSHIP.

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

No report received.

ELIZABETH CITY.

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

John W. Whelan, President; James J. Manning, Secretary; Dr. William A. M. Mack; Dr. James S. Green, Jr., Physician; William Birnie, Jr., John J. Donahue, E. G. Putman, Inspector. Post-office address of all, Elizabeth.

Inside water-closets removed and placed outside in the public high-school. The crematory process has been substituted in public schools Nos. 3 and 4, in place of inside closets. There will soon be sewers constructed in Pine and Bond streets. I have caused the foul gutters in said streets to be flushed by water from hydrants when practicable, and this has afforded temporary relief at a very small outlay. The condition of the Elizabeth river has been very much improved. At and above West Jersey street, streets and gutters have been kept in better condition than usual. Very many residents are now using city water in preference to water from wells. I have analyzed water from many suspected wells, and in some cases have ordered the wells closed; in others a thorough cleaning has removed the source of foulness. Number of cases of contagious and infectious diseases reported for the year: Diphtheria, 57; scarlet fever, 53; measles, 29; typhoid fever, 8; typhus fever, 1; whooping-cough, 2; chicken-pox, 1.

E. G. PUTMAN,
Inspector.

FANWOOD TOWNSHIP.

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

Hon. George Hyte, Fanwood; L. W. Miller, Scotch Plains; William Terry, Plainfield; John Robison, Scotch Plains; F. W. Westcott, Scotch Plains.

Water-supply from wells and cisterns. At Fanwood about twenty-five houses are furnished with water from the Fanwood Water-Supply Company. This supply is obtained from driven wells and proves to be an excellent quality of water in every way. The usual water-level is such as to secure dry cellars. Most of the swamps are properly cared for, and we have very little malaria. We have no system of sewerage. In a part of the township cesspools are not cemented, but laid up with loose stone. In Fanwood they are cemented and most every house has two or three connected with each other. They are emptied as often as it is necessary. We have had no prevalent disease this year, except la grippe, and that in a mild form. We have no slaughter-houses in our town. We have no ordinances. The Board meets each month. We have had no trouble this year, as each case reported to the Board has been attended to in a satisfactory way. I am glad to say that the people are each year

growing to look on the work of the Local Board in a very friendly way, and seem anxious to obey the laws and rules as laid down. We have so far only to request and every nuisance is promptly abated.

F. W. WESTCOTT,
Secretary.

LINDEN BOROUGH.

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

Edward Grileger, Rev. Oscar Gesner, Hon. Ferdinand Blancke, Ernest A. Knopf, Mr. Rue, John A. Ethridge. Milton C. Loudon, Inspector. Post-office address of all, Linden.

I have the pleasure of reporting that the past year has been one of unusual good health. No cases of contagious disease.

JOHN A. ETHRIDGE,
Assessor.

LINDEN TOWNSHIP.

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

John W. Metz, Chairman, Tremley; John P. Winans, Tremley; Jacob M. Winans, Linden; William F. Donaldson, Linden; George A. Benwell, Linden; John F. Spinning, Elizabeth; Moses W. Mulford, Elizabeth; Dr. Henry C. Pierson, Inspector, Roselle; Philip Shangle, Roselle.

The past year throughout the township has been one of unusual good health. Three or four cases of scarlet fever have occurred of a very mild form, and through the timely and prompt action of the parents and the use of disinfectants, the disease was kept from spreading.

JOHN A. ETHRIDGE,
Assessor.

NEW PROVIDENCE TOWNSHIP.

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

John M Badgley, New Providence; Samuel R. Valentine, New Providence; Lewis Bergmiller, Berkeley Heights. A. M. Cory, M.D., Inspector, New Providence.

The health of the community has been excellent during the year, excepting the prevalence of la grippe, to some extent, during the winter and spring. Health ordinances have not been passed.

A. M. CORY, M.D.,
Inspector.

PLAINFIELD CITY.

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

George W. Rockfellow, President; Lemuel W. Serrell, Stephen A. Ginna, George W. Endicott, M.D. Oliver B. Leonard, Secretary. Post-office address of all, Plainfield.

The water is obtained from twenty driven wells, reaching to the underground sources of supply, and the supply is about 2,500,000 gallons per day if required. At present but a limited number of house-takers have availed themselves of its advantages. The character of the water is excellent. The year just closed has witnessed a quiet but continuous work by the Board in looking after the healthfulness of Plainfield. The Health Inspector has reported 495 personal inspections of different properties, and 100 mandatory notices, for the removal of nuisances, have been served. During this time 460 cesspools have been emptied and 346 vaults cleaned. The collection of kitchen garbage is attended to by regularly-licensed persons, often enough every week to prevent any accumulation. In these ways and many others the Board has endeavored to promote a fair degree of healthfulness by averting the causes of preventable diseases. It is a pleasure to be able to report another year of good health, notwithstanding the great amount of upturning of fresh earth for laying water-mains, &c., and the excessive moisture of oversprinkling. The number of cases of sickness has been smaller this year than any recent year.

OLIVER B. LEONARD,
Secretary.

RAHWAY CITY.

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

Elihu B. Silvers, M.D., President; John M. Tufts, M. H. Acken, W. E. Cladek, M.D. Charles H. Lambert, Inspector. Post office address of all, Rahway.

The health of the city has been exceptionally good. There have been more complaints in regard to small nuisances this year than usual, but they have been abated without difficulty.

CHARLES H. LAMBERT,
Inspector.

SPRINGFIELD TOWNSHIP.

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

C. Cox, Abner P. Stikes, Albert P. Carter, J. J. Huff. T. G. Cusack, M.D., Inspector. Post-office address of all, Springfield.

Our Health Board has been active and prompt in performing its duties, although not having any case of a bad nature to contend with. Several small nuisances have been abated without any trouble. We have had very little sickness during the past summer. Some of the ponds in the township have been drained. We have held monthly meetings during the summer. No contagious diseases have been reported.

F. G. CUSACK, M.D.,
Inspector.

SUMMIT TOWNSHIP.

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

Parker W. Page, James H. Kelly, John A. Hicks; William H. Risk, Physician; John W. Hughes, Assessor; J. J. Lane, Secretary. Post-office address of all, Summit.

The water-supply is controlled by a private company. About two hundred and fifty connections have been made with the mains. When necessary the water comes from driven wells. The new sewer system is being introduced. The Board has rigidly enforced the ordinances and has had very few complaints. There have been no prevalent diseases.

UNION TOWNSHIP.

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

James B. Woodruff, Roselle; John Leonard, Union; William A. Allen, Hilton; D. Hobart Sayre, Union.

But very few complaints have been made, and these were acted upon either by committee or the Board, or, when the case seemed to warrant it, by the whole Board. Where nuisances existed, parties were notified to abate the same. Our requests were always kindly received and acted upon, and we have never been compelled to enforce any penalties.

D. HOBART SAYRE,
Secretary.

WESTFIELD TOWNSHIP.

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

Chas. C. Endicott, N. B. Gardner, A. S. Clark, Jos. B. Harrison, M.D., John M. C. Marsh, Secretary.

Our Board holds regular meetings and is in good working order. Have had no contagious diseases to contend with the past year.

J. M. C. MARSH,
Secretary.

WARREN COUNTY.

ALLAMUCHY TOWNSHIP.

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

Alfred Buckley, S. H. Drake, Mathias Hibler. E. J. Hardin, Assessor. Address of all, Allamuchy.

We have had no prevalent diseases this year. Our Board of Health has never organized.

E. J. HARDIN,
Assessor.

BELVIDERE TOWN.

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

George A. Augh, P. S. Yetter, Simon Wade, Leo Rehner, Geo. Lommarson, J. Treator, Frank Joiner. Post-office address of all, Belvidere.

BLAIRSTOWN TOWNSHIP.

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

John I. Blair, Blairstown; Jacob A. Smith, Blairstown; Samuel Linaberry, Walnut Valley.

Our Board of Health has never regularly organized, but the health of the township is good and we have a good public water-supply.

JOHN C. JOHNSON, M.D.

FRANKLIN TOWNSHIP.

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

William Pursel, New Village; Albert C. Metler, Broadway; Marshall Hoffman, Asbury; William Vliet, Assessor, Franklin.

FRELINGHUYSEN TOWNSHIP.

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

John Stickler, Johnsonburg; John V. Allen, Marksboro; Reed Kerr, Johnsonburg; W. H. Ackerson; Johnsonburg; Frederick Rorback, M.D., Johnsonburg.

Our water-supply is taken from wells and springs. The water-level is such that we have very dry cellars. The past year has been a very healthy one, and there have been no prevalent diseases.

W. H. ACKERSON,
Assessor.

GREENWICH TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

A. P. Kinney, President, Stewartsville; Philip Hance, Bloomsbury; Robert I. Smith, Treasurer, Bloomsbury; Enos E. B. Beatty, M.D., Stewartsville; William Sherer, Secretary, Bloomsbury.

The Board has passed a code of ordinances within the last year. No prevalent diseases reported. There was complaint made to the

Board of a foul odor arising from a hog-pen and cow-stable situated in the village of Stewartsville. The Board was called to view the premises but found everything cleaned up. Served notice on parties to the effect that hereafter the said premises must be kept in a healthy condition or that they would suffer the penalty for any negleet.

WILLIAM SHERER,
Secretary.

HACKETTSTOWN TOWNSHIP.

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

A. H. Dellickie, G. W. Smith, James Tomblyn, Wallace Taylor, Dr. J. S. Cook, Dr. A E. Martin, A. W. Cutler. J. M. Everett, Inspector. Post-office address of all, Hackettstown.

There have been no prevalent diseases during the year. Our water-supply is first-class; could not be better. There has not been much for our Health Board to do this year.

THOMAS NOLAN,
Clerk.

HARDWICK TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

No report received.

HARMONY TOWNSHIP.

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

James W. Dewitt; Henry Metz, Harmony; Ralph Rush, Montana; J. D. De Witt, M.D., Harmony.

No prevalent diseases during the year. Public health good. School-houses are new and comfortable. Vaccination is neglected. Nothing special to report.

J. D. DE WITT.

HOPE TOWNSHIP.

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

George G. Depue, Henry Aten, John Parke, John Miller, M.D. R. M. Van Horn, Assessor. Post-office address of all, Hope.

INDEPENDENCE TOWNSHIP.

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

James F. Johnson, Hackettstown; Andrew Ayers, Hackettstown; A. D. Simanton, Vienna.

KNOWLTON TOWNSHIP.

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

William B. Moore, Columbia; John Albertson, Delaware; G. M. McCracken, Polkville; Ephraim Dietrich, Columbia; Robert Bond, M.D., Knowlton.

Swamps are common, but there is no malaria to speak of. Most of the people depend upon wells. Water is frequently hard. There have been no prevalent diseases this year. The Board has passed ordinances. There are no slaughter-houses in the township. Vaccination sadly neglected in the township. It has been an exceptionally healthy year; no epidemic has occurred here.

ROBERT BOND, M.D.,
Inspector.

LOPATCONG TOWNSHIP.

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

John H. Amey, President; G. G. Dewitt, Ed. H. Paulus, Robert Barker, M.D., Physician; Rowland Firth, Secretary. Post-office address of all, Phillipsburg.

Wells and cisterns depended upon for water. Conformation of the land is hilly. Population, 2,000. Climate mild. One small slaughter-house located in the township; no complaint therefrom.

Ordinary schools and buildings cared for. There has been no necessity for special organization. We have simply organized in compliance with the law.

ROWLAND FIRTH,
Secretary.

MANSFIELD TOWNSHIP.

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

Nicholas Martenis, Port Murray; William H. Thompson, Beattystown; Edward S. Morlatt, Karrsville. James Beatty, Assessor, Stephensburg.

OXFORD TOWNSHIP.

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

John H. Hildebrant, Belvidere; William Miller, Jr., Oxford Furnace; George A. Wildrick, Oxford Furnace; Charles Wiseburn, Assessor, Oxford Furnace; L. B. Hoagland, M.D., Oxford Furnace.

We have no sewers. Cesspools not cemented; instead of emptying them when necessary, they are generally filled up and a new one dug. There have been no prevalent diseases. There has been but little for the Board to do during the past year, except to look after and correct some minor nuisances.

L. B. HOAGLAND, M.D.,
Secretary.

PAHAQUARRY TOWNSHIP.

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

John Zimmerman, Calno; Moses M. Depue, Calno; Adam Gransue, Dunfield. Jason K. Hill, Assessor, Millbrook.

PHILLIPSBURG CITY.

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

Otto Rehfuss, Inspector; Dr. A. P. Jacoby; C. D. McClary, President; Isaac Miller, John Warner, William H. Carey. Post-office address of all, Phillipsburg.

The water is supplied by a private company; the supply is taken from the Delaware river. About 800 houses take it. The supply is very satisfactory. Seventy-five per cent. of the population use cisterns. We have a partial system of sewerage, constructed in 1889. Length of sewers, 3,500 feet; grade, one to the hundred. There are only a few houses that have made connections with this system, about fifteen in all. We have had a few cases of scarlet fever and of diphtheria. There is a register kept of persons keeping animals within the city limits. No ordinances passed. The Board has done nothing the past year, except to look after the streets and gutters, &c. There has been some neglect on the part of physicians in reporting contagious diseases.

F. NIEDLER,
Clerk.

POHATCONG TOWNSHIP.

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

Marshall Hawk, Assessor, Shimers; George Snyder, Reigelsville; Charles Shirer, Shimers; William Case, Shimers.

WASHINGTON TOWNSHIP.

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

George Wycoff, Port Colden; John P. Castney, Changewater; Peter Wellen, New Hampton; William Miller, New Hampton; Thomas Martin, Washington.

Fortunately for us all, there has been very little sickness during the past year with no contagious diseases, except measles in a light form.

WILLIAM MILLER,
Secretary.

CIRCULARS AND LAWS.

CIRCULARS.

The Board has forty circulars on its permanent list. These either give the general or special health laws of the State, or present in brief form the most important facts of sanitary information. They are widely distributed through the State and are often called for by Local Boards or individuals, when some epidemic is prevailing. They present almost every subject of special importance to the health interests of the people.

During the year the whole series has been carefully reviewed, in order that these guides may be kept abreast with the advance of sanitary knowledge and administration. In co-operation with the State Superintendent of Schools, Circular 54 has been sent to each school district of the State and most valuable facts are secured. Experience has shown that the necessity of stating in detail actual conditions, leads to the correction of many evils. Circular 75, Health Inspectors' Guide, is found of much service. Two new circulars, 76 and 77, have been issued, the first on Communicable Diseases in Schools, and the second on Diphtheria. They have been distributed with thoroughness through the State. The bound "Book of Circulars" is in the hands of most Boards of Health and some others, who thereby become more fully informed as to health needs.

A new edition of the circular on institutional inquiry is also ready, and will add much in systematizing this division of our work. We herewith publish the two circulars named and commend them to the special attention of teachers and physicians.

CIRCULAR LXXVI.

OF THE

NEW JERSEY STATE BOARD OF HEALTH.

(School Circular No. 4.)

PROTECTION OF SCHOOLS FROM COMMUNICABLE DISEASES—METHODS TO BE OBSERVED WHEN THEY OCCUR.

One of the most disturbing factors that can occur in reference to the health and education of children is the outbreak of a contagious disease in a school. If it is in a public school or one in which the children board at home, the effect often is to spread over a whole city or community a disease which was confined to a single family or one little portion of a village or town. If it is a school made up of boarders and day scholars, many perplexing questions arise as to the separation of the two or the disposition to be made of the scholars individually or as a class. If it is a boarding-school there are the disadvantages and anxieties connected with the sickness of children away from their parents or the breaking up of the school for a time, thus not only disarranging the course of study, but often carrying contagious disease in public conveyances to cities, villages and hamlets where it is not prevalent. This Board has often been called into private consultation in these emergencies both in public and private schools, and too often where the disease has been illy managed so far as methods for the prevention of its spread were concerned. The design of this brief article is to indicate our present views on this subject.

Hygiene is first of all a preventive art, and so the first point is *how to prevent* the occurrence of contagious disease in schools as well as in case of occurrence to confer upon it as mild a type as possible. To this end there must be, *first* of all, the most thorough attention to buildings and surroundings and to all those details as to cleanliness, heating, ventilation and care which are included in thorough sanitary arrangements and good housekeeping. Strange as it may seem, no class of buildings suffer so much for the lack of thorough *housekeeping* as colleges, select schools, public schools and boarding-schools.

It is not necessary here to enumerate all the details included under this heading.

Second. There must be close attention to the individual. In assemblages from so many homes of different grade and locality and of persons of various habits, there is need of special knowledge as to the cleanliness of each scholar and sometimes of the teachers. The hair and the hands need special watchfulness. Schools, in their first assemblage in September, are often disturbed by the occurrence of diseases after a couple of weeks, because pupils, just gathered in from what is too often the unsystematic life of vacation and from various unusual exposures, develop fevers or prevalent diseases.

A foul mouth, uncleansed teeth and a foul breath are often a cause of disease. We have great diffidence in interfering with any expression of affection, yet a kiss on the lips is not always a sanitary act. A plain talk on "Mouth Cleansing and a Sweet Breath" is seasonable in an opening term.

The same is true as to all spittle. It is probable that not only diphtheria but other forms of sore throat are communicated by dried particles therefrom. The same is true as to most of the eruptive diseases and as to whooping-cough. It is now claimed that consumption and even pneumonia may be communicated to susceptible persons in this way. School children should be forbidden to spit on the floor. Girls do live without it, and boys ought to. One or two spittoons with water in should be allowed in each school-room, to which those should be allowed to go who have to spit. They must be cleansed each day.

Uncleansed finger-nails often carry particles of contagious matter.

Third. Were I the conductor of any form of boarding-school I would, five days previous to the school opening, forward to each parent a request to send the following facts as to the pupil to be entered:

I. What children's diseases has the pupil had?

II. Has he within two weeks been exposed to any contagious disease, and if so, what?

III. Has he been vaccinated, and if so, when?

IV. Have you any information to give as to his general health or as to any particular tendencies to be guarded against?

V. If the pupil on any visit home is exposed to any contagious disease, be so kind as to acquaint us of the fact.

VI. In sending clothing or other articles to the pupil, be sure that these shall not come from any room or locality in which there has been exposure to contagion.

The Principal should arrange all ascertained facts in a table, so as to be able to make ready reference as to each scholar.

We believe all parents will appreciate such precautions and inquiries. Although the Principal must not be excessive in his particularity, it is due the school that he be in possession of such facts, and use them as needed.

The plan of physical examination and inquiry as to each pupil at the beginning of each term, and a record thereof as now made in some institutions, is an excellent one.

As to day scholars in public schools, it seems to us proper that a notice, in some form, be given to each parent, that scholars are not to be sent at the opening of the term from houses in which there is contagious disease, except with the consent of the physician, and that they are to be kept at home in any outbreak of disease unless the physician regards their attendance as safe. It is always to be remembered that disease is spread more by mild cases than by those confined to a room.

Where no physician is employed the parent should refer to the teacher the question as to when return to the school is permissible. With clean clothing, thorough bathing and proper habits of cleanliness, return is allowable from some homes much sooner than from others. At times when any special, communicable disease is very prevalent in any town, the teacher should be especially but quietly watchful as to the physical condition of the pupils, and excuse any from attendance who seem to be not as well as usual. In a boarding-school, as a rule, a pupil should be put in his room and to bed, if having a chill or severe headache and general aching, or sickness of stomach and fever, or sore throat, so that the teacher may see if it passes over in a few hours, or send for a physician. Day scholars, if complaining of illness, should be allowed to sit separately or in an ante-room, when they cannot be at once sent home. If not returning to school for two or three days, the cause should be known.

It is a delicate and difficult matter to have proper precaution and yet avoid the kind of inquiry and anxiety which too often disarranges a school or suspends it unadvisedly. This, like other judgment and tact, is acquired by experience, guided by knowledge. Constant vigilance is necessary, and must be exercised.

Fourth. The serious question now comes: What is to be done when a case of contagious disease occurs?

Action will be different in different cases and in different diseases. Here are some of the general rules by which we have been guided with success in several instances:

(*a*) If the case has been early separated, vacate adjacent rooms, and assign a care-taker who does not mingle with others In due time apprise the parents of the real facts, and give to them the judgment of the physician and yourself as to the best course, leaving them to do as they think best, although not forgetting that they must not do anything to expose others.

(*b*) All of our colleges and larger schools should have a hospital building, or at least somehow it should be possible to thoroughly isolate real or suspected cases of communicable disease. We have several times prevented the adjournment of a school by early and proper precautions of isolation, and had no extension of the disease. It is often at least safe to wait and see whether a first case has communicated disease to others. It is always wise to avoid panic, and, what is more common, that state of anxiety which unsettles a school.

(*c*) Much depends upon what the disease is.

If it is measles, avoid exposing others, but, as a rule, continue the school. So as to whooping-cough. If it is small-pox, require at once each pupil to be vaccinated. If this is done within two days from first symptoms, it would not occur to us to disband a school on account of a case of small-pox.

Scarlet fever depends very much upon the type and number exposed, so that a physician, aided perhaps by a competent Health Inspector, may determine what action is needed. The teacher should know which of the pupils have already had it. As to diphtheria, the decision is often more complicated.

We easily connect the contagion of several other diseases with the breath, the eruption or the shedding of scarf skin, but the cause of diphtheria is less defined, and it often seems obscure and to cling to localities. Where a case of *diphtheria is positively made out* as distinct from follicular tonsilitis, or some other less specific form of throat disease, careful isolation will often prevent spread. If, however, there is any indication of spread, in our judgment both public

and private schools are more appropriately adjourned for two weeks on account of this than for any other of the ordinary communicable diseases.

One great design of the adjournment is the most thorough and radical house-cleaning and disinfection of premises.

Where a case of diphtheria or scarlet fever can be shown to have been brought to a school there is more probability that the case will not be followed by others.

(*d*) Diseases of the eyes, especially if there is the least possible secretion of pus, are often contagious. Hence, any pupil having inflamed eyelids or eyes should at once receive attention and have a physician's certificate that there is no risk to others therefrom. Many skin diseases are communicable.

Where there is a prompt notification of contagious diseases, and prompt attention on the part of teachers, physicians and Sanitary Inspectors to first cases of diseases in their first stages, we are more and more learning the probability of preventing the multiplication of cases by prompt and precise isolation, and so saving the necessity of disruptive methods.

We almost hesitate to state how often, under strict management, we have known small-pox, scarlet fever, measles and diphtheria not to spread, lest some, imitating exact methods by half methods, should not secure all the details of isolation, and then regret that the school had not been disbanded.

Each case of communicable disease in a school is to be considered by itself in all its details as related to facts of exposure, possibilities of isolation, and what is involved in continuance of school or dismissal.

If so considered by judicious Principals and wise physicians and experienced sanitarians, errors in action will be made much less frequently. Only there must be promptness.

We herewith give a table of details as to the time of communicability of several diseases, after that just furnished by Dr. Whittelegge, which differs little from the one by Dr. F. Vacher, as found in the 11th Report of this Board, and which we also add:

	Quarantine to be required after exposure to infection.	Earliest date of return to school after an attack.
Small-pox	18 days.	When all scabs have fallen off.
Chicken-pox	18 days.	When all scabs have fallen off.
Scarlet Fever	14 days.	Six weeks, and then only if no desquamation or sore throat.
Diphtheria	12 days.	Three weeks, if convalescence is complete, and no sore throat, albuminuria or discharges remain.
Measles	16 days.	Three weeks, if all desquamation and cough have ceased.
Whooping-cough	21 days.	Six weeks from the commencement of the whooping, if the characteristic spasmodic cough and whooping have ceased. Earlier, if all cough be gone.
Rötheln, or Rubella.	16 days.	Two to three weeks, according to the nature of the case.
Mumps	24 days.	Four weeks, if all swelling have subsided.

This table assumes that a person exposed may himself convey contagion from the first.

It is never certain how soon a person who has been exposed to scarlet fever or diphtheria will take the disease or be in a condition to give it to others.

As to the other diseases named, this is not likely before nine days have passed. (See, also, Dr. Vacher's table as appended to this circular.)

Any such table is somewhat arbitrary. The time for the return to school can in many cases be shortened by proper precautions. When any contagious disease has occurred in a room, or more generally in a school, there should be *thorough and skilled disinfection*, such as is directed in other circulars of this Board.

These are familiar to Inspectors or can be had on application by postal. The circulars of this Board as to communicable diseases should be on hand, ready for reference by all Principals of schools. See especially, Circulars XXXVII., XLIV., XLVII. and LXIV.

Not only the welfare of each school, but the interests of the public demand that our schools should not so frequently be the means of multiplying cases of disease.

EZRA M. HUNT, M.D., *Sec'y.*

Copies of this and other circulars can be had by addressing postal, State Board of Health, Trenton, N. J.

VACHER'S TABLE.

DISEASES.	Time from inception to beginning of eruption.	Time from first precursory symptom to beginning of eruption.	Time from beginning of eruption to cessation of febrile state.	Time from the beginning of eruption till patient ceases to be infective.
Small-pox	13 days. (range, 7 to 21 days.)	2 days. (range, a few hours to 7 days.)	14 days.	56 days.
Modified Small-pox	13 days. (range, 7 to 21 days.)	2 days. (range, a few hours to 7 days.)	14 days.	35 days.
Chicken-pox	18 days. (range, 4 to 17 days.)	2 days. (range, a few hours to 3 days.)	5 days. (range, 3 to 7 days.)	17 days.
Measles	14 days. (range, 7 to 21 days.)	4 days. (range, 1 day to 9 days.)	6 days.	27 days.
Rubella, German Measles	14 days. (range, 10 to 20 days.)	1 day (range, *nil* to 3 days.)	7 days.	14 days.
Scarlet Fever	4 days. (range, a few hours to 14 days.)	1 day	7 days.	49 days.
Diphtheria	5 days (range, 1 day to 14 days.)	2 days. (range, a few hours to 4 days.)	14 days.	28 days.
Idiopathic Erysipelas	5 days. (range, 2 to 14 days.)	1 day	14 days.	35 days.
Typhus Fever	19 days. (range, a few hours to 28 days.)	7 days. (range, 3 to 7 days.)	7 days. (range, 7 to 14 days.)	21 days.
Typhoid Fever	21 days. (range, 1 day to 28 days.)	7 days. (range, 7 to 12 days.)	21 days. (range, 14 to 28 days.)	28 days.
Mumps	18 days. (range 8 to 25 days.)	4 days.	7 days.	21 days.

CIRCULAR LXXVII.

OF THE

NEW JERSEY STATE BOARD OF HEALTH.

DIPHTHERIA.

To Physicians and Local Boards of Health:

This Board has hitherto presented to the attention of physicians the fact that diphtheria surpasses all of the so-called zymotic diseases in our records of fatality. It now urges that very special attention be given to the facts that have quite recently accumulated as to it. This is done in the belief that a united effort on the part of physicians, Health Boards, Sanitary Inspectors and parents can do much to limit the disease.

This belief is founded on the following facts:

1. Our knowledge as to the chief exciting cause of diphtheria is more definite than as to the eruptive diseases, and so localizes it as to give many hopeful indications as to modes of prevention and treatment. While some questions as to pseudo or simulated cases of diphtheria are still puzzling, it does not seem premature to say that it is caused by the Löffler bacillus.

Says Dr. Woodhead: "The fact must be accepted that careful clinical observation and experimental investigation have been made by many thorough workers, and that these workers have assigned to a special bacillus the power of giving rise to at least one form of diphtheria.

"The evidence in favor of the specific, infective Klebs-Löffler bacillus is now almost overwhelming."

More interesting and important still is it that we can make some definite statements as to it, which have an important bearing on sanitation and treatment.

(a) This organism does not occur in the blood, in the lymph or in any of the organs of the body. Its only locality is in the false membranes composed of fibrinous lymph and altered epithelial cells that are found in the throat.

The poison which gives rise to the constitutional symptoms is

formed only at this point and is there absorbed and carried to various parts of the body.

It is true that other organisms beside it are found in the throat, and that these undoubtedly give rise to symptoms that simulate true diphtheria. But the fatal form of diphtheria is probably never caused by these microbes.

(*b*) These organisms are of such rapid growth that from the time of entrance and locating, colonies visible to the naked eye may form in twenty-four hours, which is not the case with any other organism.

Yet they are more affected by local antiseptic applications than most organisms. As they soon choose the deeper layers of the exudation and leave the more superficial to other organisms, they are not reached as easily in older membrane as they are in that which is very recent.

While not able to say that a sound and normal throat structure is never attacked, the start is almost invariably upon a weakened mucous membrane, a sore throat not yet diptheritic or a wounded or abraded surface. It is here that the mischief begins and the bacilli rapidly secrete a poison which is absorbed and produces characteristic effects.

(*c*) The diphtheritic poison is always more active when alkaline. Acids, locally or when they reach the lower part of the membrane continuously, seem to restrain or destroy it.

"At first sight it would seem that in the case of the diphtheria bacillus, there is, on account of the extreme activity of the poison, little hope of rendering the tissues of an animal resistant to its action, as even very minute doses produee marked poisonous effects. On the other hand, however, we have from the nature of the position and development of the poison, indications as to treatment and also as to prevention of the disease."

Its real incubating stage is within sight, and watchfulness of it *in situ*, and proper local treatment promise increased success, if only it can be entered upon early.

The bacillus of diphtheria is often in the mouth without finding a soil ready for its reception. "It appears that these bacilli can exert little or no injurious effect where the mucous lining of the throat, larynx, nostrils, &c., remains sound and unaffected by minor diseases." Hence, all sore throats need watchfulness.

(*d*) While the diphtheria bacillus is wilted and destroyed by moist heat at 58° C., *antiseptics* have decided influence in inhibiting its activity.

If there is not a continuance of antiseptic washes after apparent local recovery it is often found in the mouth for days after local symptoms have subsided.

(*e*) At ordinary temperatures these bacilli retain their vitality in rooms and upon bed-linen for weeks, although light, sunlight and air, if continuous and repeated, have great power for their destruction.

(*f*) The bacillus of diphtheria grows and is promoted into virulence, both on the fauces and outside the body, by the presence of other organisms, and by those filth conditions which, if they do not cause benign or common organisms to be changed into malignant or specific ones, do so assure their presence as greatly to add to the gravity of the disease.

Such is the clear voice at present of microscopic and biological study, and of observant practice as to this disease.

It has its lessons both in treatment and in sanitary discipline, which, could they from year to year be applied with exactness in this State, would very largely diminish the number of cases and the fatality from this disease. Some of these lessons are as follows:

I. The disease should be dealt with locally, except where it is so far advanced that neither local application nor removal can hope to reach it. This means for the patient, careful and skillful survey of the entire throat and buccal cavity, and great perseverance in the use of local antiseptic methods.

But it also means *far more than attention to the individual patient.* In any case of well-ascertained diphtheria, each day before seeing the patient accounted as sick, the medical attendant should see the mouth and fauces of each one who has been at all exposed, the design being to prevent an incubatory stage.

Mild but frequent and efficient mouth-washes and gargles have an important place in a family in which there is a case of diphtheria.

II. Treatment should thus always be early, or if there has been delay, attention should promptly be given to any possibility of compensation for this by the active character of local treatment.

While local treatment of the disease will not relieve that part of it which has become constitutional and the treatment of which is so important, it will cut off the base of supply for the poison which is not generated inside. As many cannot use gargles thoroughly, and as such antiseptics as tinc. ferri chloridi, potassii chloratis, &c., are often indicated internally, it is safer that some of the wash be swallowed.

Many contend that, with those exposed, mouth-washes should be used before there are any positive signs of local disease, in order to keep the throat in an antiseptic condition.

III. The effect of acids on the bacillus, and of various antiseptic remedies, as well as of sustaining treatment, are more hopeful than when the poison is being actively produced inside of the body.

IV. The fact that bacilli may continue so long to be found in the mouth and in rooms and in clothing, makes it imperative that the most thorough methods of disinfection should be practiced as to the disease. What these are Circulars XLIV. and LXIV. state. Neither the bedclothes nor the patient's body-linen should be mixed with the other soiled clothes or admitted to the general wash until they are first disinfected.

Neither during nor after the sickness should garments, bed furniture or anything that has been in the sick-room be carried to or through other parts of the house. Let the room and its contents be disinfected apart from the rest of the house. Articles that cannot be put in solution can be thrown out or let out of windows, so as to have some light and airing. In this disease as in scarlet fever there is a special need for the exact details of isolation and disinfection.

Very hot water, chloride of lime, quick-lime, in the form of fresh whitewash, and sunlight in the room or on its contents out of doors are, as a rule in these cases, the most ready at hand and available disinfectants.

Where fumigation is necessary many prefer chlorine gas to the sulphur or sulphurous gas fumigation. It is thus described by Thudicum: "The best mode of disinfecting a room is by distributing chlorine gas in its atmosphere. The room being unoccupied, place a quarter of a pound of chloride of lime in a wide basin, stir it up with a quarter of a pint of water and pour into the mixture a pint of hydrochloric (muriatic) or dilute sulphuric acid. The person who has to mix these materials should be cautioned not to inhale the vapors which are rapidly evolved."

V. Other organisms so seem to favor the activity of this bacillus that we should watch for it as a sequel to other diseases.

As the vitality and virulence of various organisms are promoted by uncleanliness, we should pursue the most scrupulous exactness as to personal and local conditions and surroundings. Roux and Yersin are so impressed with the first point that they say: "It is necessary at the very commencement of simple forms of throat disease, and of

those associated with measles and scarlatina, to practice careful and frequent swabbing of the throat with antiseptics."

As to local conditions, we can say from experience that sudden exposure of filthy matter about buildings, such as the spreading of cess-pool matter over gardens, or of foul compost over fields near a house, has seemed to cause distinct outbreaks of diphtheria. It has been recently claimed by good authorities that diphtheria is especially a disease of surface filth, perhaps because the throat and mouth are especially exposed to foul particles and the gases of decay. There is no disease in which the free and continuous use of air, sunlight and active disinfectants, about rooms or premises where it occurs, is more forcibly indicated. It is well to bear in mind that there are always more microbes in the air where there is much decomposing matter or where decaying particles are floating in the air; also where there is not uninterrupted circulation of air and occasional flushings by perceptible draughts.

Microbes, like other particles, cling to surfaces, and especially to damp walls, cellars and other moist surfaces, so that after a disease has ceased and the air of the rooms shows no micro-organisms, it is in part because they have settled upon surfaces. This emphasizes the importance of ventilation, sunlight, dryness and proper cleansing.

VI. There is no one of the zymotic diseases in which *isolation* is more important or results from it more hopeful. It is the mouth, and not the whole person, that, *in cases well isolated and well guarded from the first,* is the source of danger. But it is so great a source that it is to be recognized as a kind of cess-pit from which there must be protection not only by antiseptic washes but by separation. These microbes have here a factory in close relation to those around who may be susceptible. While it is not probable that the primary contagion is conveyed afar from the mouth, yet the breath and the mouth secretions are such a mode of conveyance, that careful isolation must be secured in each and every case, and must be enforced by the physician, and any aid rendered by the Health Inspector that the physician may desire.

Milk or other food must not be allowed to stand in the sick-room, and what is left must not be used by others. The nurse, when out of the sick-room, must not have others closely about her. All cats, dogs or other pet animals must be carefully excluded from the sick-room, and if possible, from the house. There is no doubt that they sometimes convey the contagion.

Attention must be given to children at school to see that they do not spread the contagion. No child should attend school from a house in which there is or has recently been diphtheria, without a permit from a physician.

VII. The spittle or mouth secretion must be diligently cared for from the start. It is best received into a small handbowl or deep saucer not over six inches in diameter, into which a piece of newspaper or other soft paper is fitted, so as to be easily removed with the spittle. This should be sprinkled over with a spoonful of chloride of lime, and changed three or four times a day, according to the amount of secretion. If there is a fire in the room it should be thrown into it; if not, it should be covered with boiling water for a half hour, and then thrown into a common receptacle. It is convenient for interchange to have two of these small bowls of about six inches inside diameter, and two or three inches in depth.

We have found these practically more useful than any other form of sick-room spitcups. Handkerchiefs and small pieces of rag should be used as little as possible, but are often necessary. A small separate piece to receive each spittle is best. This should be thrown into some small porcelain or iron, china or glass vessel containing chloride of lime in solution, and boiling water should be thrown over it before it is thrown into the closet. While it is the membrane which is the most hazardous, the entire secretion of the mouth must be cared for.

We have purposely not specified the kind of mouth-washes to be used or said anything as to general treatment, only because such treatises as those of Oertel, Löffler, Jacobi, Parker, Thorne and the various recent text-books of practice are sufficiently full.

It is our conviction that new light has come to us as to the prevention and management of diphtheria, and that success depends upon accurate attention to minute details, which the physician must direct and see carried out, and in the execution of which Boards of Health and Health Inspectors and parents must diligently aid him.

We believe it possible very greatly to diminish the frequency and mortality of this disease, and we earnestly urge upon all to co-operate with us in a new attempt to restrain its ravages.

Copies of this circular and also of Circulars XLIV., LXIV., &c., can be had through postal addressed

EZRA M. HUNT, M.D., *Secretary*,
TRENTON, N. J.

Reprint 1892.

LAWS.

In Circulars LX., LXVI., LXII., LIX., LXV. will be found the most important health laws, with reference to many others.

It was well urged, at a recent meeting of the New Jersey Sanitary Association, in a paper presented by Counselor Lanning, that the State system of sanitary law was far ahead of its best application and use in localities by means of well-devised ordinances and their faithful execution. While no doubt from time to time changes or additions will be needed, the main effort should be in efficient administration.

The chief health laws of the Legislature of 1891 were as follows:

LAWS OF 1891.

Chaper CCX.—A supplement to an act entitled "An act to prevent the adulteration and to regulate the sale of milk," approved March fourteenth, one thousand eight hundred and eighty-two.

Chapter CLXXVI.—A further supplement to an act entitled "An act to provide for the assessment and payment of the costs and expenses incurred in constructing sewers and making other improvements in townships and villages," approved March twelfth, one thousand eight hundred and seventy-eight.

Chapter CCXXXIII.—A supplement to an act entitled "An act for the construction, maintenance and operation of systems of sewerage in cities, towns and boroughs," approved June thirteenth, one thousand eight hundred and ninety.

Chapter XXXIX.—An act concerning townships.

Chapter CLVII.—An act relating to depositing of refuse from chemical factories near residences.

Chapter CCLXIV.—An act to amend an act entitled "An act to provide for sewerage and drainage in incorporated townships in which there is a public water-supply," passed April fourteenth, one thousand eight hundred and ninety.

Chapter LXXVI.—An act to provide for drainage and sewerage in densely-populated villages in which there is a public water-supply.

Chapter CXXX.—Supplement to an act entitled "An act to provide for sewerage and drainage in incorporated townships in which there is a public water-supply," approved April fourteenth, one thousand eight hundred and ninety.

Chapter CCVIII.—An act to amend an act entitled "An act to provide for the reconstruction of main outlet sewer heretofore constructed at the joint expense of two cities," approved March eighteenth, one thousand eight hundred and ninety.

Chapter CCIX.—A supplement to an act entitled "An act to provide for the reconstruction of main outlet sewer heretofore constructed at the joint expense of two cities," approved March eighteenth, one thousand eight hundred and ninety.

Chapter CCLXXV.—A supplement to the act entitled "A further supplement to the act entitled 'An act to regulate fees,' approved April fifteenth, one thousand eight hundred and forty-six," approved April third, one thousand eight hundred and eighty-eight. (As to pension certificates.)

MEDICAL REGISTRY.

LIST OF PRACTICING PHYSICIANS IN THE STATE, WITH THEIR LOCALITIES BY COUNTIES AND TOWNSHIPS, AND THEIR POST-OFFICE ADDRESSES.

In the constant correspondence of this office and the important relations that the medical profession bears to the public health and to the returns of vital statistics, it has been found necessary to secure such a registry as enables us to be aware of the localities of medical men.

The list is very nearly complete, although it is probable that a few omissions have occurred. Of any such we will be glad to be informed, or of any errors made.

The list does not assert anything as to the individual diplomas, but is such as is furnished for each township or city.

We add to this list all who have passed the Board of Medical Examiners up to January 1st, 1892. A few of the names occur in the general list, but we are not as yet able to distribute all to the respective townships or towns in which they have settled.

ATLANTIC COUNTY.

TOWN OF ABSECON.

Name.	P. O. Address.
E. H. Madden	Absecon.
T. P. Waters	"
M. S. Lyon	"
J. K. Pitney	"

ATLANTIC CITY.

Name.	P. O. Address.
L. H. Armstrong	Atlantic City.
A. W. Bailey	" "
Eli S. Beary	" "
Wm. H. Bennett	" "
Geo. W. Crosby	" "
J. A. Doughty	" "
Jno. R. Fleming	" "
Wm. B. Garside	" "
Nelson Ingram	" "
Philip Marvel	" "
Morris B. Miller	" "
M. L. Munson	" "
B. C. Pennington	" "
W. M. Pollard	" "
J. C. Pursell	" "
Boardman Reed	" "
E. L. Reed	" "
Lewis Reed, Sr	" "
Thomas K. Reed	" "
E. A. Reiley	" "
Arnold Schott	" "
De Witt Sherman	" "
W. C. Sooy	" "
Lewis R. Souder	" "
T. J. Stanley	" "
Julius Kemmerer	" "
S. A. de Selmitz	" "
Samuel Stille	" "

ATLANTIC COUNTY—Continued.

Name.	P. O. Address.
J. B. Thompson	Atlantic City.
Bart J. Melestor	" "
M. West	" "
E. P. Williams	" "
W. Wright	" "
M. D. Youngman	" "
Wm. Macauley Powell	" "

BUENA VISTA TOWNSHIP.

(No physicians reported.)

EGG HARBOR CITY.

Name.	P. O. Address.
Theophilus H. Boysen	Egg Harbor City.
J. U. Elmer	" " "

EGG HARBOR TOWNSHIP.

(No physicians reported.)

GALLOWAY TOWNSHIP.

Name.	P. O. Address.
G. M. Harris	Port Republic.

HAMILTON TOWNSHIP.

Name.	P. O. Address.
H. C. James	Mays Landing.
J. A. Massinger	" "

TOWN OF HAMMONTON.

Name.	P. O. Address.
Edward North	Hammonton.
George F. Jahucke	"
Theo. G. Bieling	"
Godfrey M. Crowell	"
W. M. Hodges	"

MULLICA TOWNSHIP.

Name.	P. O. Address.
H. W. Smith	Elwood.

WEYMOUTH TOWNSHIP.

(No physicians reported.)

BOROUGH OF PLEASANTVILLE.

Name.	P. O. Address.
Jos. H. North, Jr	Pleasantville.
Rich'd M. Sooy	"
Garret De Mill	"

BERGEN COUNTY.

BOILING SPRING TOWNSHIP.

Name.	P. O. Address.
J. W. Phelps	Rutherford.

ENGLEWOOD TOWNSHIP.

Name.	P. O. Address.
Hardy M. Banks	Englewood.
Edward W. Clarke	"
D. A. Baldwin	"
Geo. B. Best	"
Jno. A. Wells	"
Daniel Currie	"
J. W. Terry	"
P. H. Morris	"

FRANKLIN TOWNSHIP.

Name.	P. O. Address.
E. W. Hamilton	Oakland.

HARRINGTON TOWNSHIP.

Name.	P. O. Address.
Lewis B. Parsell	Closter.
Henry A. Crary	"
Frederick Morris	Norwood.

HOHOKUS TOWNSHIP.

Name.	P. O. Address.
H. T. Elliot	Ramseys.
C. P. De Yoe	"

LODI TOWNSHIP.

Name.	P. O. Address.
Oliver Soper	Lodi.
Dr. Tygert	Carlstadt.
Dr. Mohn	"

MIDLAND TOWNSHIP.

(No physicians reported.)

NEW BARBADOES TOWNSHIP.

Name.	P. O. Address.
David St. John	Hackensack.
F. H. White	"
G. Howard McFadden	"
Chas. F. Adams	"
A. Richter	"
G. E. Brown	"
M. E. Russle	"
Dr. Ackerman	"
Dr. Harris	"
J. O. Van Winkle	"

ORVIL TOWNSHIP.

Name.	P. O. Address.
Charles W. Badeau	Allendale.

PALISADE TOWNSHIP.

Name.	P. O. Address.
John J. Haring	Tenafly.
J. M. Simpson	Schraalenburg

BERGEN COUNTY—Continued.

RIDGEFIELD TOWNSHIP.

Name.	P. O. Address.
Joseph Huger	Fort Lee.
M. S. Ayers	Fair View.
George Cosine	Bogata.
Conrad Mesgler	Ridgefield Park.
Geo. M. Oakford	" "

RIDGEWOOD TOWNSHIP.

Name.	P. O. Address.
John T. Demund	Ridgewood.
George B. Parker	"
W. L. Vroom	"

SADDLE RIVER TOWNSHIP.

(No physicians reported.)

UNION TOWNSHIP.

Name.	P. O. Address.
H. H. Hollister	Rutherford Park.
Dr. Armstrong	" "
Dr. Lamberson	Lyndhurst.
Dr. Trautwein	"
Chas. Calhoun	Rutherford.
John H. Davis	"

WASHINGTON TOWNSHIP.

Name.	P. O. Address.
Henry C. Neer	Park Didge.
Simeon J. Zabriskie	Westwood.
Eugene Jehl	Pascack.

BURLINGTON COUNTY.

BASS RIVER.

Name.	P. O. Address.
C. Garrabrant	New Gretna.

BEVERLY TOWNSHIP.

Name.	P. O. Address.
Addison W. Taylor	Beverly.
Ellsworth Adams	"
Joseph J. Currie	"
J. V. Roberts	"
Charles J. Massinger	"

BORDENTOWN TOWN AND TOWNSHIP.

Name.	P. O. Address.
Irene D. Young	Bordentown.
Wm. H. Shipps	"
James S. Gilbert	"
Edward E. French	"
Burr W. McFarland	"
Levi D. Tebo	"
G. L. Whitehead	"

CITY OF BURLINGTON.

Name.	P. O. Address.
A. O. Buck	Burlington.
J. B. Cassady	"
Walter E. Hall	"
J. Howard Pugh	"
Joseph Shreve	"
E. F. Rink	"
L. Van Renssalaer	"
E. S. Lansing	"
Franklin Gauntt	"
F. Allen Gauntt	"
W. G. Parrish	"
R. J. Waln	"

CHESTER TOWNSHIP.

Name.	P. O. Address.
N. Newlin Stokes	Moorestown.
Joseph Stokes	"
Pusey Wilson	Moorestown.
Alfred Mattson	"
Geo. B. L. Clay	"
F. G. Stroud	"
Chalkley Kille	"

CHESTERFIELD TOWNSHIP.

Name.	P. O. Address.
J. G. L. Whitehead	Crosswicks.
Chas. L. Dey	"
Elias D. Maine	Sykesville.

CINNAMINSON TOWNSHIP.

Name.	P. O. Address.
H. B. Hall	Riverton.
Alex. Marcy	"
Frances S. Janney	Cinnaminson.
J. D. Janney	"
Lippincott Sharp	Palmyra.
J. A. Vannort	"

DELRAN TOWNSHIP.

Name.	P. O. Address.
Alex. Small	Riverside.
T. S. Lippincott	"

EASTAMPION TOWNSHIP.

(No physicians reported.)

EVESHAM TOWNSHIP.

Name.	P. O. Address.
P. V. B. Stroud	Marlton.
E. B. Sharp	"

FLORENCE TOWNSHIP.

Name.	P. O. Address.
Chas. A. Baker	Florence.
G. W. H. Calver	Columbus.
A. S. Ironside	Florence.

BURLINGTON COUNTY—Continued.

LITTLE EGG HARBOR TOWNSHIP.

Name.	P. O. Address.
M. V. Reeves	Tuckerton.
Theophilus T. Price	"

LUMBERTON TOWNSHIP.

(No physicians reported.)

MANSFIELD TOWNSHIP.

D. G Van Marter	Columbus.
A. Patterson	Georgetown.
A. C. Haines	Columbus.

MEDFORD TOWNSHIP.

Josiah Reeve	Medford.
Lewis L. Sharp	"
Richard S. Braddock	"
A. E. Zeitler	"

MOUNT LAUREL TOWNSHIP.

(No physicians reported.)

NEW HANOVER TOWNSHIP.

Amos Shaw	Jacobstown.

NORTHAMPTON TOWNSHIP.

Richard C. Barrington	Mount Holly.	
Wm. P. Melcher	"	"
Richard H. Parsons	"	"
Richard E. Brown	"	"
Samuel Caley	"	"
Wm. W. Whitehead	"	"
John W. Branin	"	"
Geo. Vanderveer	"	"
William Chamberlain	"	"
Jacob Grigg	"	"

PEMBERTON TOWNSHIP.

Name.	P. O. Address.
E. Hollingshead	Pemberton.
Dr. Lane	"
Dr. Woodruff	"

RANDOLPH TOWNSHIP.

John E. Carey	Lower Bank.

SHAMONG TOWNSHIP.

(No physicians reported.)

SOUTHAMPTON TOWNSHIP.

J. C. Brown	Vincentown.

SPRINGFIELD TOWNSHIP.

(No physicians reported.)

WASHINGTON TOWNSHIP.

(No physicians reported.)

WESTAMPTON TOWNSHIP.

(No physicians reported.)

WILLINGBORO TOWNSHIP.

W. L. Martin	Rancocas.
Franklin T. Haines	"

WEYMOUTH TOWNSHIP.

(No physicians reported.)

WOODLAND TOWNSHIP.

(No physicians reported.)

CAMDEN COUNTY.

CAMDEN.

Name.	P. O. Address.
Purnell W. Andrews	Camden.
Sam'l F. Ashkraft	"
J. D. Baer	"
P. W. Beale	"
F. A. Bean	"
D. Benjamin	"
Thos. R. Blackwood	"
H. G. Bonwill	"
Walter S. Bray	"
O. W. Braymer	"
Sam'l Carles	"
Rob't Casperson	Camden.
E. A. Claire	"
W. T. Collins	"
C. J. Cooper	"
H. H. Davis	"
N. Davis	"
Wm. A. Davis	"
A. T. Dobson	"
Jno. W. Douges	"
Jno. G. Doran	"
W. G. Dubois	"
Wilfred Dupont	"

CAMDEN COUNTY—Continued.

Name.	P. O. Address.
F. W. Eaton	Camden.
M. L. Emrick	"
Jas. P. Finlan	"
Geo. R. Fortiner	"
Ida F. Fortiner	"
Joel W. Fithian	"
J. Howard Frick	"
E. L. B. Godfrey	"
Annie E. Griffith	"
Wesley Grindle	"
Grulford Gunter	"
O. B. Gross	"
R. T. Haines	"
Walter G. Hammel	"
Louis Hasson	"
Geo. W. Henry	"
Conrad G. Howell	"
E. M. Howard	"
Aaron Howell	"
F. L. Horning	"
I. N. Hugg	"
H. P. Hunt	"
W. H. Hunt	"
Wm. H. Ireland	"
S. B. Irwin	"
Wm. H. Izard	"
Harry Jarrett	"
Wm. S. Jones	"
Jno. B. Longshore	"
J. L. Lane	"
J. F. Leavitt	"
Jno. D. Leckner	"
Benj. S. Lewis	"
A. Marcy	"
Wm. Martin	"
Alex. M. Mecray	"
M. F. Middleton	"
Wm. S. Mosslander	"
A. McAlister	"
Wm. F. H. Osman	"
H. P. Palm	"
F. P. Pfieffer	"
Wm. R. Powell	"
Sophia Presley	"
Silas H. Quint	"
Geo. F. Ralston	"
Rufus Reed	"
R. W. Richie	"
Jas. M. Ridge	"
Geo. T. Robinson	"
Thos. G. Rowand	"
C. M. Schellinger	"
Wm. Schafer	"
Wm. N. Sher	"
E. R. Smiley	"
S. B. Smith	"
Charles Souder	"
Jas. G. Stanton	Camden.
Jas. H. Stanton	"
Jacob F. Stock	"
V. R. Stone	"
Dan'l Strock	"
H. Genet Taylor	"
R. G. Taylor	"
E. P. Townsend	"
E. R. Tullis	"
C. J. Wallace	"
M. West	"
J. Orlando White	"
W. White	"
F. E. Williams	"
W. C. Williams	"
J. J. Wills	"
J. H. Wills	"
Geo. D. Woodward	"

CENTRE TOWNSHIP.

Benj. Climonson	Mount Ephraim.

DELAWARE TOWNSHIP.

Elijah B. Woolston	Marlton.

CITY OF GLOUCESTER.

Henry A. M. Smith	Gloucester City.	
James A. Wamsley	"	"
Duncan W. Blake	"	"
Edwin Tomlinson	"	"
John K. Bennett	"	"
John J. Haley	"	"
S. C. Ross	"	"
W. L. Delap	"	"
Wm. McBride	"	"
Richard Gardiner	"	"

GLOUCESTER TOWNSHIP.

Henry E. Branin	Blackwood.
Jos. E. Hurff	"

HADDON TOWNSHIP.

C. H. Shivers	Haddonfield.
B. H. Shivers	"
F. E. Williams	"
W. B. Jennings	"
J. R. Stevenson	"
L. L. Glover	"
W. S. Long	"
H. B. Miller	"
Edward H. Megill	"

STOCKTON TOWNSHIP.

James A. George	N. Cramer Hill.
Jerome L. Artz	Cramer Hill.

CAMDEN COUNTY—Continued.

Name.	P. O. Address.
H. H Shirk	Cramer Hill.
Wm. H. Kensinger	N. Cramer Hill.
J. B. Davis	Cramer Hill.
L. Reese	" "
D. H. Bartine	Merchantville.
J. M Hinson	"
John W. Marcy	"
Chas Jennings	"

WINSLOW TOWNSHIP.

(No physicians reported.)

WATERFORD TOWNSHIP.

Name.	P. O. Address.
D. M. Stout	Berlin.
Wm. Westcott	"
Wm. Raughley	"
Dr. Hoovender	"

CAPE MAY COUNTY.

CAPE MAY CITY.

Name.	P. O. Address.
Jas. Mecray	Cape May City.
Virgie M. D. Marcy	" " "
Alonzo L. Leach	" " "
E. H. Phillips	" " "
Emlen Physick	" " "

DENNIS TOWNSHIP.

Name.	P. O. Address.
P. M. Way	Ocean View.
Eugene Way	Dennisville.

LOWER TOWNSHIP.

Name.	P. O. Address.
Eli B. Wales	Cold Spring.
Louise L. Wylie	Cape May Point.

MIDDLE TOWNSHIP.

Name.	P. O. Address.
James M. Slaughter	Rio Grande.
Wilson R. Lake	Green Creek.
John H. Hand	Dias Creek.
Isaac M. Downs	Cape May C. H.
Julias Way	" " "
Jonathan F. Leaming	" " "
Humphry Swain	Goshen.
Dr. Hutchinson	Wildwood.

OCEAN CITY.

Name.	P. O. Address.
Jas. E. Pryor	Ocean City.
J. S. Waggoner	" "

UPPER TOWNSHIP.

Name.	P. O. Address.
Joseph C. Marshall	Tuckahoe.
Randolph Marshall	"
Benjamin T. Abbott	"

CUMBERLAND COUNTY.

BRIDGETON.

Name.	P. O. Address.
Hamilton Mailly	Bridgeton.
J. C. Applegate	"
Theo G. Davis	"
Henry W. Elmer	"
Matthew K. Elmer	"
Geo. A. Harris	"
John H. Moore	"
David H. Oliver	"
J. Barron Potter	"
J. H. Putnam	"
Jacob G. Streets	"
David R. Streets	"
Thos. J. Smith	"
Jos. Sheppard	"
John R C. Thompson	"
Mrs. L. M. Putnam	"

DEERFIELD TOWNSHIP.

Name.	P. O. Address.
Charles C. Phillips	Deerfield.
Rulon Dare	"
E. E. Howard	Rosenhayn.

DOWNE TOWNSHIP.

Name.	P. O. Address.
A. P. Glandon	Newport.
Charles T. Hill	"

FAIRFIELD TOWNSHIP.

Name.	P. O. Address.
Wm. D. Straughn	Fairton.

GREENWICH TOWNSHIP.

Name.	P. O. Address.
Thomas E. Slathams	Greenwich.
Ephraim Holmes	"

CUMBERLAND COUNTY—Continued.

HOPEWELL TOWNSHIP.

Name.	P. O. Address.
Charles H. Dare	Shiloh.
Geo. M. Paullen	"
John G. Sweeney	"

CITY OF VINELAND, LANDIS TOWNSHIP.

Name.	P. O. Address.
Chas. R. Wiley	Vineland.
Judson L. Bech	"
Orange H. Adams	"
Edwin H. Bidwell	"
Chas Brewer	"
A. C. Taylor	"
Mrs. M. E. Ford	"
Waldo F. Sawyer	"
Emory R. Fuller	"
Wm. H. Martin	"
Louis Cooper	"
Henry Esten	"
Arthur Dare	"

LAWRENCE TOWNSHIP.

Name.	P. O. Address.
Enos Blackwell	Cedarville.
Ephraim Bateman	Cedarville.
W. P. Glenden	"

MAURICE RIVER TOWNSHIP.

Name.	P. O. Address.
J. Howard Willets	Port Elizabeth.
Stacy M. Wilson	Susburg.
Joseph Butcher	Heislerville.

CITY OF MILLVILLE.

Name.	P. O. Address.
J. S. Whitaker	Millville.
W. L. Newell	"
W. H. C. Smith	"
J. W. Wade	"
T. C. Wheaton	"
Jos. C. Wheaton	"
C. H. Hubbard	"
Edwin H. Jones	"
Chas. B. Neal	"

STOE CREEK TOWNSHIP.

Name.	P. O. Address.
Joseph Tomlinson	Roadstown.

ESSEX COUNTY.

BELLEVILLE TOWNSHIP.

Name.	P. O. Address.
D. M. Skinner	Belleville.
A. M. Clark	"
C. H. Winans	"

BLOOMFIELD TOWNSHIP.

Name.	P. O. Address.
Wm. H. White	Bloomfield.
Edwin M. Ward	"
Chas. H. Bailey	"
Wm. H. Van Gieson	"
John E. Wilson	"

CALDWELL TOWNSHIP.

Name.	P. O. Address.
Edw. E. Peck	Caldwell.
Edwin R. Laine	"
H. B. Whitehorne	Verona.

CLINTON TOWNSHIP.

Name.	P. O. Address.
M. Osborne Christian	Irvington.
Joseph Wade	"
W. Pennington	"

EAST ORANGE TOWNSHIP.

Name.	P. O. Address.
Ralph Blakelock	East Orange.
G. Clinton Blakelock	" "
T. R. Chambers	East Orange.
Alice D. Condict	" "
Wm. H. Davis	" "
Elisabeth J. T. Gould	" "
Walton D. Garrett	" "
Francis A. Gile	" "
Chas. A. Groves	" "
Thos. N. Gray	" "
Richardson Gray	" "
Wm. B. Graves	" "
W. K. Gray	" "
Wm. D. Robinson	" "
Geo. B. Dowling	" "
Winthrop D. Mitchell	" "
Eliza B. Phelps	" "
Francis A. Lane	" "
C. H. Hadley	" "
Milton Baldwin	" "

FRANKLIN TOWNSHIP.

Name.	P. O. Address.
George B. Philhower	Nutley.
A. H. Van Riper	"
Henry D. White	"

LIVINGSTON TOWNSHIP.

(No physicians reported.)

ESSEX COUNTY—Continued.

MILLBURN TOWNSHIP.

Name.	P. O. Address.
E. English	Millburn.
Wellington Campbell	"

MONTCLAIR TOWNSHIP.

John J. H. Love	Montclair.
John W. Pinkham	"
Richard P. Francis	"
Richard C. Newton	"
Levi W. Case	"
James S. Brown	"
Clarence W. Butler	"
Chas. H. Shelton	"
Andrew L. Nelden	"
Morgan W. Ayres	"
A. E. Dickinson	"
Henry Power	"

CITY OF NEWARK.

Henry J. Anderson	Newark.
Wm. J. Andrews	"
John L. Adams	"
H. Allers	"
C. Bachmann	"
Walter S. Baker	"
Aaron K. Baldwin	"
T. H. Baldwin	"
Solomon Baruch	"
E. D. Bemiss	"
F. W. Becker	"
W. E. Baldwin	"
C. D. Bennett	"
A. J. Bassboger	"
Herman C. Bleyle	"
E. N. Bliss	"
Wm. Bailey	"
George E. Babbitt	"
Ed. De L. Bradin	"
Rudolf Braun	"
J. D Brumley	"
W. R. Bruyere	"
C. S. Baker	"
James B. Burnet	"
F. W. Becker	"
Robert L. Burrage	"
A. L Calabrese	"
W. E. Carroll	"
J. Henry Clark	"
Henry L Coit	"
E. A. G. Conkling	"
Jas. W. Collins	"
Joseph A. Corwin	"
R. W. Chapman	"
Theodore W. Corwin	"
James H. Cummins	"
H. B. Crane	Newark.
J. P. Campbell	"
M. S. Crane	"
John S. Candee	"
Arthur N. Curtis	"
Chas. Dehlbach	"
John N. Dehart	"
Laban Dennis	"
R. G. P. Diffenbach	"
Daniel M. Dill	"
William S. Disbrow	"
M. O. F. Dolphin	"
Arthur C. Dougherty	"
Charles J. Duffy	"
Charles H. Duncker	"
Frederick W. Duncker	"
John F. Duncker	"
W. P. Eagleton	"
John L. Duryee	"
William J. Eccles	"
D. J. & T. P. Edwards	"
Emma W. Edwards	"
Jules Egge	"
Daniel Elliot	"
James Elliot	"
Lucy S. Evarts	"
Edward Everitt	"
Joseph Fewsmith	"
A. Frey	"
Frederick Friess	"
Charles H. Frings	"
S. H. Frazer	"
R. S. Gage	"
Henry Frankindorf	"
Hilmer J. Galuba	"
Robert F. Gillen	"
Holden E. Goldberg	"
Emil E. Guenther	"
William Glatzmayer	"
Anna M. Graves	"
Frank Gruber	"
John F. Hagar	"
Albert J. Hahn	"
Eleanor Haines	"
Clara Hampson	"
G. W. Harman	"
Hans Haux	"
Dr. Hinckley	"
Joseph H. Haydon	"
Edward H. Hammill	"
John H. Hedden	"
Joseph Hedges	"
Hugh C. Hendry	"
E. M. Q. Hawkes	"
Henry T. Herold	"
H. C. H. Herold	"
C. W. Harrison	"

ESSEX COUNTY—Continued.

Name.	P. O. Address.
Peter V. P. Hewlett	Newark.
W. E. Hitchcock	"
Fred. Hexahammer	"
J. A. Hoffman	"
Edgar Holden	"
L. Eug. Hollister	"
E. J. Howe	"
E P. Iliff	"
Charles L. Ill	"
Edward J. Ill	"
J. Ely Janes	"
Jotham C. Johnson	"
William M. Johnson	"
S. Wasson Jones	"
W. A. Judson	"
George R. Kent	"
Charles J. Kipp	"
Dr Krause	"
Harriet L. Knudsen	"
Alex. Kunstlick	"
Henry A. Kornemann	"
Dr. Krautz	"
T W. Lauterborn	"
W. H. C. Lee	"
Charles Lehlbach	"
C. F. J. Lehlbach	"
F. Lehmacher	"
John J. Leppa	"
Thomas W Loweree	"
Henry Mahr	"
William Martland	"
Fred B. Mandeville	"
Fred. A. Mandeville	"
Sarah R Mead	"
George Meeker	"
Archibald Mercer	"
R. B Mershon	"
F. L. Meyers	"
D. J. C. Morgan	"
Alexander Morison	"
Edward Mueller	"
Charles Mueller	"
H. D. McCormick	"
D. D. Mulcahy	"
J. K. Mulhollan	"
Frederick C Nadler	"
Vincent Nager	"
Albert B Nash	"
Theodore Neuman	"
E. D. Newman	"
George O'Gorman	"
William O'Gorman	"
C. Herbert Osborne	"
J. D Osborne	"
Charles B Parker	"
S. H. Pennington	"
A. C. Peters	"
W. N. Pindell	Newark.
G. E. Potter	"
John Pringle	"
John M. Rand	"
William Rankin, Jr	"
Jacob Rau	"
Joshua W. Read	"
John W. Reid	"
Philippe Ricord	"
Nicolo Rivellini	"
Samuel E. Robertson	"
M. N. Robinson	"
Hugh P. Roden	"
Philip Roth, Jr	"
E. Emory Rothe	"
Ernest Schoffler	"
Albert J. Schureman	"
Charles A. Schureman	"
Emanuel Schwartz	"
Edward Sealy	"
Marcus Seidmann	"
Wm. F. Seidler, Jr	"
Daniel Winans Smith	"
E. Fayette Smith	"
William A. Smith	"
W. Schilling	"
Smith & Lyon	"
B. H. B. Sleght	"
Lott Southard	"
M. F. Squier	"
Rob't G. Stanwood	"
E Swartz	"
J. S. Sutphen	"
R. M. Sutphen	"
Theron Y. Sutphen	"
Daniel L. Sweeney	"
Alfred Thayer	"
Hiram H. Tichenor	"
F. W. Thuer	"
William Titus	"
Henry A. Towle	"
W. S. Thompson	"
George D Trumpore	"
Amunda Taft	"
C. F. Underwood	"
S W. Van Duyn	"
G. A. Van Wagenan	"
Charles Vogler	"
Peter Von Aa	"
H. Von Frankendorff	"
Ed. R. Wagner	"
David L. Wallace	"
H. J. F. Wallhauser	"
Aaron C. Ward	"
Arthur Ward	"
George S. Ward	"
William S. Ward	"

ESSEX COUNTY—Continued.

Name.	P. O. Address.
E. A. Ward	Newark.
Walter S. Washington	"
Augustus V. Wendel	"
H. N. Woolman	"
C. S. Whitehead	"
D. A. Wildeman	"
I. C. Whitehead	"
George M. Wait	"
William R. Willman	"
Frank C. Woodruff	"
James T. Wrightson	"
Alice Hamilton Ward	"
Charles Young	"
Joseph C. Young	"
Charles M. Zeh	"
Hugo Zipper	"

CITY OF ORANGE.

Wm. Pierson	Orange.
J. L Seward	"
Carl Buttner	"
Jas. H. Bradshaw	"
Eugene Tresler	"
Thos. W. Harvey	"
Geo. C. Bayles	"
Frank J. Tetreault	"
C. M. Conant	"
F. M. Deems	"
Wm. A. Durrie	"
Thos. S. Fitch	Orange.
H. P. Gerbert	"
C. A. Groves	"
Wm. H. Holmes	"
H. E. Matthews	"
Laura M. Wright	"
Wm. P. Vail	"
Joseph W. Stickler	"
Sarah C. Spottiswoode	"
M. H. Simmons	"
G. H. Richards	"
G. W. Richards	"
T. F. Phelan	"
Edgar V. Moffat	"
Frank C. Bruin	"

SOUTH ORANGE TOWNSHIP.

Wm. J. Chandler	South Orange.
A. A. Ransom	" "
Mefford Runyon	" "
Lucy S. Forbes	" "
H. A. Manderville	" "
Phœbe D. Brown	Hilton.

WEST ORANGE TOWNSHIP.

James M. Maghee	West Orange.
Bethuel W. Dodd	" "

GLOUCESTER COUNTY.

CLAYTON TOWNSHIP.

Name.	P. O. Address.
Samuel S. Fisler	Clayton.
H. G. Buckingham	"
Alfred Porch	"
Charles L. Duffell	"

DEPTFORD TOWNSHIP.

Harry A. Stout	Wenonah.
Geo. W. Bailey	"

FRANKLIN TOWNSHIP.

A. A. Smith	Malaga.

EAST GREENWICH TOWNSHIP.

(No physicians reported)

GLASSBORO TOWNSHIP.

J. Down Heritage	Glassboro.
Jacob Iszard	Glassboro.
Howard Iszard	"
M. J. Luffberry	"
Seymore Wescott	"

GREENWICH TOWNSHIP.

George C. Laws	Paulsboro.
E. L. Reeves	"
R. H. Reeves	"
Wm. H. Pounds	"

HARRISON TOWNSHIP.

E E. De Groff	Mullica Hill.
John H. Ashcraft	" "

LOGAN TOWNSHIP.

E. T. Oliphant	Bridgeport.
P. E. Stilwagon	"

GLOUCESTER COUNTY—Continued.

MANTUA TOWNSHIP.

Name.	P. O. Address.
Albert Trenchard	Mantua.
E. Z. Hillegass	"
S. M. Snyder	Pitman Grove.

MONROE TOWNSHIP.

L. M. Halsey	Williamstown.
J. G. Edwards	"
Wm. R. Brick	"

SOUTH HARRISON TOWNSHIP.

S. F. Stanger	Harrisonville.

WASHINGTON TOWNSHIP.

Cyrus B. Phillips	Hurffville.

WEST DEPTFORD TOWNSHIP.

(No physicians reported)

CITY OF WOODBURY.

Name.	P. O. Address.
Clarence G. Abbott	Woodbury.
Henry C. Clark	"
H. B. Diverty	"
W. A. Glover	"
Wallace McGeorge	"
T. E. Parker	"
George Evans Reading	"
H. A. Wilson	"
Henry H. Clark	"

WOOLWICH TOWNSHIP.

Luther F. Halsey	Swedesboro.
Benj. F. Buzby	"
E. B. Sharp	"
O. Grimshaw	"

HUDSON COUNTY.

Name.	P. O. Address.
B. A. Andrew	Jersey City.
H. T. Adams	" "
Ulamor Allen	" "
Clovis Adam	" "
D. R. Atwell	" "
Henry Allers	Harrison.
W. J. Arlitz	Jersey City.
M. S. Ayers	Fairview, Bergen county.
E P. Buffett	Jersey City.
Horace Bowen	" "
J. B. Burdett	" "
Eleazer Bowen	" "
H. Mortimer Brush	Bayonne.
H. G. Bidwell	Jersey City.
Fred. W. Briegleb	" "
R. Belmer	" "
Louis Baumann	" "
J. S. Briggs	" "
Wm. S. Boyd	" "
P. W. Barber	Kearny Twp.
J. J. Bauman	Jersey City.
Henry J. Bogardus	" "
Ed. L. Bull	" "
Thomas Byrnes	Town of Union.
L. D. Broughton	Jersey City.
S. E. Bondy	Bayonne.
Carl De Wolf Brownell	Jersey City Hospital.
Maria H Broxhaus	Hoboken.
Horace Bowen	Jersey City.
Denis W. Barry	Hoboken.
Nathan G. Bozeman	New York.
Jno. J. Broderick	Jersey City.
H. H. Burnette	Hoboken.
M. Edith H. Banch	Jersey City.
E. Mills Baker	" "
Frank T. Brow	Bayonne.
Wm. M. Brien	Jersey City.
Oliver R. Blanchard	" "
Alexander Beck	Arlington.
R. F. Chabert	Hoboken.
C. H. Case	Jersey City.
J. E. Culver	" "
W. J. Cadmus	" "
C. B. Converse	" "
W. A. Clark	" "
C. W. Cropper	" "
D. W. Culver	" "
A. H. Clark	Kearny Twp.
S. W. Clark	Jersey City.
Fred. M. Corwin	Bayonne.
B. P Craig	Jersey City.
A. J. Carpenter	" "
E. A. Cudlipp	" "
E. H Congdon	" "
Joseph J. Craven	" "
Bernard Clausen	Hoboken.
John Connell	Jersey City.
Walter J. Clark	" "
Harvey R. Cronk	New York.
Jas. E. Cosgrove	Bayonne.
Deborah V. Clute	New York.
Ephraim De Groff	Town of Union.
N. R. Derby	Bayonne.
M. F. De Hart	Jersey City.

HUDSON COUNTY—Continued.

Name.	P. O. Address.
G. K. Dickinson	Jersey City.
W. A. Durrie, Jr.	" "
Alexander Dallas	Bayonne.
E. J. Deraismes	Town of Union.
W. L. Darlington	" " "
John W. Doherty	Jersey City.
M. O'F. Dolphin	Harrison.
Arthur D. De Long	Jersey City.
James Davies	" "
H. S. Drayton	" "
Morris Drossner	" "
Lucius F Donohue	Bayonne.
Jos. M. Doyle	Jersey City.
John R Everett	" "
L. W. Elder	Hoboken.
J. A. Exton	Kearny Twp.
W. T. Elmore	Jersey City.
Benj. Edge	" "
S. R. Forman	" "
W. R. Fisher	Hoboken.
J. F. Finn	Jersey City.
J. T. Field	Bayonne.
Johannes Faber	Jersey City.
N. Foote	" "
Henry G. Fish	Newark.
John H. Finnerty	Jersey City.
Julius Fehr	Hoboken.
S. E. Fernold	Jersey City.
J. E. Fopeano	Hoboken.
W. F. Faison	Jersey City.
Jos. W. Finerty	" "
Jas. N. Faulkner	Hoboken.
Nelson Fanning, Jr.	Jersey City.
Zachary Peck Fletcher	" "
R. B. Gilman	" "
L J. Gordon	" "
F. D. Grey	" "
L. V. Guerin	" "
W. Griswold	" "
R. W. Gelback	Hoboken.
L G. Goode	Jersey City.
Francis B. Grew	Hoboken.
J. H. Graham	New York
Eugene H. Goldberg	Kearny.
D. T. Gray	Jersey City.
James E Gray	" "
Wm. C. Gallagher	" "
Josiah Hornblower	" "
T. R. Hornblower	" "
D S. Hardenberg	" "
A. V. Hill	Guttenberg.
A. J. Holcombe	Jersey City.
S. A. Helfer	Hoboken.
Melissa Hinchman	Jersey City.
H W A. Haase	" "
Peter Hoffman, Jr.	" "
J P. Henry	" "
Jas. Hoffman	Jersey City.
P. Hommell	" "
C Percy Hopper	" "
H. J. Holcombe	" "
Willard Hillegar	" "
Henry D. Holt	" "
Alfred W. Herzog	Hoboken.
S. A. Hollister	Jersey City.
C. L. Humphrey	" "
Richard Henning	" "
Chas. D. Hill	" "
Harry Hawlik	" "
Geo. W. Harder	" "
Mary E Hennessy	New York City.
F. C. Heppenheimer	" " "
Max Hecht	West Hoboken,
C. L G Hoening	" "
Roy Inglis	Jersey City.
C. E Jaeckel	" "
Wm. F. Jones	" "
Fred. L. Johnson	" "
Wm. A. Judson	Town of Union.
Matilda A. Jardine	" " "
John Kudlich	Hoboken.
Adolph Kirsten	Jersey City.
John Keating	" "
Wm. T. Keeler	New York.
Geo. W. King	Snake Hill.
W. T. Kudlich	Hoboken.
Calvin F. Kyte	Jersey City.
T. Harris Kirk	Hoboken.
E. F. Kopetschny	Jersey City.
O. E. Kopetschny, Jr.	" "
Gertrude B. Kelly	Hoboken.
A. C. Kammerer	"
Richard Kuehne	Jersey City.
Arthur Kahn	" "
John S. Kelly	" "
W. H. Keller	Bayonne.
A. A. Lutkins	Jersey City.
M. Lampson	" "
E. J. Lowenthal	Hoboken.
John Lochner	Jersey City.
W. C. Lutkins	" "
Henry H. Lynch	" "
E. H. Linnell	Hoboken.
Albert J. Lignot	Jersey City.
H. L. Lockwood	" "
A. J. Loomis	" "
John T. Luck	Town of Union.
E. P. Luce	Bayonne.
C. A. Limeburner	Jersey City.
W. C. Lewis, Jr.	" "
Geo. W La Vence	" "
Joseph W. Love	" "
T. F. Morris	" "
Daniel Murray	" "

HUDSON COUNTY—Continued.

Name.	P. O. Address.
John Mohns	Town of Union.
Louis Michel	West Hoboken.
S. V. Morris	Jersey City.
S. I. Myers	Bayonne.
A. T. Muzzy	Jersey City.
Ed. Muller	Hoboken.
Christian Mohns	Town of Union.
A. C Muttart	Jersey City.
J. W. MacMillan	" "
Geo. F. Maerker	Newark.
T. D. MacRae	Harrison.
Euphemia J. Myers	New York.
J. D. Montmarquet	Jersey City.
Edward M. Merrins	" "
Mary E. Mitchell	" "
Edward Mulvany	" "
J. D. McGill	" "
T. J. McLaughlin	" "
C. Holmes McNeil	" "
D. McClellan	West Hoboken.
W. J. McDowell	Jersey City.
Geo. D. McGauran	New York City.
Andrew McFarlane	Jersey City.
Jno. J. McLean	" "
Geo. E. McLaughlin	" "
Edw. B. Meisgeier	West Hoboken.
W. H. Newell	Jersey City.
F. E. Noble	" "
Frank Nichols	Hoboken.
J. L. Nevin	Jersey City.
H. L. Norris	West Hoboken.
R. G. Nolan	Bergen Point.
Jno. J. Nevin	Jersey City.
H. F. Nichols	Hoboken.
Jennie W Newell	Jersey City.
Andrew L. Nelden	" "
A. J. Nabers	Bayonne.
W. R. Nevin	Jersey City.
T. C. O'Callaghan	" "
L. F. Ossa	New York City.
L. A. Opdyke	Jersey City.
Patrick O'Sullivan	" "
Chas. Pomeroy Opdyke	" "
E. W. Pyle	" "
R. M. Petrie	" "
J. J. Prendergast	Brooklyn.
John Pindar	Hoboken.
James Paul	Jersey City.
F. W. Pettigrew	" "
R. W. Peacock	" "
F. G. Payn	Bayonne.
Fred G. Pitts	Hoboken.
Gotthold Pape	"
W. J Parker	Jersey City.
C. E Putman	" "
W. L. Pyle	" "
John Pringle	Kearny Twp.
Nathan J. Paddock	Jersey City.
August Chas. Pfenning	West Hoboken.
D. B. Pindar	Hoboken.
Geo. E. Potter	Jersey City.
Louis Eben Poole	" "
J. W. Quimby	" "
H. E. Rothe	Harrison.
H. B. Rue	Hoboken.
J. H. Rosenkrans	"
Jno. W. Reid	Kearny Twp.
W. H. Russell	Jersey City.
T. C. Rhoads	Hoboken.
W. F. Radue	Jersey City.
D. L. Reeve	" "
Herm. J. Rechard	" "
A. G. Renwick	" "
Jay H. Radley	Hoboken.
Jos. G. Rooney	Weehawken.
S. V. W. Stout	Jersey City.
M. F. Squier	Harrison.
G. D. Saltonstall	Hoboken.
Fred. Selnow	Jersey City.
Noah Sanborn	Bayonne.
H. R Simmons	Jersey City.
P. M. Senderling	" "
F. Straughn	" "
H. Melville Smith	" "
J. E. Salter	Bayonne.
H. D. Sherwood	Jersey City.
Hugo Senftleben	" "
Fennimore C. Smith	Guttenberg.
C. I Simon	Hoboken.
Fred. Spring	Bergen Point (Bayonne).
Richard Schlemm	Town of Union.
E. T. Steadman	Hoboken.
J. A. Stegmair	Jersey City.
G. E. Steel	" "
Chas, F. Snyder	" "
A. L. W. Stephenson	New York City.
John J. Sutton	Bayonne.
Geo. M. Silvers	Jersey City.
Theo. Schindeler	Hoboken.
Francis W. Shain	Jersey City.
M. G. Simpson	" "
Hulda G. Smith	" "
Matthew J. Smith	" "
Adolph H. Schonger	New York.
Richard J. Schofield	Jersey City.
Edward Sutton	Bayonne.
Jas. L. Shiland	"
Ernest C. Schultze	Hoboken.
Geo. H. Sexsmith	Jersey City.
G. N. Tibbles	" "
Paul J. Taylor	Hoboken.
Julian P. Thomas	Jersey City.
Henry A. Towle	Newark.

HUDSON COUNTY—Continued.

Name.	P. O. Address.
A. F. Van Horn	Jersey City.
J. H. Vondy	" "
W. W. Varick	" "
J. P. Van Horne	" "
Hamilton Vreeland	" "
J. Vander Back	Guttenberg.
John D. Van Saun	Jersey City.
B. Vallarino	New York City.
B A. Watson	Jersey City.
W. Perry Watson	" "
T. F. Wolfe	" "
James Wilkinson	" "
W. P. Watson	" "
George Wilkinson	" "
W. P. Ware	" "
Conrad Wienges	" "
John Williams	Kearny Twp.
Joseph Wolfson	Jersey City.
A. W. Warden	Weehawken.
Jas. E. Weeks	Jersey City.
Chas. F. Wolff	Town of Union.
Mary A. Willis	Jersey City.
W. S. Wilson	" "
H. S. Warwick	" "
Thompson Whalley	" "
T. D. Williams	" "
Jno. E. West	" "
Louis Wolfstvin	Hoboken.
A. P. Walter	Jersey City.
Walter Wilkinson	" "
Otto A. Weigand	Hoboken.
Guillianne A Zabriskie	New York City.
Otto Ziegenhorn	Hoboken.

HUNTERDON COUNTY.

ALEXANDRIA TOWNSHIP.

Name.	P. O. Address.
M. D. Knight	Little York.
H. Race	Pittstown.

BETHLEHEM TOWNSHIP.

Name.	P. O. Address.
G. M. Pidcock	Bloomsbury.
Thomas E. Hunt	Glen Gardner.
Edgar Hunt	" "
Wm. R. Little.	Bloomsbury.
A. C Smith	"
Howard Servis	Junction.
Robert Fenwick	"

CLINTON TOWNSHIP.

Name.	P. O. Address.
Willard E. Berkaw	Annandale.
Joseph A. Stites	Lebanon.

CLINTON BOROUGH.

Name.	P. O. Address.
S. Van Sickle	Clinton.
Wm. Knight	"
W. C. Warrington	"
A. Jacobus	"

DELAWARE TOWNSHIP.

Name.	P. O. Address.
Geo V. Best	Rosemont.
Wm. E. Cornog	Sergeantsville.
John H. Fretz	Stockton.

EAST AMWELL TOWNSHIP.

Name.	P. O. Address.
Peter C. Young	Ringoes.
J. W. Silvara	"
C. W. Larison	"
Chas. F. Creveling	Reaville.
A. M. Hart	Ringoes.

FRANKLIN TOWNSHIP.

Name.	P. O. Address.
Q. E. Snyder	Quakertown.

BOROUGH OF FRENCHTOWN.

Name.	P. O. Address.
A. B. Nash	Frenchtown.
E. K. Denny	"
W. F. Finney	"
Dr. Harmon	"

HIGH BRIDGE TOWNSHIP.

Name.	P. O. Address.
William C. Alpaugh	High Bridge.
William Hacket	" "

HOLLAND TOWNSHIP.

Name.	P. O. Address.
J. N. Lowe	Milford.
Geo. Ribble	"

KINGWOOD TOWNSHIP.

Name.	P. O. Address.
E. D. Leidy	Baptisttown.

CITY OF LAMBERTVILLE.

Name.	P. O. Address.
Geo. L Romaine	Lambertville.
Edw'd W. Closson	"
Peter McGill	"
George P. Swift	"
Walter W. Nayler	"
Jas. E. Stiles	"
Geo. H. Larison	"
Frank W. Larison	"
Clarence T. Kurtz	"

HUNTERDON COUNTY—Continued.

LEBANON TOWNSHIP.

Name.	P. O. Address.
Theodore B. Fulper	Glen Gardner.
Terrence M. A. Herron	Junction.

RARITAN TOWNSHIP.

Name.	P. O. Address.
J. H. Ewing	Flemington.
W. H. Schenk	"
Geo. R Sullivan	"
A. Parish	"
O. H. Sproul	"
Eugene Garretson	Reaville.
J. V. Robbins	Flemington.
T. B. J. Burd	"

READINGTON TOWNSHIP.

Name.	P. O. Address.
W. W. Pursell	White House Station.
J. V. Johnson	White House Station.

TEWKSBURY TOWNSHIP.

Name.	P. O. Address.
Henry H. Miller	Mountainville.
Theodore Miller	Califon
F. L. Johnson	Pottersville.
F. A. Apgar	New Germantown.

UNION TOWNSHIP.

Name.	P. O. Address.
N. B. Boleau	Jutland.

WEST AMWELL TOWNSHIP.

(No physicians reported)

MERCER COUNTY.

EAST WINDSOR TOWNSHIP.

Name.	P. O. Address.
L Wilbur	Hightstown.
W. L. Wilbur	"
Geo E. Titus	"
J. P. Johnson	"
Geo H. Franklin	"

EWING TOWNSHIP.

Name.	P. O. Address.
John W. Ward	Trenton.
John Kirby	"

HAMILTON TOWNSHIP.

Name.	P. O. Address.
George R. Robbins	Hamilton Square

HOPEWELL TOWNSHIP.

Name.	P. O. Address.
Jno. A. Miller	Hopewell.
Edw'd P. Hawke	"
Israel Hart	Pennington.
Edgar Hart	"
E. L. Welling	"
Wm. Radcliffe	Woodsville.
O. G. Sands	Titusville.

LAWRENCE TOWNSHIP.

Name.	P. O. Address.
E. De Witt	Lawrenceville.
Dr. Johnson	"

PRINCETON TOWNSHIP.

Name.	P. O. Address.
J. G. Bayles	Princeton.
E H. Bergen	"
A. K. Kline	Princeton.
O. H. Bartine	"
A. K. Macdonald	"
J. H. Wikoff	"
Wm. J. Lytle	"

CITY OE TRENTON.

Name.	P. O. Address.
Richard R. Rogers	Trenton.
Cornelius Shepherd	"
David Warman	"
Lyman Leavitt	"
Wm W. Wyckoff	"
H. Waldburg Coleman	"
William Elmer	"
Thos. H. Mackenzie	"
William S. Lalor	"
Chas. H. Dunham	"
William Rice	"
Wm. A. Clark	"
Wm. B. Van Duyn	"
Rob't C. Hutchinson	"
Ezra M. Hunt.	"
Henry M. Weeks	"
Chas. B. Leavitt	"
Chas. H. McIllwaine	"
Horace G. Wetherill	"
Wm McD. Struble	"
Elmer H. Rogers	"
Joseph B. Shaw	"
Addison H. Dey	"
Frank V. Cantwell	"

MERCER COUNTY—Continued.

Name.	P. O. Address.
Margaret H. Preston	Trenton.
Frank H. Williams	"
Jos. C. Boardman	"
Isaac Cooper	"
A. H. Worthington	"
Wm. G. McCullough	"
Chas. W. Gerry	"
Nelson D. Oliphant	"
Edward Kelly	"
C. F. Adams	"
H. M. Beatty	"
C. C Brown	"
A. Coleman	"
J. W. Cooper	"
H. B Costill	"
W. H. G. Griffith	"
E. E. Hollinshead	"
M. Jenkins	"
E. W. Johnson	"
F. Johnson	"
W. McDonald	"
W. T. Rogers	"
J. H. Satterthwaite	"
J. P. Turner	"
J. D. Tantum	"
E Witte	"
J. K. Young	"
John Woolverton	"
Wm. W. L. Phillips	"
Richard R. Rogers, Jr	"
Elmer Barwis	"

Name.	P. O. Address.
J. D. Abbott	Trenton.
A. T. Bruere	"
Dr. Burroughs	"
J. Bruyere	"
Wm. Dickinson	"
E. J. Doud	"
J. J. Encke	"
P. G. Gallagher	"
H. G. Norton	"
H. Shafer	"
G. A. Silvers	"
H. H. Sinne	"
E. R. Skellinger	"
A. C. Stokes	"
G. W. Strong	"
J. M. Wells	"
G. D Weston	"
A. Woodward	"
H. R. Worthington	"
W. Young	"
L. Satterthwaite	"
John C. Felty	"
Dennis C. Leary,	"
Wm. Watson Woolsey	"

WASHINGTON TOWNSHIP.

Geo. A. Silvers.....Windsor.

WEST WINDSOR TOWNSHIP.

(No physicians reported.)

MIDDLESEX COUNTY.

CRANBURY TOWNSHIP.

Name.	P. O. Address.
H. C. Symmes	Cranbury.
J. H. Widdikes	"

EAST BRUNSWICK TOWNSHIP.

John C. Thompson.....South River.
John J. Bissett..... " "
C. J. W. Van Dyke.....Spotswood.

MADISON TOWNSHIP.

S. M. Disbrow.....Old Bridge.

MONROE TOWNSHIP.

J. L. Suydam.....Jamesburg.
H. D. Zant..... "

CITY OF NEW BRUNSWICK.

Henry R. Baldwin.....New Brunswick.
E. H Barber..... " "

Name.	P. O. Address.
Staats V. D. Clark	New Brunswick.
David C. English	" "
John Helm	" "
Samuel Long	" "
J. Warren Rice	" "
Patrick A. Shannon	" "
John S. Van Marter	" "
Chas. U. Voohees	" "
Nicholas Williamson	" "
Edward B Young	" "
C. T. Applegate	" "
C. M. Slack	" "
A. V. N. Baldwin	" "
David Davis	" "
Franklin B Lippincott,	" "

NORTH BRUNSWICK TOWNSHIP.

J. E. Riva .....Milltown.

MIDDLESEX COUNTY—Continued.

CITY OF PERTH AMBOY AND TOWNSHIP.

Name.	P. O. Address.
J. Glirlson	Perth Amboy.
L. S. Blackwell	" "
W. W. Hubbard	" "
W. P. Keasbey	" "
E. A. Hults	" "
H. W. Phillips	" "
Wm. E. Ramsay	" "
Dr. Wilson	" "

PISCATAWAY TOWNSHIP.

Wm. J. Nelson .....New Market.
M. J. Whitford..... " "
D. P. Vail..... " "
P. W. Brakley .....Dunellen.
H. M. Champney..... "

RARITAN TOWNSHIP.

Charles H. Andrus.....Metuchen.
E. B. Dana..... "

Name.	P. O. Address.
A. C. Hunt	Metuchen.
W. V. McKenzie	"

SAYREVILLE TOWNSHIP.

Jesse Beekman.....Sayreville.

BOROUGH OF SOUTH AMBOY.

A. Traganowan.....South Amboy.
E. E. Haines..... " "
E. Miller..... " "
S. H. Lewis..... " "
John Henry Price..... " "

SOUTH BRUNSWICK TOWNSHIP.

Edgar Carroll.....Dayton.

WOODBRIDGE TOWNSHIP.

Samuel E. Freeman.....Woodbridge.
Samuel Harned..... "
Dayton E. Decker..... "
Stephen J. Keefe..... "

MONMOUTH COUNTY.

ATLANTIC TOWNSHIP.

Name.	P. O. Address.
James E. Cooper	Colt's Neck.

EATONTOWN TOWNSHIP.

Wm. B. Beach.....Eatontown.
Geo. H. Baker..... "
W. S. Kimball..... "
E. W. Beach.....W. Long Branch.

FREEHOLD TOWNSHIP AND VILLAGE.

Isaac S. Long.....Freehold.
Otis R. Freeman..... "
D. McLean Forman..... "
William M. Hepburn..... "
Harry Neafie..... "
James G. Maynard..... "
William W. Burnett..... "
Neil J. Hepburn..... "

HOLMDEL TOWNSHIP.

H. G. Cook.....Holmdel.

HOWELL TOWNSHIP.

Stephen M. Disbrow.....Farmingdale.
Vandevere M. Disbrow.. "
William R. Kinmouth... "

MANALAPAN TOWNSHIP AND BOROUGH OF ENGLISHTOWN.

Name.	P. O. Address.
Asher T. Applegate	Englishtown.
George H. Hutchinson	"

MARLBORO TOWNSHIP.

J. D. Ely.....Marlboro.

MATAWAN TOWNSHIP.

A. J Jackson.....Matawan.
C. Knecht..... "

MIDDLETOWN TOWNSHIP.

Edw. F. Taylor.....Middletown.
Dan'l D. Hendrickson... "
Wm. F. Patterson.....Chapel Hill.
R. F. Andrews.....Navesink.
Geo. B. Labaw..... "
John H. Van Mater.... Atlantic Highlands.
H. A. Hendrickson..... " "
Geo. D. Fay..... " "
Susan Ewing..... " "

MILLSTONE TOWNSHIP.

R. M. Smith..... Perrineville.

MONMOUTH COUNTY—Continued.

NEPTUNE TOWNSHIP.

Name.	P. O. Address.
H. S. Kinmouth	Asbury Park.
Samuel Johnson	" "
J. A. W. Hetrick	" "
Bruce S. Keator	" "
Alex. Williamson	" "
I. N. Beegle	Ocean Grove.
R. A. Tusting	Asbury Park.
H. B. Alday	Ocean Grove.
J. H. Alday	" "
D. M. Barr	" "
G. F. Wilbur	Asbury Park.
Charles Carsner	Ocean Grove.
P. L. Tantum	" "
Mrs. Dr. Currie	" "
F. T. Alba	Bradley Beach.
Henry Mitchell	Asbury Park.
H. S. Des Anges	" "
J. H. Mackintosh	" "
Dr. Marshall	Ocean Grove.
C. Pemberton	Asbury Park.
J. T. Ackerman	" "

OCEAN TOWNSHIP AND LONG BRANCH.

H. H. Pemberton	Long Branch.
John P. Pemberton	" "
J. B. Goodenough	" "
J. O. Green	" "
G. W. Brown	" "
Chas. A. Vanderveer	" "
J. W. Taylor	" "
J. W. Bennett	" "
Henry Hughes	" "
W. E. Newing	" "
E. Thierceland	" "

RARITAN TOWNSHIP.

Jos E. Arrowsmith	Keyport.
C. H. Hamilton	"
W. E. Johnson	"
D. E. Roberts	"
E. B. Reed	Keyport.
W. W. Palmer	"
W. A. Bevins	"
G. T. Welch	"
B. W. F. Underwood	"

SHREWSBURY TOWNSHIP.

A. A. Armstrong	Fair Haven.
W. A. Betts	Red Bank.
T. A. Curtis	" "
F. T. Chadwick	" "
James S. Conover	" "
Edwin Field	" "
John Keough	" "
Geo. F. Alexander	" "
T. E. Ridgeway	" "
J. E. Sayre	" "
Al. Trafford	" "
Wm. Warner	" "
Walter S. Whitmore	Oceanic and Red Bank.
Mrs Zandt	Red Bank.
J. K. Cheesman	" "
J. J. Reed	Seabright.

UPPER FREEHOLD TOWNSHIP.

T. C. Price	Imlaystown.
Geo. M. Shafer	Ocean Ridge.
H. P. Johnson	Allentown.
D. B. Pumyea	"

WALL TOWNSHIP.

Robert Laird	Manasquan.
A. A. Higgins	"
R. W. Herbert	"
J. B. Wainright	"
W. L Kinmouth	Belmar.
C. H. Thompson	"
E. Thompson	"
W. W. Trout	Spring Lake.
J. F. Davison	Glendola
A. P. Yelvington	Manasquan.

MORRIS COUNTY.

BOONTON TOWNSHIP.

Name.	P. O. Address.
Cuthbert Wigg	Boonton.
J. G. Ryerson	"
A. E. Carpenter	"
Mrs. H. M. C. Woodruff	"

CHATHAM TOWNSHIP.

Wm J. Wolfe	Chatham.
George M. Swain	"

CHESTER TOWNSHIP.

Name.	P. O. Address.
Levi W. Case	Chester.
Alonzo Green	"
Smith E. Hedges	"

HANOVER TOWNSHIP.

E. P Cooper	Troy Hills.
H. B. Andrews	Morris Plains.

MORRIS COUNTY—Continued.

JEFFERSON TOWNSHIP.

Name.	P. O. Address.
Sylvester Utter	Woodport.

BOROUGH OF MADISON.

Calvin Anderson	Madison.
Stuart H. Reed	"
William H. Martin	"

MENDHAM TOWNSHIP.

John S. Stiger	Mendham.
I. Henry Stiger	"
George S. De Groot	"

MONTVILLE TOWNSHIP.

(No physicians reported.)

MORRIS TOWNSHIP AND MORRISTOWN.

Jos. R. Hoffman	Morristown.
J. Boyd Risk	"
A. Becker	"
A. A. Lewis	"
F. W. Owens	"
Stephen Pierson	"
P. C. Barker	"
J. H. Reily	"
J. C. Douglass	"
F. S. Bradford	"
A. Uberlacker	"
Wm. J. Parmlee	"

MOUNT OLIVE TOWNSHIP.

Chas. N. Miller	Flanders.

PASSAIC TOWNSHIP.

(No physicians reported.)

PEQUANNOCK TOWNSHIP.

Name.	P. O. Address.
Geo. A. Coates	Butler.
H. V. Day	Bloomingdale.
A. A. McWhithey	Pompton.
C. D. V. Romont	Pompton Plains

CITY OF DOVER AND TOWNSHIP OF RANDOLPH.

T. R. Crittenden	Dover.
I. W. Condit	"
Geo O. Cummins	"
R. L. Cook	"
R. A. Bennett	"
W. E. Derry	"
John J. Smith	"
Dr. Lindaberry	"
Dr. Miller	Port Oram.
H. W. Kice	" "
John Walters	" "
Miss Mary Ford	Dover.

ROCKAWAY TOWNSHIP.

John W. Jackson	Rockaway.
J. V. Menagh	"
R. C. Lunsden	"
F. W. Flagge	"
G. W. Foster	Rockaway or Port Oram.
W. Walters	Rockaway.

ROXBURY TOWNSHIP.

N. H. Adsit	Succasunna.
J. L. Taylor	"

WASHINGTON TOWNSHIP

E. C. Willett	German Valley.
Levi Farrow	Middle Valley.
John Miller	Stephensburg.
Peter S. Hann	German Valley.

OCEAN COUNTY.

BERKELEY TOWNSHIP.

(No physicians reported.)

BRICK TOWNSHIP.

Name.	P. O. Address.
D. H. Mount	Bay Head.
W. H. Katzenbach	" "
B. F. Hawley	" "
J. H. Platt	Lakewood.
H. J. Cute	"
G. S Turris	Burrsville.
H. A. Bennett	Point Pleasant.

DOVER TOWNSHIP.

R. L. Disbrow,	Toms River.
E. C. Disbrow	" "
I. C. Schureman	" "
John W. Webb	" "

EAGLESWOOD TOWNSHIP.

(No physicians reported)

OCEAN COUNTY—Continued.

JACKSON TOWNSHIP.

(No physicians reported)

LACEY TOWNSHIP.

Name.	P. O. Address.
C. R. Van Doren	Forked River.
C. B. Weaks	" "

MANCHESTER TOWNSHIP.

Irvin W. Kirk	Manchester.

OCEAN TOWNSHIP.

(No physicians reported.)

PLUMSTEAD TOWNSHIP.

Name.	P. O. Address.
William McMillen	New Egypt.
Howard Allen	" "
Charles Woodard	" "
Daniel A. Warren	" "

STAFFORD TOWNSHIP.

Samuel B. Irwin	Manahawkin.

UNION TOWNSHIP.

Edmund Bennett	Barnegat.

PASSAIC COUNTY.

ACQUACKANONK TOWNSHIP.

(No physicians reported.)

LITTLE FALLS TOWNSHIP.

Name.	P. O. Address.
M. Van Winkle	Little Falls.
J. R. M. Gedney	" "
E. A. Keeler	" "

MANCHESTER TOWNSHIP.

(No physicians reported.)

CITY OF PASSAIC.

Richard A Terhune	Passaic.
Cornelius Van Riper	"
George T. Welsh	"
Chas. A. Church	"
N. C. Ricardo	"
William H. Carroll	"
Percy H. Terhune	"
G. J. Van V. Schott	"
John Sullivan	"
J. T. Hadley	"
Edwin De Baun	"
F. F. Demarest	"
F. H. Rice	"

PASSAIC TOWNSHIP.

(No physicians reported.)

CITY OF PATERSON.

J. Henggler	Paterson.
Walter B. Johnson	"
Thomas J. Kane	"
Henry Kip	"
John L. Leal	"
E. S. McClellan	Paterson.
S. R. Merrill	"
C. F. W. Meyers	"
Elias J. Marsh	"
Rush Neer	"
Wm. K. Newton	"
T. F. O'Grady	"
Henry Parke	"
J. P. Paxton	"
A. W. Rogers	"
James W. Smith	"
Spencer Van Dalsen	"
C. S. Van Riper	"
Henry Withers	"
W. S. Hurd	"
T. Y. Kinne	"
P. S. Kinne	"
Davis P. Borden	"
John H. Bradsworth	"
W. F. Decker	"
F. D. Vreeland	"
James Crooks, Jr	"
John Thomas Gillson	"
Thomas Lloyd Paton	"
James F. Stewart	"
M. W Gillson	"
Geo. F. Newcombe	"
F. J. Hepworth	"
S. Cyrus Townsend	"
Frank E. Agnew	"
B. C. Magennis	"
Ada Carr	"
A. D Jousset	"
J Solatinor	"
Willhelm C. Dittmar	"
Edward W. Doty	"
John R. Merrill	"
James Crooks	"

PASSAIC COUNTY—Continued,

Name.	P. O. Address.
James K Atkinson	Paterson.
C. Percy Hopper	"
John H. Banta	"
James S. Bibb	"
Wm. Blundell	"
Philander A. Harris	"
Geo. W. Terriberry	"
Calvin Terriberry	"
O. V. Garnett	"
D. J. Bowden	"
Alexander Brown	"
Charles C. Crocker	"
George Fisher	"
William S. Green	"
A F. McBride	"
William Matzinger	"
Edward B Morgan	"
S. F. Wiley	Paterson.
Thos. B. Hopper	"

POMPTON TOWNSHIP.

J. C. Morgan	Pompton.
E. H. Wenarsey	Midvale.

WAYNE TOWNSHIP.

William Colfax	Pompton.

WEST MILFORD TOWNSHIP.

W. S. Coursen	Oak Ridge.
Theodore Coursen	" "
R. G Maines	West Milford.
Charles A Olcott	" "

SALEM COUNTY.

ALLOWAY TOWNSHIP.

Name.	P. O. Address.
Warren L. Ewen	Alloway.
Lemuel Wallace	"

ELSINBORO TOWNSHIP.

(No physicians reported.)

LOWER ALLOWAYS CREEK TOWNSHIP.

W. S. Smith	Hancock's Bridge.
F. B. Harris	Canton.

LOWER PENNS NECK TOWNSHIP.

Wm. H. James	Pennsville.

MANNINGTON TOWNSHIP.

(No physicians reported.)

OLDMANS TOWNSHIP.

James B. Ware	Pedricktown.
Harry T. Johnson	"
James Given	Auburn.

PILESGROVE TOWNSHIP.

L A. D. Allen	Woodstown.
Uriah Gilman	"
Ellis F. Frost	"
William Patrick	"
P. G Sowder	"
Mrs. Naomi B. Foster	"
Miss Sarah Taylor	Woodstown.
Charles Newton	Sharptown.

PITTSGROVE TOWNSHIP.

C. P. Atkinson	Palatine.
A. B Woodruff	Elmer.
C. P. Cheeseman	"

QUINTON TOWNSHIP.

Wm. T. Good	Quinton.
David Wiley	Salem.
Francis Bilderback	"
A. T. Beckett	"
Henry Jackson	"
E. S. Sharpe	"
J. A. Patterson	"
Theo. Patterson	"
B. A. Waddington	"
Henry Chevanne	"
Quinton Gibbon	"

UPPER PENNS NECK TOWNSHIP.

Mayhew Johnson	Pennsgrove.
John H. Groff	"
John Summerhill	"
Daniel Garrison	"
David Moore	"
Henry W. Flanagan	"
Nathan H. Barnhart	"

UPPER PITTSGROVE TOWNSHIP.

M. J. Paulding	Daretown.

SOMERSET COUNTY.

BEDMINSTER TOWNSHIP.

Name.	P. O. Address.
E. F. Farrow	Peapack.
Edward Perry	"
J. B. Beekman	Pluckamin.

BERNARDS TOWNSHIP.

A. F. Voorhies	Baskingridge.
John Dayton	"
Fred. Jones	"
E. M. Stelle	Bernardsville.
Fred. C. Sutphin	Liberty Corner.

BRANCHBURG TOWNSHIP.

A. Nelson	Neshanic Station.

BRIDGEWATER TOWNSHIP.

H. G. Wagoner	Somerville.
W. J. Swinton	"
Wm. B. Mattison	"
J. F. McWilliams	"
Dr. Stilwell	"
Mary Gaston	"
T. H. Flynn	"
A. P. Hunt	"
Arthur Kenney	"
J. P. Hect	Raritan.
Dr. Dugan	"
B. B. Mathews	Bound Brook.
C. R. P. Fisher	" "
J. L. Compton	" "

Name.	P. O. Address.
C. F. Phinney	Bound Brook.
E. C. Davis	" "
E. E. Conover	North Branch.

FRANKLIN TOWNSHIP.

Fred. W. Hagerty	Bloomington.
G. G. Hoagland	Franklin Park.
Wm. B. Ribble	East Millstone.

HILLSBOROUGH TOWNSHIP.

S. O. B. Taylor	Millstone.
George Van Neste	"
Wm. H. Merrill	South Branch.
Dr. Anderson	Neshanic.

MONTGOMERY TOWNSHIP.

Jesse S. B. Ribble	Harlingen.
Abram B. Mosher	Griggstown.
Lucius D. Tompkins	Harlingen.
W. B. Searle	Rocky Hill.

NORTH PLAINFIELD TOWNSHIP.

Daniel C. Adams	Plainfield.
J. H. Carman	"
W. E. Mattison	"
J. H. Cooley	"

WARREN TOWNSHIP.

Peter J. Zeglio	Warrenville.

SUSSEX COUNTY.

ANDOVER TOWNSHIP.

Name.	P. O. Address.
Jeptha C. Clark	Andover.
Wm. R Smith	"

BYRAM TOWNSHIP.

C. R. Nelden	Stanhope.
C. H. Davison	"

FRANKFORD TOWNSHIP.

Joseph Hedges	Branchville.
J. Cole Price	"
Edward S. Dalrymple	"

GREEN TOWNSHIP.

Sidney B. Straley	Huntsville.

HAMPTON TOWNSHIP.

(No physicians reported.)

HARDYSTON TOWNSHIP

Name.	P. O. Address.
J. B. Pellet	Hamburg.
J. P. Couse	"

LAFAYETTE TOWNSHIP.

John C. Strader	Lafayette.
John L. Allen	"

MONTAGUE TOWNSHIP.

(No physicians reported.)

TOWN OF NEWTON.

Wm. Henry Lewis	Newton.
Levi D. Miller	"
Ephraim Morrison	"
Bruno Hood	"
Shepard Voorhees	"

SUSSEX COUNTY—Continued.

SANDYSTON TOWNSHIP.

Name.	P. O. Address.
J. M. Miller	Laytons.
Martin Cole, Jr	Hainesville.

SPARTA TOWNSHIP.

T. H. Andress	Sparta.
L. C. Burd	Ogdensburg.

STILLWATER TOWNSHIP.

C. V. Moore	Stillwater.
J. H. McCloughn	Swartswood.
Jos. T. Hetzel	Stillwater.

VERNON TOWNSHIP.

Name.	P. O. Address.
Carlos Allen	Vernon P. O.

WALPACK TOWNSHIP.

(No physicians reported.)

WANTAGE TOWNSHIP.

Jos. Woolfe	Coleville.
E. C. Armstrong	Deckertown.
John Moore	"
H. D. Van Gaesbeck	"
Benj. Ferguson	Beemerville.
D. W. Cooper	Unionville.

UNION COUNTY.

CLARK TOWNSHIP.

(No physicians reported.)

CRANFORD TOWNSHIP.

Name.	P. O. Address.
Dr. McConnell	Cranford.
W. Cornell Allen	"

CITY OF ELIZABETH.

George W. Bailey	Elizabeth.
Pierce A. Banker	"
Rob't Brittain	"
Josephine I. Burceau	"
Louis R. Brown	"
Crane & Bridgeman	"
Anna J. Crouthers	"
Alfred Q. Donovan	"
Eleanor E. Galt	"
E. C. Jenigor	"
James S. Green	"
I. H. Grier	"
E. B. Grier	"
Thos. E. Hough	"
Herbert S. Jones	"
Johanna G. Leary	"
F. F. Livingood	"
W. A. M Mack	"
Thomas N. McLean	"
David M. Miller	"
Wm. A. Miller	"
J. B Morton	"
Victor Mravlag	"
E. R. O'Reilly	"
Alonzo Pettit	"

Name.	P. O. Address.
John H. Pickett	Elizabeth.
Davis Schleimer	"
Thomas Terrill	"
William F. Turner	"
N. L. Wilson	"
John Younglove	"

FANWOOD TOWNSHIP.

F. W. Wescott	Scotch Plains.
J. Ackerman Coles	" "

LINDEN TOWNSHIP.

Henry C. Pierson	Roselle.

NEW PROVIDENCE TOWNSHIP.

A. M Cory	New Providence.

CITY OF PLAINFIELD.

J. A. Allis	Plainfield.
J. F. Berg	"
W. C. Boone	"
Thos. S. Davis	"
J. T. Fritts	"
J. F. Griffen	"
E. W. Hedges	"
O. L Jenkins	"
Sarah D Keeney	"
M. B. Long	"
H. H. Lowrie	"
A. Manning	"
W. H. Murray	"

UNION COUNTY—Continued.

Name.	P. O. Address.
Rebecca P. Page	Plainfield.
Comyges Paul	"
John B. Probasco	"
E. Rushmore	"
M. S. Simpson	"
T. H. Tomlinson	"
G. W. Endicott	"
C. M. Field	"

CITY OF RAHWAY.

D. W. C. Hough	Rahway.
Elihu B Silvers	"
W. U Silvers	"
J. J Daly	"
H. Page Hough	"
W. E. Cladek	"
E. J. Westfall	"
F. W. Oliver	"
C. B. Holmes	"
John M. Randolph	"

SPRINGFIELD TOWNSHIP.

Name.	P. O. Address.
T. W. Harris	Springfield.
Thos. J. Cusack	"

SUMMIT TOWNSHIP.

W. H. Risk	Summit.
Wm. H. Lawrence	"
John Burling	"
A. S. Clutterbuck	"

UNION TOWNSHIP.

(No physicians reported.)

WESTFIELD TOWNSHIP.

Joseph B. Harrison	Westfield.
Sherman Cooper	"
Frederick A. Kinch, Jr.	"
Wm. Call	"
T. V. Smith	"
F. McNaughy	"

WARREN COUNTY.

ALLAMUCHY TOWNSHIP.

Name.	P. O. Address.
W. L. Lindabury	Allamuchy.

TOWN OF BELVIDERE.

E. J. Bergen	Belvidere.
W. H. McGee	"
Wm. H. Burd	"
W. C. Albertson	"
F. P. Lefferts	"

BLAIRSTOWN TOWNSHIP.

John C. Johnson	Blairstown.
Harry L. Carhart	"
Milton Armstrong	"
Wm. H. Vail	"

FRANKLIN TOWNSHIP.

Sam'l E. Crisman	Broadway.
F. S. Janson	Asbury.

FRELINGHUYSEN TOWNSHIP.

F. Rorback	Johnsonsburg.

GREENWICH TOWNSHIP.

T. F. Hulshizer	Stewartsville.
E. B Beatty	"
Wm. Shipman	Phillipsburg.

TOWN OF HACKETTSTOWN.

Name.	P. O. Address.
John S. Cook	Hackettstown.
A. C. Vansyckle	"
A. E Martin	"
Gertrude Allen	"
Geo. L. Rundle	"

HARDWICK TOWNSHIP.

(No physicians reported.)

HARMONY TOWNSHIP.

James D. Dewitt	Harmony.
Garner H. Cline	"

HOPE TOWNSHIP.

John Miller	Hope.

INDEPENDENCE TOWNSHIP.

S. W. Rowell	Vienna.
F. W. Haggerty	"

KNOWLTON TOWNSHIP.

(No physicians reported.)

LOPATCONG TOWNSHIP.

(No physicians reported.)

MANSFIELD TOWNSHIP.

Harry S. Founk	Port Murray.

WARREN COUNTY—Continued.

OXFORD TOWNSHIP.

Name.	P. O. Address.
L. B. Hoagland	Oxford.
B. W. Hoagland	"
G. O. Tunison	"
Geo. S. Dearborn	"

PAHAQUARRY TOWNSHIP.

(No physicians reported.)

CITY OF PHILLIPSBURG.

J. M. Reese	Phillipsburg.
R. A. Stewart	"
L. C. Osmun	"
Isaac Barber	"
L. D. Bieber	"
A. C. Jacoby	Phillipsburg.
H. R. West	"
G. C. Young	"
J. H. Griffith	"

POHATCONG TOWNSHIP.

Warford L. Nixon	Riegelsville.
J. C. Albright	Springtown.

CITY OF WASHINGTON.

E. M Cook	Washington.
Wm. Stites	"
J. V. Mattison	"
F. P. McKinstry	"
P. N. Jacobus	"

LIST OF THOSE WHO HAVE PASSED THE EXAMINATIONS OF THE BOARD OF MEDICAL EXAMINERS FROM OCTOBER, 1890, TO JULY, 1891.

Allen, Gertrude	Morristown.
Allen, Jacob M	Blairstown.
Allen, Winfred Cornell	Cranford.
Baird, David, Jr	Manalapan.
Baldwin, Winfred Eugene	Newark.
Beck, Alexander	Arlington.
Bennett, Francis Wayland	Atlantic City.
Blanchard, Oliver Rowland	Jersey City.
Brien, William Miller	Orange Valley.
Bunn, Frank Caulkins	Orange.
Chapman, Robert William, Jr	Newark.
Chew, Elisha Chew	Atlantic City.
Clark, Henry Herbert	Woodbury.
Connett, George Crammer	Morristown.
Cooper, Joseph Howard	Millstone.
Dare, Arthur	Vineland.
Doyle, Joseph Mark	Jersey City.
Drasel, Gustav William	Hoboken.
Felty, John Calvin	Trenton.
Fletcher, Zachary Peck	Jersey City.
Foster, William Story	Flatbrookville.
Friedman, David	Paterson.
Gallagher, William Charles	Jersey City.
Haines, Rowland Ivins	Camden.
Hallock, Henry M	Jersey City.

Hancock, Edward Clinton.....Plainfield.
Hecht, Max.....West Hoboken.
Hedges, Benjamin Van Doren.....Plainfield.
Hetzel, Joseph Linn.....Sussex county.
Hœning, Carl Leopold Gustav.....Hoboken.
Hopper, Thomas Banta.....Paterson.
Inglis, Roy.....Jersey City.
Knecht, Cyrus.....Matawan.
Kurtz, Clarence Suplee.....Lambertville.
Lansing, Joseph Burnside Wands.....Tenafly.
Lasker, Wilhelm.....Fort Lee.
McLaughlin, George Eyerman.....Jersey City.
McNair, Robert Hamilton.....East Orange.
Mailly, Hamilton.....Bridgeton.
Marsh, Caroline Hempstead.....New Brunswick.
Meisgeier, Edward Benno.....West Hoboken.
Moffat, Edgar Victor.....Orange.
Montfort, Robert J.....Elizabeth.
Mulvany, Edward.....Jersey City.
Murphy, Francis Paul Keane.....Jersey City.
Neal, Charles Bodine.....Millville.
Neer, William.....Paterson.
Neilson, William Howard.....New Brunswick.
Nelden, Harry Holcombe.....Stanhope.
O'Hanlon, Joseph Patrick.....Trenton.
O'Leary, Dennis.....Trenton.
Oberndorfer, Isidore Pierce.....Long Branch.
Osmun, Louis Cook.....Hackettstown.
Paris, Louis Jack.....Orange.
Parmley, William Josiah.....Morristown.
Parsons, John Cady.....Jersey City.
Powell, William Macauley.....Atlantic City.
Power, Henry.....Montclair.
Price, John Henry.....South Amboy.
Reed, Howard.....Manasquan.
Reed, Louis Thompson.....Somerville.
Reilly, Philip.....Elizabeth.
Rundle, George Lester.....Hackettstown.
Scofield, Alfred Hedges.....Princeton.
Seidler, William Frederick, Jr.....Newark.
Shelby, Edmund Pendleton, Jr.....Jersey City.
Sherrill, George, Jr.....Jersey City.
Shute, Albert Clement.....Clarksboro.
Smith, Charles Bartles.....Washington.
Snowball, James William.....Flemington.
Sprague, Ezra Kimball.....Jersey City.
Staehlin, Edward.....Newark.
Stein, Frank Ott.....Bayonne.
Tracy, Samuel Gately.....Long Branch.

Trevisanello, Charles.....Paterson.
Underwood, Benoni F. W.....Keyport.
Van Riper, Washington Irving.....Paterson.
Vineberg, Hiram Nahan.....Long Branch.
Voorhees, Shepard.....Newton.
Woolsey, William Watson.....Trenton.
Worl, Edward Eli.....Newark.
Wylie, Louise Lowrie.....Cape May Point.

REPORT

OF THE

BUREAU OF VITAL STATISTICS

OF THE

STATE OF NEW JERSEY

FOR THE

Statistical Year from July 1st, 1890, to July 1st, 1891.

WITH CLIMATOLOGY, LOCALITY, POPULATION,
VITAL RECORDS, ETC.

By EZRA M. HUNT, M.D., D.Sc.,
Secretary and Medical Superintendent of Vital Statistics

REPORT ON VITAL STATISTICS.

BY EZRA M. HUNT, M.D., D.SC., MED. SUP'T. OF VITAL STATISTICS.

INTRODUCTION.

Vital Statistics increase each year in importance as their essential relation to the care of the public health and to other public interests become more and more manifest. The Superintendent of the Eleventh U. S. Census in his report says:

"The great importance of complete and accurate records of vital statistics, including marriages, births, and deaths, is becoming more and more recognized in this country. Such records are the absolutely necessary foundation for well-directed attempts to improve the health and lengthen the life of the people; to increase the productive efficiency of the workers; to form a sound basis for the enormous money interest involved in the business of life insurance, and for other purposes vital to the health and well-being of the population. The great majority of the States have still no satisfactory system for registration of vital statistics, although most of them are slowly being improved in this respect."

At the recent International Congress at London, the section of Demography occupied a large place. Statistical methods seek to furnish a basis of actual fact in place of speculation. Even where tables are incomplete, the approximate methods of numerical calculation and analysis to no small degree allow for errors and correct them by definite and well-ascertained mathematical laws of probabilities. These at least are far more reliable than the vague generalizations of observation and inference. The records of this State have increased in number, in correctness and in value. We find that they were the only ones of all the States found available in our last census for study and comparison, together with those of some of the larger cities.

A comparison of this our thirteenth report of Vital Statistics with the one made for 1878, will show returns out of proportion to the

increase of population, since then some localities made no returns at all, and many more only partial returns. We still fail to get a proper return of births especially in cities, although the deficiency can be calculated with some accuracy. Our chief embarrassment now is that by reason of inadequate appropriation, we are not able to make many of the various tables or combinations of statistics now considered valuable and informatory, and so in fact accumulate material which we cannot use in all the directions in which we can impart information. It fully pays, indeed, in the information which we cull from it as to the course, locality and cause of disease and the different age-periods of human life, but a thorough study and classification would give far more than this.

We are, however, of those who do not believe that it is the duty of the State to use all this material.

A proper method would be that the States should carefully and accurately accumulate the material on a uniform basis, and that then the General Government should look to the States as the source from which it can so copy and arrange as to be of the highest service. Thus the great value of large numbers would be secured, while at the same time there would not be that waste which must occur when each State does that, which is far better done in bulk by the General Government.

Surgeon Billings, in charge of the Vital Statistics of the Eleventh Census, has well illustrated this in the use he has made of the statistics of New Jersey, and of various cities.

If the U. S. Government would by proper appropriation extend the plan, it would be of the greatest service both to the Nation and to the States. At present the statistics of only three or four States are available, but the result would soon bring into line most of the States and cities and secure tables, charts and comments of the highest value in a statistical and practical point of view.

We shall continue to collect, classify and arrange our statistics in the best methods known to us for present and future use, and make the most we can of the means at our command.

Mr. Dallas Reeve, the Registrar of Vital Statistics, by his long and thorough acquaintance with the work and his systematic methods, has placed the Bureau in a most satisfactory condition so far as all the records since 1878 are concerned, and much aids the Medical Superintendent in his department of the work. Since the entire charge of

all searches has been placed in this Bureau, and especially since the demand for pension certificates has increased, it adds greatly to the work of the office. Many of these searches have to be made previous to 1878 in old and illegible books, and so that part of the work is much complicated. All revenue from this source goes to the treasury of the State. A recent act, however, which requires that all searches for those seeking pensions be without charge, makes the income therefrom inconsiderable. Yet it is known that through the Adjutant-General's office and this office the greatest facilities are thus given to those who are in such circumstances as make it desirable to avoid application to pension agents.

In former reports and in Circular LXXII. of the last report, we have fully set forth the main facts as to the importance and availability of vital statistics, and so do not need to repeat them here.

As there are some terms as to vital statistics that are often met with and some confusion in their meaning even as referred to by some life insurance companies, we here give from the recent volume of Whitelegge on "Hygiene and Public Health," an abstract which presents them in a plain way, and is especially valuable, as showing the deductions to be made as to the expectation of life and length of life, as furnished by the most recent life-tables:

"*Statistical Evidence of Health of Communities.*—The usual criteria adopted are the death-rate, 'zymotic death-rate' and infant mortality, together with others of a different class, which are regarded as tests of the average longevity of a population, namely, 'expectation of life,' 'probable duration of life,' 'mean age at death.'

"The gross death-rate, or, still better, the corrected death-rate, affords a simple and, in the main, accurate measure of the comparative prevalence of disease. It is liable to become misleading if the figures are so small as to be exposed to violent fluctuations; thus the 'weekly death-rate' is only useful in very large communities. Other sources of error are (i) uncertainty as to population, and (ii) severe epidemics, which may have no known relation to impaired public health in general.

"The zymotic death-rate is a popular but very unsafe standard. A high death-rate from enteric fever, diphtheria or diarrhœa may in general fairly be taken to imply a defective sanitary state; but may also be due to temporary and accidental causes, such as climatic conditions or wholesale pollution of milk or water. Little is known of the determining causes of epidemics of small-pox, measles, whooping-cough and scarlet fever; but their predisposing causes are all widely different, and are for the most part not affected by what are known

as 'sanitary conditions.' The death-rate due to such a heterogeneous group denotes simply the presence or absence of grave epidemics, and connotes nothing as to the health condition of the community in other respects.

"Infant mortality is influenced chiefly by the prevalence of epidemic diarrhœa in early autumn, by epidemics of whooping-cough or measles, and by the want of proper care and management on the part of mothers. It is sometimes high in towns which have a low general death-rate—Leicester, for example; and a high infant death-rate cannot, therefore, be regarded as necessarily indicating a high tendency to death among the rest of the population. It is highest in those towns in which the causes of epidemic diarrhœa are operative, and, as a rule, high in districts where female labor is largely employed in manufactures.

"At least equally significant with the zymotic death-rate and infant mortality is the *phthisis death-rate*, which, if excessive, indicates dampness of soil, unhealthy work-rooms or overcrowding of tenements. The death-rate from respiratory diseases (other than phthisis) is also important.

"'Mean age at death' is obtained by adding up the ages and dividing by the number of deaths. This is a very rough and imperfect measure of longevity, and is largely controlled by the birth-rate. A high birth-rate gives a large proportion of infants in the population, and hence a correspondingly large proportion of infant deaths, which must necessarily reduce the average age at death. The mean age at death is 42 years for males, and 45 years for females.

"'Probable duration of life' is the age at which exactly half of any given number of children born will have died. It can only be ascertained from a life-table, and is of no great value or convenience as a test of longevity. The latest English life-table gives the probable duration of life for males as 47, and for females as 52 years.

"'Expectation of life,' at any age, is the average number of years which a person at that age will live, as shown by a life-table. The expectation of life at age 0—*i. e.* at birth—is also known as the '*mean duration of life.*'* At other ages than the time of birth it is sometimes termed '*mean after-lifetime,*' and the present age *plus* the mean after-lifetime is the age to which a person may expect to survive.

"The expectation of life is the true measure of the vitality of a community. The expectation at birth is the most convenient for

"*The 'mean duration of life' differs from the 'probable duration of life' just as the arithmetical mean of a list of numbers differs from the middle value of the series. The fact that one term has as many terms above as below it does not render it the mean of the series.

"The 'mean duration of life' must also be carefully distinguished from the 'mean age at death.' The latter expression is not employed in reference to a life-table population."

comparative purposes, but if necessary we can eliminate the influence of infant mortality by taking the expectation at later age.

"A life-table shows how many, out of a million persons supposed to be born simultaneously, will survive at the end of each year or each term of years. The data required are (1) a census population—that is, a population of which the distribution according to ages and sexes is known; (2) returns of deaths (grouped in the same age-periods as have been adopted for the census population) for one or more years among this same population. The simplest plan is to take only the deaths in the census year, when the population is known with precision; but as it is important to obtain large numbers, it is better to use the death returns of a series of three or more years, in which the census year is central. Thus the 1881 census population may fairly be assumed to be substantially the same as the average population in the years 1880, '81, '82. The most satisfactory method is to take the death returns for a whole inter-censal period, and the *mean* population. A separate table should be constructed for each sex."

We here add also a table as illustrative of mean annual death-rates from special diseases at different age-periods:

MEAN ANNUAL DEATH-RATES FROM CERTAIN CAUSES AT DIFFERENT AGE-PERIODS PER 1,000 LIVING AT EACH AGE-PERIOD. ENGLAND AND WALES, 1871-1880.

	0–5	5–10	10–15	15–20	20–25	25–35	35–45	45–55	55–65	65–75	75+
ALL CAUSES	62.12	6.44	3.70	5.33	7.04	8.93	12.62	17.72	31.49	64.85	161.59
Small-pox	.53	.28	.14	.20	.30	.24	.17	.11	.07	.05	.04
Measles	2.57	.21	.02	.01	.01	.01	.00	.00	.00	.00	.00
Scarlet Fever	3.49	1.52	.33	.10	.06	.05	.02	.01	.01	.00	.00
Diphtheria	.47	.29	.09	.03	.02	.02	.02	.01	.02	.02	.01
Whooping-cough	3.65	.14	.01	.00	.00	.00	.00	.00	.00	.00	.00
"Fever"	.65	.52	.44	.54	.51	.41	.38	.40	.46	.55	.50
Diarrhœa	5.73	.07	.02	.02	.04	.06	.10	.16	.41	1.19	3.51
Cancer	.01	.01	.01	.02	.03	.13	.53	1.26	2.21	3.12	3.33
Phthisis	.77	.36	.66	2.04	3.12	3.62	3.75	3.13	2.45	1.48	.49
Diseases of Nervous System	9.08	.57	.33	.36	.38	.60	1.20	2.25	4.91	11.43	21.28
Diseases of Circulatory System	.09	.14	.24	.30	.34	.62	1.31	2.27	4.81	9.48	12.09
Diseases of Respiratory System	12.20	.56	.20	.30	.45	.78	1.62	3.26	7.43	16.08	30.24
Diseases of Digestive System	1.28	.18	.15	.21	.26	.44	.90	1.67	3.01	4.84	5.69
Diseases of Urinary System	.15	.09	.07	.10	.15	.25	.43	.66	1.20	2.21	3.31
Violence	1.22	.39	.35	.44	.50	.56	.72	.93	1.19	1.46	2.56

NOMENCLATURE OF DISEASES, CONDENSED FORMS OF MORTUARY TABLES AND COMPARISON OF DEATH-RATES.

The Twelfth Report of this Board gives the nomenclature of disease in accord with the most recent and approved order thereof. It is well worthy of frequent reference by physicians, both as an aid to their own definiteness of diagnosis and for stating primary or secondary cause of death in burial certificates.

For brevity and convenience the following is the form and selection of the State Board in the abbreviated statement of yearly returns for handy reference.

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

This average after June 30th, 1885, was on an increased population of 146,917.

The marriages occurring in Camden and other places, as a result of

* Corrected from last report.

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	
1887	2,527
1888	4,332
	4,557

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, from July 1st, 1890, to 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

COMMENTS AND COMPARISONS.

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, BEGINNING JULY 1ST, 1878.

Remittent Fever	289
Typhoid Fever	579
Small-Pox	71
Scarlet Fever	610
Measles	135

Whooping-Cough	161
Diphtheria	1,280
Erysipelas	101
Diarrhœal Diseases	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 Urinary 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
Typhoid Fever	724
Small-Pox	3
Scarlet Fever	533
Measles	118
Whooping-Cough	278
Diphtheria	1,574
Erysipelas	114
Diarrhœal Diseases	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 Urinary 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
Scarlet Fever	209
Measles	174
Whooping-Cough	371
Diphtheria and Croup	1,575
Erysipelas	81
Diarrhœal Diseases	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 Urinary 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
Scarlet Fever	288
Measles	250
Whooping-Cough	299
Diphtheria and Croup	1,737
Erysipelas	85
Diarrhœal Diseases	3,191
Consumption	3,456
Acute Lung	4,161
Brain and Nervous Diseases of Children	2,029
Diseases of Heart and Circulation	1,960
Renal and Urinary Diseases	1,200
Adult Brain and Spinal Diseases	2,333
Adult Digestive and Intestinal Diseases	1,573
Cancer	642
Acute Rheumatism	76
Puerperal	296

The population of the State in 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, and the last three years on the average of estimated population since.)

COMPARISON OF DEATH-RATES.

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 fulfilled. Even if not fulfilled, approximations are of value if only they are recognized at their true worth. We even feel apologetic toward indefensible comparisons and imperfect deductions

when they grope toward the true light. In the Census of 1880, Dr. Billings, I think, had some maps drawn showing, as a result of the returns, the distribution of malaria in the United States. He expended most of his remarks in showing how unreliable the maps were, yet he pointed to them as showing lines of direction for legitimate work. I myself with regret see all sorts of deductions from vital statistics that have no basis in the figures, in reason or in fact. Some Western man, from the statistics of Connecticut, New Jersey, &c., has been drawing a kidney belt, and showing that here is the storm-center of Bright's disease.

Two years since, in one of our reports, I had occasion to speak as follows:

"Returns of death are valuable *en masse* or in their entirety, first as indicating the general mortality of the population, and the diseases by which it is limited or destroyed. We desire to emphasize the words *en masse*, or entirety. Nothing can be more subversive of the real use of statistics than a wholesale statement of the number of deaths per thousand and an inference of sanitary conditions therefrom, unless the population on which they are based is 100,000 or over, and unless right alongside there is a statement as to the diseases which have occasioned the deaths, the age of the material exposed, and the ages of those dying. The death-rate in gross is merely the statement of a leading fact, which is to form a nucleus for the arrangement and comparison of other statements, both as to mortality and morbility. * * * At least, let no physician or citizen get it into his head that the death statistics are only designed to show the sanitary condition of the locality. In a sphere, and properly used, they show him much about this, but many things more important."

A year since, in addressing a letter to a gentleman as to complaints in respect to the *pro rata* of the death-rate of his section, I had occasion to speak thus:

"When a citizen sees a statement that the death-rate in his city was only twenty per 1,000 the past year, let him know that such bare fact does not indicate very much as to healthfulness. The statistician does use it as one of many facts for comparison. For instance, if, as is the case, he finds the death-rate of London, with its five and a half millions of people, only 17.5 per 1,000, he does bear in mind the contrast. But with this as only a starting-point, he goes on to compare ages of death, so as to know how the significance of number is modified by the significance of age. He then proceeds to find how both of these are modified by the significance of diseases,

as deaths by some diseases mean far more, as to local sanitary conditions, than is meant by the same number of deaths from some other diseases. But the statistician goes further. He then asks in what part of the city—in what kind of houses—they died, and what were their advantages or disadvantages as to food, water and care. He also, as far as possible, inquires into heredity, vitality, into the rate of sickness as compared with the death-rate, and into other indications which show how the general race-vitality at the general working-age, and how the endurance of the population are being affected; for these are not always in exact proportion to the number of deaths.

"The evils of statistics are the drawing of hasty and unauthorized conclusions from them. Their value is that in their study, comparison and assortment, they furnish to us some of the valuable materials which, joined with other information, enable us to practically deal with the limitation and prevention of disease.

"Thus, by restraining the people, and sometimes ourselves, from hasty generalizations, and by using the record as *parts* of evidence and only for purposes intimated, we shall find them highly valuable in aiding in the prevention and the cure of disease, and in guarding the life, health and welfare of population."

We have now had twelve years of vital statistics in New Jersey, which, with some allowance for the time taken to place the system in working order, presents a fair outline of the results of disease and accident in the State.

I desire just here, not to indicate all that can be done with such statistics elsewhere or in the future, but what can be done in our present studies of say 12,000,000 people through a period of twelve years, from whose ranks over 275,000 have departed.

The first indication as to comparative healthfulness to be derived from a study of all the facts, will be sought somewhat thus:

First. Compare the entire city population in cities over 5,000, with the entire rural populations. They are nearly enough balanced in New Jersey to admit of valuable comparisons in all such particulars as to numbers dying, at what ages, and of what diseases. A subcomparison or subdivision might be made by dividing cities into two divisions, viz., those large and manufacturing and with much variety of population, and those that are more rural or centers of farming districts, as Bordentown, Burlington, Woodbury, Newton, Morristown, Long Branch, in compare with Jersey City, Newark, Trenton and Camden.

Second. Study especially, both as to places and causes of deaths, those who have died under five years of age, the first month not being included.

Third. Study the diseases with especial reference to the diarrhœal diseases of children, diphtheria and enteric fever.

Tuberculosis in all its forms is an important separate study, as to its death-rate. So, also, small-pox, scarlet fever, measles, whooping-cough, influenza, mumps, &c.

While the aggregated yearly death-rate for ten years has important significance, it is only when interpreted by the light of these other data that it is especially informatory.

More important still is it for our cities to have records of their own, which will give by houses and blocks and causes the mortality, and, as far as possible, the morbility.

Better still if graphics or dotted maps, with varied colors for diseases, aid and illustrate the record.

These are the kind of studies that, in some of our American cities, like New York, and many foreign cities, like London, Glasgow, Paris, &c., have most fully indicated the facts and the preventive or modifying methods to be used in order to diminish the frequency of disease and the aggregate of death.

The following summary from an article in the "Edinburgh Review" (1891), presents interesting facts bearing on death-rates:

"If all men lived their full span of eighty years the death-rate would be 12.5 per thousand. In Surrey, outside London, the actual death-rate was brought down to 14.3. The death-rate in 1838, in England, was 22.4, but it has never fallen below 21. In the ten years from 1871 to 1880, the children born in any one of these years had 1,800,000 years more of expectation of life than they would have had if they had been born between 1838 and 1854. Notwithstanding all our sanitary progress, the chance of a man reaching threescore years and ten is smaller than it was sixty years ago. In London, in the second half of the seventeenth century, the death-rate was 80 per thousand; in the eighteenth it had fallen to 50 per thousand; in the first half of the nineteenth to 25, and it is now down to 17½. Rothbury has the lowest death-rate in the kingdom, viz., 11.33. The death-rate goes up the more crowded the population is to the square mile. In 129 districts, with less than 200 per square mile, the death-rate is 18½, while in those which have a density of 6,000 to the

square mile, the death-rate is 30¼. In London the death-rate from zymotic diseases has fallen from 5.2 in 1840 to 1850, to 2.24 in 1889. The death-rate from consumption has fallen from 2.68 in 1851 to 1860 to 1.55 in 1888. Deaths from diseases of the nervous system in London are fewer than those in Wiltshire. In 1888 the figures were: London, 2.19 per thousand; Wiltshire, 2.67."

THE CENSUS AND COMPARATIVE FACTS AS RELATED TO VITAL STATISTICS.

BY A. CLARK HUNT, M.D.

The object of a census is not merely the numbering of a people so as to secure facts as to the increase or decrease, but also to ascertain the most important conditions of the population and the influences affecting their welfare. There is a recognition of the fact that population is a material resource to a degree that no other product, animal, vegetable or mineral, is, and that the development of the people is the highest duty of state polity and government. In order to study population there are series of facts that must be ascertained. Of these, few are of more importance than those associated under the name of Vital Statistics. Marriages, births and deaths not only essentially concern the increase of the people but influences that are at work to modify or diminish these or that embarrass life in its relation to any of these, can never be overlooked by the political economist. Hence it is that in all enlightened nations, in addition to various inquiries as to numbers, occupations, distribution of population, its propensities and embarrassments, omission is no longer made of such facts as will enable us to examine into every department of what is now called demography, or a study of population.

For our purpose of comparison and record in this State it is first necessary that we ascertain the increase or decrease of population at various periods in our minor civil divisions and then consider these in the aggregate.

We therefore first give the population of New Jersey for 1890 and 1880 as presented in the enumeration of the recent census.

POPULATION BY MINOR CIVIL DIVISIONS.

MINOR CIVIL DIVISIONS.	1890.	1880.
ATLANTIC COUNTY.		
Atlantic City	13,055	5,477
Buena Vista township	1,299	885
Egg Harbor City	1,439	1,232
Egg Harbor township, including Linwood borough and Absecon town (a)	4,255	4,075
Linwood borough	*536*	.....
Absecon town	*501*	*507*
Galloway township	2,208	2,337
Hamilton township, including borough of Wilmer	1,512	1,464
Hammonton township, co-extensive with Hammonton town	3,833	1,776
Mullica township	697	717
Weymouth township	538	741
Total	28,836	18,704
BERGEN COUNTY.		
Boiling Spring township (b)	1,438	.....
Englewood township	4,785	4,076
Franklin township	2,307	2,206
Harrington township	2,769	2,570
Hohokus township	2,373	2,920
Lodi township	5,131	4,071
Midland township	1,829	1,591
New Barbadoes township, co-extensive with Hackensack town	6,004	4,248
Orvil township (b)	1,690	.....
Palisade township	2,590	2,302
Ridgefield township	5,477	3,952
Ridgewood township	1,841	1,478
Rutherford borough	2,293	2,299
Saddle River township	2,197	1,355
Union township	1,560	(c) 865
Washington township	2,942	2,853
Total	47,226	36,786
BURLINGTON COUNTY.		
Bass River township	853	1,006
Beverly city	1,957	1,759
Beverly township	1,451	(d) 1,369
Bordentown township, including Bordentown city	5,090	5,334
Bordentown city	*4,252*	*4,258*
Burlington township, including Burlington city	8,222	7,237
Burlington city and Fieldsboro	*7,264*	*6,090*
Chester township	3,768	2,855
Chesterfield township	1,253	1,525
Cinnaminson township	3,966	2,184
Delran township	2,267	1,760
Eastampton township	654	566
Evesham township	1,501	1,602
Florence township	1,922	1,528
Little Egg Harbor township (e)	1,771	1,881
Lumberton township	1,799	1,689
Mansfield township	1,671	1,648
Medford township	1,864	1,980
Mount Laurel township	1,699	1,739
New Hanover township	1,962	2,373
Northampton township	5,376	4,630
Pemberton township, including Pemberton borough	2,639	2,885
Pemberton borough	*834*	*799*
Randolph township	302	428

(a) Absecon town was set off from Egg Harbor township and should not be included with it.
(b) Organized since 1880.
(c) Exclusive of Rutherford borough.
(d) Exclusive of Beverly city.
(e) Since annexed to Ocean county.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
BURLINGTON COUNTY—Continued.			
Shamong township		958	1,097
Southampton township		1,849	2,269
Springfield township		1,670	1,886
Washington township		310	389
Westampton township		688	715
Willingboro township		739	743
Woodland township		327	325
Total		58,528	55,402
CAMDEN COUNTY.			
Camden city		58,313	41,659
Ward 1	7,650		
Ward 2	9,536		
Ward 3	4,533		
Ward 4	5,299		
Ward 5	7,325		
Ward 6	6,956		
Ward 7	6,149		
Ward 8	5,996		
Ward 9	4,869		
Center township		1,834	1,538
Delaware township		1,457	1,481
Gloucester city		6,564	5,347
Ward 1	2,845		
Ward 2	3,719		
Gloucester township		3,091	2,527
Haddon township, including Haddonfield and Collingswood boroughs		3,929	2,551
Collingswood borough		*539*	.....
Haddonfield borough		*2,502*	*1,480*
Merchantville borough		1,225	439
Stockton township		6,445	(e) 3,093
Waterford township		2,421	2,149
Winslow township		2,408	2,158
Total		87,687	62,942
CAPE MAY COUNTY.			
Anglesea borough (f)		161	.....
Cape May City		2,136	1,699
Cape May Point borough		167	.....
Dennis township		1,707	(g) 1,812
Holly Beach City borough (h)		217	.....
Lower township		1,156	(i) 1,977
Middle township		2,368	(j) 2,575
Ocean City borough (k)		452	.....
Sea Isle City borough (l)		766	.....
Upper township		1,381	(m) 1,702
West Cape May borough		757	.....
Total		11,268	9,765

(e) Exclusive of Merchantville borough.
(f) Organized since 1880 from Middle township.
(g) Includes population of Sea Isle City borough.
(h) Organized since 1880 from Lower township.
(i) Includes population of West Cape May, Cape May Point and Holly Beach boroughs.
(j) Includes population of Anglesea borough.
(k) Organized since 1880 from Upper township.
(l) Organized since 1880 from Dennis township.
(m) Includes population of Ocean City borough.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
CUMBERLAND COUNTY.			
Bridgeton city		11,424	8,722
Ward 1	3,158		
Ward 2	3,023		
Ward 3	2,865		
Ward 4	2,378		
Commercial township		2,344	2,265
Deerfield township		2,614	1,643
Downe township		1,793	1,687
Fairfield township		1,688	(n) 3,215
Greenwich township		1,173	1,245
Hopewell township		1,743	1,764
Landis township		3,855	(o) 3,486
Lawrence township (p)		1,729	
Maurice River township		2,279	2,374
Millville city		10,002	7,660
Ward 1	3,352		
Ward 2	1,705		
Ward 3	3,057		
Ward 4	1,888		
Stoe Creek township		972	1,107
Vineland borough		3,822	2,519
Total		45,438	37,687
ESSEX COUNTY.			
Belleville township		3,487	3,004
Bloomfield township		7,708	5,748
Caldwell township		3,638	3,167
Clinton township		3,684	2,742
East Orange township		13,282	3,349
Franklin township		2,007	1,617
Livingston township		1,197	1,401
Millburn township		2,437	1,743
Montclair township		8,656	5,147
Newark city		181,830	136,508
Ward 1	7,595		
Ward 2	7,151		
Ward 3	6,404		
Ward 4	5,946		
Ward 5	5,403		
Ward 6	25,830		
Ward 7	9,288		
Ward 8	19,575		
Ward 9	7,084		
Ward 10	13,897		
Ward 11	11,784		
Ward 12	19,616		
Ward 13	27,600		
Ward 14	5,700		
Ward 15	8,957		
Orange city		18,844	13,207
Ward 1	4,931		
Ward 2	5,481		
Ward 3	8,432		
South Orange township, including South Orange borough		4,970	3,911
South Orange borough		*3,106*	*2,173*
West Orange township		4,358	3,385
Total		256,098	189,929

(n) Includes Lawrence township; taken from Fairfield in 1885.
(o) Exclusive of Vineland borough.
(p) From Fairfield in 1885.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
GLOUCESTER COUNTY.			
Clayton township, including Clayton borough		2,299	1,981
Clayton borough		*1,807*	*1,433*
Deptford township		2,064	(q) 1,520
East Greenwich township (r)		1,259	
Franklin township		2,021	2,480
Glassboro township (s)		2,642	2,088
Greenwich township		1,900	(t) 2,598
Harrison township		1,545	(u) 2,841
Logan township		1,523	1,765
Mantua township		1,791	1,718
Monroe township		1,945	1,858
South Harrison township (v)		971	
Washington township		1,155	1,366
West Deptford township		1,588	1,399
Woodbury city		3,911	2,298
Ward 1	1,014		
Ward 2	1,654		
Ward 3	1,243		
Woolwich township, co-extensive with Swedesboro town		2,035	1,974
Total		28,649	25,886
HUDSON COUNTY.			
Bayonne city		19,033	9,372
Ward 1	2,085		
Ward 2	3,868		
Ward 3	3,173		
Ward 4	4,402		
Ward 5	5,505		
Guttenberg town		1,947	1,206
Harrison city		8,338	6,898
Ward 1	2,143		
Ward 2	1,203		
Ward 3	1,947		
Ward 4	3,045		
Hoboken city		43,648	30,999
Ward 1	10,063		
Ward 2	5,765		
Ward 3	14,859		
Ward 4	12,961		
Jersey City		163,003	120,722
Aldermanic district 1	17,837		
Aldermanic district 2	30,216		
Aldermanic district 3	24,312		
Aldermanic district 4	36,776		
Aldermanic district 5	20,294		
Aldermanic district 6	33,568		
Kearny township		7,064	777
North Bergen township		5,715	4,268
Union town		10,643	5,849
Union township		2,127	1,310
Weehawken township		1,943	1,102
West Hoboken township		11,665	5,441
Total		275,126	187,944

(q) Exclusive of Woodbury city.
(r) Organized since 1880; taken from Greenwich township.
(s) In 1891 Elk township was formed from parts of Clayton, Glassboro and South Harrison townships.
(t) Includes population of East Greenwich township.
(u) Includes population of South Harrison township.
(v) Organized since 1880; taken from Harrison township.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
HUNTERDON COUNTY.			
Alexandria township		1,250	1,324
Bethlehem township		2,308	2,330
Clinton township, including Clinton town		2,888	2,975
Clinton town		*1,975*	*842*
Delaware township		3,037	3,092
East Amwell township		1,375	1,696
Franklin township		1,287	1,338
Frenchtown borough		1,023	1,039
High Bridge township		1,935	2,209
Holland township		1,704	1,886
Kingwood township		1,424	1,694
Lambertville city		4,142	4,183
Ward 1			
Ward 2	1,274		
Ward 3	1,163		
Lebanon township	1,705		
Raritan township		2,337	2,699
Readington township		3,798	4,188
Tewksbury township		2,813	3,103
Union township		2,034	2,108
West Amwell township		1,134	1,167
		866	1,039
Total		35,355	38,570
MERCER COUNTY.			
Chambersburg borough		(*w*)	5,487
East Windsor township, including Hightstown borough		2,756	2,271
Hightstown borough		*1,875*	*1,355*
Ewing township		3,129	2,412
Hamilton township		4,163	3,370
Hopewell township		4,338	4,462
Lawrence township		1,448	(*x*) 3,174
Princeton township, including Princeton borough		4,231	4,348
Princeton borough		*3,422*	*3,209*
Trenton city		57,458	29,910
Ward 1			
Ward 2	5,076		
Ward 3	3,063		
Ward 4	7,331		
Ward 5	5,032		
Ward 6	5,585		
Ward 7	2,791		
Ward 8	9,383		
Ward 9	3,802		
Ward 10	6,128		
Ward 11	3,949		
Washington township	5,318		
West Windsor township		1,126	1,281
		1,329	1,396
Total		79,978	58,061
MIDDLESEX COUNTY.			
Cranbury township		1,422	1,599
East Brunswick township		4,438	3,272
Madison township		1,520	1,662
Monroe township		3,040	3,017
New Brunswick city		18,603	17,166
Ward 1			
Ward 2	2,573		
Ward 3	3,556		
Ward 4	1,731		
Ward 5	912		
Ward 6	5,122		
	4,709		

(*w*) Annexed to Trenton since 1880 as Millham.
(*x*) Includes that part annexed to Trenton since 1880.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
MIDDLESEX COUNTY—Continued.			
North Brunswick township		1,238	1,251
Perth Amboy township, co-extensive with Perth Amboy city		9,512	4,808
Perth Amboy city by wards—			
Ward 1	2,533		
Ward 2	3,321		
Ward 3	3,658		
Piscataway township, including Dunellen borough		3,286	3,242
Dunellen borough		*1,060*	*817*
Raritan township		3,788	3,789
Sayreville township		3,509	1,930
South Amboy township, co-extensive with South Amboy borough		4,330	3,648
South Brunswick township		2,403	2,803
Woodbridge township		4,665	4,099
Total		61,754	52,286
MONMOUTH COUNTY.			
Atlantic township		1,505	1,743
Eatontown township		2,953	2,642
Freehold township, including Freehold town		5,097	4,302
Freehold town		*2,932*	*2,432*
Holmdel township		1,479	1,575
Howell township		3,018	3,374
Manalapan township		2,002	2,175
Marlboro township		1,913	2,193
Matawan township		3,183	2,699
Middletown township, including Atlantic Highlands town		6,595	5,059
Atlantic Highlands town		*945*	
Millstone township		1,782	2,080
Neptune township, including Ocean Grove town and Asbury Park borough (*y*)		8,333	4,187
Ocean Grove town		*2,754*	*620*
Ocean township, including Long Branch town		10,209	6,027
Long Branch town		*7,231*	*3,833*
Raritan township, including Keyport town		4,779	3,891
Keyport town		*3,411*	
Shrewsbury township, including Red Bank town		8,367	6,526
Red Bank town		*4,145*	*2,681*
Upper Freehold township		2,861	3,256
Wall township, including Manasquan town		5,052	3,829
Manasquan town		*1,506*	
Total		69,128	55,538
MORRIS COUNTY.			
Boonton township, including part of Boonton city		3,307	2,682
Boonton city (part of)		*2,981*	
Chatham township		4,681	4,276
Chester township		1,625	2,337
Hanover township, including part of Boonton city (*y*)		4,481	4,138
Jefferson township		1,611	1,792
Mendham township		1,266	1,526
Morris township, including Morristown city		10,155	6,837
Morristown city		*8,156*	*5,418*
Mount Olive township		1,848	1,982
Montville township		1,333	1,270
Passaic township		1,821	1,896
Pequannock township		2,862	2,239
Randolph township		7,972	7,700
Rockaway township		6,033	7,366
Roxbury township		2,789	2,139
Washington township		2,367	2,681
Total		54,101	50,861

(*y*) Not separately returned.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
OCEAN COUNTY.			
Berkeley township		786	683
Brick township		4,065	2,990
Dover township		2,880	2,439
Eagleswood township		791	592
Jackson township		1,717	1,803
Lacey township		711	814
Manchester township		1,057	1,057
Ocean township		482	484
Plumsted township		1,327	1,561
Stafford township		1,095	1,008
Union township		1,063	1,024
Total		15,974	14,455
PASSAIC COUNTY.			
Acquackanonk township		2,562	1,781
Little Falls township		1,890	1,404
Manchester township		2,576	1,513
Passaic city		13,028	6,532
Ward 1	5,075		
Ward 2	2,844		
Ward 3	1,677		
Ward 4	3,432		
Paterson city		78,347	51,031
Ward 1	8,324		
Ward 2	10,395		
Ward 3	15,180		
Ward 4	8,890		
Ward 5	10,835		
Ward 6	4,024		
Ward 7	5,956		
Ward 8	14,743		
Pompton township		2,153	2,251
Wayne township		2,094	1,757
West Milford township		2,486	2,591
Total		105,046	68,860
SALEM COUNTY.			
Elsinboro township		524	570
Lower Alloways Creek township		1,308	1,373
Lower Penns Neck township		1,289	1,334
Mannington township		1,870	2,230
Oldmans township (z)		1,432	
Pilesgrove township, including Woodstown borough		3,312	3,497
Woodstown borough		*556*	*490*
Pittsgrove township		2,756	1,778
Quinton township		1,307	(a) 1,390
Salem city		5,516	5,056
East ward	2,891		
West ward	2,625		
Upper Alloways Creek township		1,675	1,917
Upper Penns Neck township		2,239	(b) 3,361
Upper Pittsgrove township		1,923	2,073
Total		25,151	24,579

(z) Organized since 1880 from Upper Penns Neck township.
(a) Exclusive of Salem city.
(b) Includes population of Oldmans township; taken from Upper Penns Neck since 1880.

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
SOMERSET COUNTY.			
Bedminster township		1,749	1,812
Bernards township		2,558	2,622
Branchburg township		1,152	1,316
Bridgewater township, including Somerville, Bound Brook and Raritan boroughs		9,323	7,997
Somerville borough		*3,861*	*3,105*
Bound Brook borough		*1,462*	*934*
Raritan borough		*2,556*	*2,046*
Franklin township, including Bloomington borough		3,754	3,818
Bloomington borough		*801*	*671*
Hillsborough township		2,825	3,248
Montgomery township		1,655	1,928
North Plainfield township		4,250	3,217
Warren township		1,045	1,204
Total		28,311	27,162
SUSSEX COUNTY.			
Andover township		1,126	1,150
Byram township		1,380	1,406
Frankford township		1,459	1,682
Green township		636	727
Hampton township		866	895
Hardyston township		2,542	2,645
Lafayette township		742	781
Montague township		797	1,022
Newton township, co-extensive with Newton town		3,003	2,513
Sandyston township		1,084	1,195
Sparta township		1,724	2,274
Stillwater township		1,296	1,502
Vernon township		1,756	1,811
Walpack township		436	575
Wantage township		3,412	3,361
Total		22,259	23,539
UNION COUNTY.			
Clark township		367	353
Cranford township		1,717	1,184
Elizabeth city		37,764	28,229
Ward 1	8,874		
Ward 2	7,610		
Ward 3	5,836		
Ward 4	2,213		
Ward 5	5,990		
Ward 6	2,597		
Ward 7	2,004		
Ward 8	2,640		
Fanwood township		1,305	1,167
Linden township		2,057	1,889
New Providence township		839	781
Plainfield city		11,267	8,125
Ward 1	2,221		
Ward 2	2,897		
Ward 3	2,203		
Ward 4	3,946		
Rahway city		7,105	6,455
Ward 1	1,362		
Ward 2	1,687		
Ward 3	2,746		
Ward 4	1,310		
Springfield township, co-extensive with Springfield town		959	844
Summit township		3,502	1,910
Union township		2,846	2,418
Westfield township		2,739	2,216
Total		72,467	55,571

POPULATION BY MINOR CIVIL DIVISIONS—Continued.

MINOR CIVIL DIVISIONS.		1890.	1880.
WARREN COUNTY.			
Allamuchy township		759	648
Belvidere town		1,768	1,773
Blairstown township		1,662	1,458
Franklin township		1,283	1,529
Frelinghuysen township		879	1,042
Greenwich township		825	(c) 2,554
Hackettstown town		2,417	2,502
Hardwick township		503	583
Harmony township		1,152	1,350
Hope township		1,332	1,569
Independence township		904	1,018
Knowlton township		1,411	1,476
Lopatcong township		1,738	1,591
Mansfield township		1,362	1,709
Oxford township		4,002	(d) 4,594
Pahaquarry township		291	418
Phillipsburg city		8,644	7,181
Ward 1	2,033		
Ward 2	2,207		
Ward 3	2,799		
Ward 4	1,605		
Pohatcong township (e)		1,483	
Washington township, including Washington borough		4,138	3,594
Washington borough		*2,834*	*2,142*
Total		36,553	36,589

(c) Includes Pohatcong township.
(d) Exclusive of Belvidere town.
(e) Organized in 1881 from part of Greenwich township.

We next give the total population of the State according to the census of 1880, 1885, 1890 and other facts as to how this is made up—male, female, native, &c.:

Entire population of the State, 1880	1,131,116
Entire population of the State, 1885	1,278,133
Entire population of the State, 1890	1,444,933

The last census (1890), as to sex, color, &c., is as follows:

Males	720,819
Females	724,114
Native	1,115,958
Foreign	328,975
White	1,396,581
Colored	48,352
Native white parents	696,718
Foreign white parents	371,878

We next present a summary, by counties, giving the population by the census of 1880, by the State census of 1885 and by the census of

1890. As our most important comparisons are those of death-rates, we also present the death-rates for counties in each of the years in which these different enumerations were made:

SUMMARY BY COUNTIES.

COUNTIES.	Population, 1880.	Death-rate per 1,000.	Population, 1885.	Death-rate per 1,000.	Population, 1890.	Death-rate per 1,000.
Atlantic	18,709	16.78	22,356	19.46	28,836	17.67
Bergen	36,786	13.86	39,880	15.10	47,226	15.25
Burlington	55,402	14.42	57,558	15.84	58,528	14.61
Camden	62,942	18.81	76,685	17.87	87,687	21.60
Cape May	9,765	12.90	10,744	14.99	11,268	15.47
Cumberland	37,687	16.20	41,982	16 32	45,438	16.06
Essex	189,929	17.35	213,764	21.81	256,098	23.89
Gloucester	25,886	14.48	27,603	16.70	28,649	16,20
Hudson	187,944	21.41	240,342	22.51	275,126	25.72
Hunterdon	38,570	12.31	37,420	12.45	35 355	14.78
Mercer	58,061	18.05	66,785	17 41	79,978	18.06
Middlesex	52,266	14.86	56,180	16.84	61,754	15.68
Monmouth	55,538	13.54	62,324	17.09	69,128	15.86
Morris	50,861	13.26	50,775	15.94	54,101	15.33
Ocean	14,455	11.20	15 586	17.19	15,974	14.97
Passaic	68,860	21.36	83,374	19 17	105 046	20.04
Salem	24,579	14.72	25,373	13.75	25,151	15.27
Somerset	27,162	12.62	27,425	15.24	28,311	15 58
Sussex	23,539	12.05	22,401	14.46	22,259	10.48
Union	55,571	15.11	61,839	18.84	72,467	17.56
Warren	36,589	14.54	37,737	14.31	36,553	14.40

In the same manner we present the same series of facts as to all cities of over 5,000 inhabitants:

CITIES OF OVER 5,000 INHABITANTS.

CITIES AND TOWNS.	COUNTIES.	Population, 1880.	Death-rate per 1,000.	Population, 1885.	Death-rate per 1,000.	Population, 1890.	Death-rate per 1,000.
Newark City	Essex	136,508	18.71	152,988	24.33	181,830	27.26
Jersey City	Hudson	120,722	20.98	153,513	22.42	163,003	25.96
Paterson City	Passaic	51,031	23.07	63,273	20.29	78,347	21.87
Camden City	Camden	41,659	19,27	52,884	18.30	58,313	23.15
Trenton City	Mercer	29.910	20.66	34,386	17.48	57,458	17.35
Hoboken City	Hudson	30,999	23.71	37,721	22.35	43,648	25.62
Elizabeth City	Union	28,229	15.58	8,398	21.70	37,764	19.30
Bayonne City	Hudson	9,872	15.04	13,080	18 58	19,033	20.37
Orange City	Essex	13 207	16.85	15,231	19.70	18,844	24.50
New Brunswick City	Middlesex	17,166	15.66	18 258	18.40	18,603	17.71
Atlantic City	Atlantic	5,477		7.948	23.54	13.055	20.01
Passaic City	Passaic	6,532	21.73	8,326	16.69	13,028	16.81
Bridgeton City	Cumberland	8,722	17.75	10.065	17.78	11,424	17.70
Plainfield City	Union	8,125	12.06	8,913	15.82	11,267	16 89
Union Town	Hudson	5,849	20.04	8,398	25.84	10,643	22.42
Millville City	Cumberland	7,660	22.71	8,824	16.89	10,002	19.48
Perth Amboy City	Middlesex	4,808		6,311		9,512	17.41
Phillipsburg City	Warren	7,181	17 54	8,058	18.37	8,644	14.96
Harrison City	Hudson	6,898	23.41	6,806	23.36	8,338	27.67
Morristown City	Morris	5,418	18.71		14.61	8,156	19.91
Burlington City	Burlington	6,090	15.61	6,653	24.45	7,264	18.30
Long Branch Town	Monmouth	3,833		5,140		7.231	14.66
Rahway City	Union	6,455	17.97	6,861	15.60	7,105	19.32
Gloucester City	Camden	5,347	15.70	5,966	15.42	6,564	18.89
Hackensack Town	Bergen	4,248				6,004	
Salem City	Salem	5,056	15.02	5,516	19.22	5,516	17.60

We also give below the number of families and of dwellings in cities of over 4,000 inhabitants, by the census of 1890.

CITIES AND TOWNS.	Number of families.	Number of dwellings.	CITIES AND TOWNS.	Number of families.	Number of dwellings.
Newark	38,906	23,296	Millville	2,154	2,117
Jersey City	34,434	18,562	Perth Amboy	1,860	1,463
Paterson	16,815	9,870	Phillipsburg	1,847	1,826
Camden	12,667	12,362	Harrison	1,794	1,168
Trenton	11,901	11,428	Morristown	1,457	1,457
Hoboken	9,413	3,411	Burlington	1,627	1,618
Elizabeth	7,683	5,820	Long Branch	1,607	1,506
Bayonne	3,487	2,697	Rahway	1,627	1,427
Orange	3,703	2,938	Gloucester	1,322	1,323
New Brunswick	4,026	3,076	Hackensack	1,318	1,149
Atlantic City	2,851	2,801	Salem	1,355	1,356
Passaic	2,481	1,723	South Amboy	913	909
Bridgeton	2,649	2,597	Bordentown	955	952
Plainfield	2,172	1,963	Red Bank	925	852
Union	2,400	1,435	Lambertville	1,001	993

We give as a collateral table of interest, a list of cities, towns, villages, &c., of the State, so far as these can be given, with their populations. Those of less than 1,000 inhabitants are not included. The population is here given by the census of 1890.

CITIES, TOWNS, ETC.

ATLANTIC COUNTY.

Atlantic City, city	13,055
Egg Harbor City, in Galloway township	1,439
Hammonton, town	3,833

BERGEN COUNTY.

Hackensack, in New Barbadoes township	6,004

BURLINGTON COUNTY.

Beverly, city, in Beverly township	1,957
Bordentown, city, in Bordentown township	4,232
Burlington, city, in Burlington township	7,264
Mount Holly, including township	5,376

CAMDEN COUNTY.

Camden, city	58,313
Gloucester, city	6,564
Haddonfield, borough, in Haddon township	2,502
Merchantville, borough, in Stockton township	1,225

CAPE MAY COUNTY.

Cape May, city	2,136

CUMBERLAND COUNTY.

Bridgeton, city	11,424
Millville, city	10,002
Vineland, in Landis township	3,822

ESSEX COUNTY.

Belleville, including township	3,487
Bloomfield, including township	7,708
East Orange, including township	13,282
Irvington, village, including township	3,684
Montclair, including township	8,656
Newark, city	181,830
Orange, city	18,844
South Orange, village	3,106

GLOUCESTER COUNTY.

Woodbury, city, in Deptford township	3,911
Swedesboro, town	2,035

HUDSON COUNTY.

Bayonne, city	19,033
Guttenberg, town	1,947
Harrison, city	8,338
Hoboken, city	43,648
Jersey City, city	163,003
Union, town	10,643

HUNTERDON COUNTY.

Clinton, town	2,888
Frenchtown, borough	1,023
Lambertville, city	4,142

MERCER COUNTY.

Hightstown, borough, West Windsor township	1,875
Princeton, borough	3,422
Trenton, city	57,458

MIDDLESEX COUNTY.

Dunellen, borough	1,060
New Brunswick, city	18,603
Perth Amboy, city	9,512
South Amboy, borough	4,330

MONMOUTH COUNTY.

Asbury Park, borough, including Neptune township	5,579
Freehold, town	2,932
Ocean Grove	2,754
Red Bank	4,145

Long Branch	7,231
Keyport, Raritan township	3,411
Manasquan, town	1,506

MORRIS COUNTY.

Boonton	2,981
Dover	*3,500
Morristown, town	8,156

OCEAN COUNTY.

Only townships.

PASSAIC COUNTY.

Passaic, city	13,028
Paterson, city	78,347

SALEM COUNTY.

Salem, city	5,516

SOMERSET COUNTY.

Somerville, town	3,861
Raritan, borough	2,556
Bound Brook, borough	1,462

SUSSEX COUNTY.

Newton, town	3,003

UNION COUNTY.

Elizabeth, city	37,764
Rahway, city	7,105
Plainfield, city	11,267

WARREN COUNTY.

Belvidere, town	1,768
Hackettstown, town	2,417
Phillipsburg, city	8,644
Washington, borough	2,834

According to this, we find that of the 1,444,933 of the inhabitants of New Jersey, about 910,366 live in cities or some form of incorporated towns of over 1,000 inhabitants. When our vital statistics reach over a greater number of years, there will be still more opportunity to study the effects of locality and of different density of population upon life and health as also upon local prosperity. From these we at present select out and associate cities and towns according to population.

*Estimated.

OVER ONE HUNDRED THOUSAND.

Newark, Essex county	181,830
Jersey City, Hudson county	163,003

NOTE.—Hoboken is so near to Jersey City that its close proximity must be borne in mind in all vital study. The same is partly true of some of the suburbs of Newark.

BETWEEN SEVENTY-FIVE AND ONE HUNDRED THOUSAND.

Paterson	78,347

BETWEEN FIFTY AND SEVENTY-FIVE THOUSAND.

Camden	58,313
Trenton	57,458

BETWEEN TWENTY-FIVE AND FIFTY THOUSAND.

Elizabeth, city, Union county	37,764
Hoboken, Hudson county	43,648

FROM FIFTEEN TO TWENTY-FIVE THOUSAND.

Bayonne, Hudson county	19,033
New Brunswick, Middlesex county	18,603
Orange, Essex county	18,844

FROM TEN TO FIFTEEN THOUSAND.

Atlantic City, Atlantic county	13,055
Passaic City, Passaic county	13,028
Bridgeton, Cumberland county	11,424
Plainfield, Union county	11,267
Union, Hudson county	10,643
Millville, Cumberland county	10,002

FROM FIVE TO TEN THOUSAND.

Perth Amboy, Middlesex county	9,512
Phillipsburg, Warren county	8,644
Harrison, city, Hudson county	8,338
Morristown, city, Morris county	8,156
Burlington, city, Burlington county	7,264
Long Branch, city, Monmouth county	7,231
Rahway, city, Union county	7,105
Gloucester City, Camden county	6,564
Hackensack, Bergen county	6,004
Salem, city, Salem county	5,516

FROM ONE TO FIVE THOUSAND.

Atlantic County—	
Egg Harbor City	1,439
Hammonton	3,833
Burlington County—	
Beverly City	1,957
Bordentown, city	4,232
Camden County—	
Haddonfield	2,502
Merchantville	1,225
Cape May County—	
Cape May, city	2,136
Cumberland County—	
Vineland	3,822
Essex County—	
Belleville	3,487
Irvington, village	3,684
South Orange, village	3,106
Gloucester County—	
Woodbury, city	3,911
Swedesboro, town	2,035
Hudson County—	
Guttenberg, town	1,947
Hunterdon County—	
Clinton, borough	1,975
Frenchtown, borough	1,023
Lambertville, city	4,142
Mercer County—	
Hightstown, borough	1,875
Princeton, borough	3,422
Middlesex County—	
Dunellen, borough	1,060
South Amboy, borough	4,330
Monmouth County—	
Freehold, town	2,932
Ocean Grove	2,754
Red Bank	4,145
Keyport	3,411
Manasquan	1,506

Morris County—	
Boonton	2,981
Dover	*3,500
Somerset County—	
Bound Brook, borough	1,462
Raritan, borough	2,556
Somerville, town	3,861
Warren County—	
Belvidere, town	1,768
Hackettstown, town	2,417
Washington, borough	2,834

From the data here given, and from the record of our reports, each locality can find its proportion of marriages, births and deaths according to its varying population. As, however, inferences of healthfulness or other vital facts are incomplete, except when dealing with large numbers, we only attempt calculations based upon counties and cities of over 5,000 inhabitants.

These various facts are put on record in order to aid the Central Bureau and all Local Boards in their study and calculation of vital statistics. It is also desirable to know the number of houses in each city in proportion to the population, the make-up of the population of each city as to sex, nationality, &c., and various other items. Some of these facts were secured and presented in the State census of 1880, and we shall avail ourselves of various other items when all the details of the National census are complete. During the past year there were 18,000 foreigners settled in New Jersey, but we do not know as to their exact distribution. But the facts we have and which are herewith presented are the starting-points for calculation as to ratios of increase and death-rates, and can be supplemented from time to time as provision therefor permits.

*Estimated.

CORONER SYSTEMS AND OUR PRESENT CORONER LAWS.

BY MESSRS. S. W. ABBOTT, M.D., CARROLL ROBBINS, COUNSELOR-AT-LAW, AND E. M. HUNT, M.D.

The sudden deaths or deaths by violence form no small proportion of the aggregate mortality in this State. Added to the ordinary cases of quick disease are the many deaths which result from our long line of sea-shore, our numerous rivers, lakes and bays, the length of rail-road and number of termini, and other active transportation on roads and water-ways, as well as the machinery incident to a State so largely engaged in manufacturing industries. While our statistics do not accurately reveal all of these, we have reason to believe that about one-twentieth of all the deaths that occur are such as are liable to invoke the services of a Coroner. Numbers of these cases involve great questions as to the public health and welfare, as to the protection of life and limb, and as to the suppression or punishment of criminal negligence or of actual intent to kill. It is all-important that any laws which look to the guarding and proper issue of these great interests should be clear in their statutes, facile and searching in their methods and radical and effective in their results. It is the design of this brief article to show the defects of the usual or old Coroner system, to present a model of what is feasible and of what has been found to be a great improvement both as to its effectiveness and economy; to present our own present law, with its slight but insufficient modification, and to urge such legislation as shall be more in accord with the progress of medical and legal knowledge and with that facility and thoroughness with which laws for the protection of human life should be framed and executed. To this end we shall present a brief abstract of a paper furnished to "The Forum," August, 1889, by S. W. Abbott, M.D., Secretary of the State Board of Health of Massachusetts, with the law and personal notes kindly

furnished to us since, from his own large experience; with an outline of our State law, prepared by Carroll Robbins, counselor-at-law, of Trenton, N. J., and accompanying facts and suggestions by the Secretary of this Board. From Dr. Abbott's papers we quote as follows:

"The Coroner system of England, and most English-speaking countries, except Scotland, has had an existence of at least a thousand years. It was in use in the days of King Alfred, and has become so interwoven with and burnt into the laws and customs of the Anglo-Saxon race that any attempt to substitute an improved method has met with bitter opposition. The functions of the old-time Coroner were much more comprehensive than at present. In addition to the duty of holding inquests upon the bodies of persons found dead from violent, sudden and suspicious causes, he was also charged with the duty of inquiring as to the causes of incendiary fires, shipwrecks, treasure-trove on land and sea, including whales and sturgeons cast up on the shore. He was also occasionally required to act in the absence of the Sheriff. Most of these extraneous duties have one after another been shorn away, and the ends of justice would be much better served if the office were everywhere abolished and a more intelligent, reasonable and economical method introduced in its stead.

"Attempts have been made in some countries to modify the system by the requirement that the office should always be filled by a physician. The objection to this method is that it requires that one man shall perform two entirely different functions, involving distinct lines of training: law and medicine. For while professional men occasionally are proficient in both of these branches of learning, the instances in which the judge and the physician are combined in one person are extremely rare. The object of a medico-legal inquiry is the detection of crime, and the points to be sought for are twofold, namely, the immediate cause of death, and person or persons who caused the death. The first of these questions is of a purely medical character, and in many cases can be answered in a satisfactory manner only by a thoroughly-educated medical man. Not only should he have a medical education, but he should also possess a special fitness for conducting a post-mortem inquiry. The performance of an autopsy in a thorough and skillful manner is frequently an absolute necessity in a medico-legal investigation.

"The second question naturally follows the first, and the solution of the first often leads directly to the solution, at least in part, of the second, as, for instance, when it determines whether a man died by his own act or by the act of another. Very often an autopsy, or at least an external medical inspection, is required to settle this question.

"John Smith's body is found in a thicket, remote from habitation, with a bullet hole in the head. An autopsy may be necessary to determine the question of the direction of the ball, and also whether

the missile was fired by his own hand or by another's. The second question, as to the author of the deed (when committed by another), naturally follows the first, and should be committed to a man of judicial training.

"The principal features of the Coroner's inquest are essentially the same in all parts of the Union. The officials concerned in an inquiry as to the cause of death by violence, are the Coroner and the jury. It may reasonably be asked for what purpose the latter body exists. Whenever a Coroner's jury by their verdict fix a crime upon an individual, the same evidence which has convinced them is again rehearsed before a court of law, and usually in a much more thorough manner. Wherefore the expense of two tribunals sitting and deciding upon the same question? Another evidence of the uselessness of the Coroner's inquest is the greater facility with which medico-legal inquiries are conducted in countries where Coroners' juries are unknown. It is not our purpose to criticise the jury system in general, but only so far as it plays a part in the Coroner's inquest. The ordinary jury of courts of law is called upon to consider questions having a very wide bearing, both of a civil and of a criminal nature. Financial and other business transactions, pertaining to the dealings of men with each other in the daily walks of life, are among the most common questions submitted to the test of trial by jury. Of these, every man having an ordinary amount of common sense and liable to jury duty is expected to have some knowledge and can usually form an opinion.

"The question properly and directly before a Coroner's jury is one and one only: What was the cause of death?

"While in many cases this question may be so clear as not to require the intervention of an expert, it is also true that cases are of frequent occurrence in which no jury, selected as juries usually are, can comprehend the exact cause of death. The question is a purely medical one, and as such requires a thorough knowledge of anatomy, chemistry, materia medica and toxicology. A knowledge of pathology is especially necessary in certain cases wherein a considerable length of time has elapsed between the primary injury and the fatal result. Under such circumstances a thorough medical training is absolutely essential. It is for these reasons that no tribunal has been subjected to so much well-merited ridicule as the Coroner's inquest. Scarcely a week passes in which a verdict is not recorded in some part of the country proving the failure of the Coroner system to accomplish its work in a manner which is at all creditable or satisfactory. From time to time lawyers, physicians and others having to do with inquests and legal proceedings were led to comment upon the defects of the system. The more examination was had the more apparent was the inefficiency of the old system and the inherent incongruity of an office requiring expert knowledge of law and of medicine combined in one office."

The matter was taken up by members of the legal fraternity and by the Massachusetts Medical Society, aided by T. H. Tyndale, who framed the original Massachusetts law.

The facts and arguments adduced made a strong impression upon the public, the press and competent authorities in law and in medicine, so that in 1877 the old system was superseded by the new, and the working of this has been, in every respect, satisfactory. Dr. Abbott says "so far as Massachusetts is concerned the old Coroner system is dead and buried and no one can be found in the State who is desirous of its resurrection." We now give the law as it at present exists in that State:

SUBSTITUTE FOR CORONER LAW.

Law Relating to Medical Examiners.

[Public Statutes, Chapter 26.]

OF MEDICAL EXAMINERS.

SECTION 1. The governor shall nominate, and by and with the advice and consent of the council shall appoint, in each county, able and discreet men, learned in the science of medicine, to be medical examiners in each county, and every such nomination shall be made at least seven days prior to the appointment.

SEC. 2. The number of medical examiners, appointed as provided in the preceding section, shall be as follows:

[Limits of districts omitted.]

SEC. 3. The governor may also, in like manner, nominate and appoint an associate medical examiner for the county of Suffolk,* who shall, at the request of either of the medical examiners for said county, perform all the duties and exercise all the powers of a medical examiner in said county, but he shall not in any year be so required to serve for more than one month at the request of either of said medical examiners.

SEC. 4. Said medical examiners and associate medical examiner shall hold their offices for a term of seven years from the time of their respective appointments, but shall be liable to removal from office by the governor and council at any time for cause shown.

SEC. 5. Each medical examiner and the associate medical examiner for Suffolk county shall, before entering upon the duties of his office, be sworn and give bond with sureties to the treasurer of the county, in the sum of five thousand dollars, for the faithful performance of such duties; if he fails to give such bond for thirty days after his appointment, such appointment shall be void.

*Includes Boston.

SEC. 6. The superior court shall each year examine into the sufficiency of all bonds given under the preceding section; and if it appears that any such bond is insufficient, said court shall cause a record of that fact to be made by its clerk, and shall require the party who gave such bond to give a new one, satisfactory to the court, within such time as it shall order.

SEC. 7. A surety on any such bond, or his heirs, executors or administrators, may petition the superior court for the county for which the officer who gave it was appointed, to be discharged from such bond, and like proceedings shall thereupon be had as in case of a similar petition by a surety on a sheriff's official bond.

SEC. 8. If the condition of any such bond is broken to the injury of any person, the officer who gave it shall be liable to removal from his office and be subject to like penalties as sheriffs in like cases, and actions may be brought upon such bonds in like manner as upon the official bonds of sheriffs.

SEC. 9. In the county of Suffolk, each medical examiner shall receive from the treasurer of the county, in full for all services performed by him, a salary of three thousand dollars a year, and the associate medical examiner a salary of five hundred dollars; but if the said associate medical examiner serves in any year more than two months, at the request of either medical examiner, he shall, for such service in excess of two months, be paid at the same rate as such medical examiner, and such compensation shall be deducted from the salary of the medical examiner in whose stead he serves; the medical examiners in other counties shall receive fees as follows: for a view without an autopsy, five dollars; for a view and autopsy, thirty dollars, and for travel, at the rate of ten cents a mile to and from the place of view.

SEC. 10. Medical examiners shall make examinations, as hereinafter provided, upon the view of the dead bodies of such persons only as are supposed to have come to their death by violence.

SEC. 11. When a medical examiner has notice that there has been found, or is lying within his county, the dead body of a person who is supposed to have come to his death by violence, he shall forthwith repair to the place where such body lies, and take charge of the same; and if, on view thereof and personal inquiry into the cause and manner of the death, he deems a further examination necessary, he shall, upon being thereto authorized in writing by the district attorney, mayor or selectmen of the district, city or town where such body lies, make an autopsy in the presence of two or more discreet persons, whose attendance he may compel by subpœna if necessary, and shall then and there carefully reduce or cause to be reduced to writing every fact and circumstance tending to show the condition of the body and the cause and manner of death, together with the names and addresses of said witnesses, which record he shall subscribe;

before making such autopsy he shall call the attention of the witnesses to the position and appearance of the body.

SEC. 12. If upon such view, personal inquiry or autopsy he is of opinion that the death was caused by violence, he shall at once notify the district attorney and a justice of the district, police or municipal court for the district or city in which the body lies, or a trial justice, and shall file a duly-attested copy of the record of his autopsy in such court or with such justice, and a like copy with such district attorney; and shall in all cases certify to the clerk or registrar having the custody of the records of births, marriages and deaths in the city or town in which the person deceased came to his death, the name and residence of the person deceased, if known, or, when the name and residence cannot be ascertained, a description of the person deceased, as full as may be, for identification, together with the cause and manner by and in which he came to his death.

SEC. 13. The court or trial justice shall thereupon hold an inquest, which may be private, in which case any or all persons, other than those required to be present by the provisions of this chapter, may be excluded from the place where such inquest is held; and said court or trial justice may also direct the witnesses to be kept separate, so that they cannot converse with each other until they have been examined; the district attorney, or some person designated by him, may attend the inquest and examine all witnesses; an inquest shall be held in all cases of death by accident upon a railroad, and the district attorney or the attorney general may, if he deems it necessary or expedient, direct an inquest to be held in the case of any other casualty from which the death of a person results.

SEC. 14. The justice or district attorney may issue subpœnas for witnesses, returnable before such court or trial justice; the persons served with such process shall be allowed the same fees, their attendance may be enforced in the same manner, and they shall be subject to the same penalties as if served with a subpœna in behalf of the commonwealth in a criminal prosecution pending before such court or trial justice.

SEC. 15. The presiding justice or trial justice shall, after hearing the testimony, draw up and sign a report, in which he shall find and certify when, where and by what means the person deceased came to his death, his name, if known, and all material circumstances attending his death; and if it appears that his death resulted wholly or in part from the unlawful act of any other person or persons, he shall further state the name or names of such person or persons, if known to him, and he shall file such report with the records of the superior court in the county wherein the inquest is held.

SEC. 16. If the justice finds that murder, manslaughter or an assault has been committed, he may bind over, as in criminal prosecutions, such witnesses as he deems necessary, or as the district attorney

may designate, to appear and testify at the court in which an indictment for such offense may be found or presented.

SEC. 17. If a person charged by the report with the commission of an offense is not in custody, the justice shall forthwith issue process for his apprehension, and such process shall be made returnable before any court or magistrate having jurisdiction in the premises, who shall proceed therein in the manner required by law; but nothing herein shall prevent any justice from issuing such process before the finding of such report, if it is otherwise lawful to issue the same. [Amended 1887, 310, § 3.]

SEC. 18. If a medical examiner reports that a death was not caused by violence, and the district attorney or the attorney-general is of a contrary opinion, either the district attorney or the attorney-general may, notwithstanding such report, direct an inquest to be held in accordance with the provisions of this chapter, at which inquest he or some person designated by him shall be present and examine all the witnesses.

SEC. 19. The medical examiner may, if he deems it necessary, employ a chemist to aid in the examination of the body or of substances supposed to have caused or contributed to the death, and such chemist shall be entitled to such compensation for his services as the medical examiner certifies to be just and reasonable, the same being audited and allowed in the manner hereafter provided; a clerk, who may be employed to reduce to writing the results of a medical examination or autopsy, shall be allowed for his services two dollars per day.

SEC. 20. When a medical examiner views or makes an examination of the dead body of a stranger, he shall cause the body to be decently buried; and if he certifies that he has made careful inquiry, and that to the best of his knowledge and belief the person found dead is a stranger having no settlement in any city or town of this commonwealth, his fees with the actual expense of burial shall be paid from the treasury of the commonwealth. In all other cases the expense of the burial shall be paid by the city or town, and all other expenses by the county, wherein the body is found. [Amended 1887, 310, § 1.]

SEC. 21. When services are rendered in bringing to land the dead body of a person found in any of the harbors, rivers or waters of the commonwealth, the medical examiner may allow such compensation for such services as he deems reasonable, but this provision shall not entitle any person to compensation for services rendered in searching for a dead body.

SEC. 22. In all cases arising under the provisions of this chapter, the medical examiner shall take charge of any money or other personal property of the deceased, found upon or near the body, and shall deliver the same to the person or persons entitled to its custody or possession, or, if not claimed by such person within sixty days,

then to a public administrator, to be administered upon according to law.

SEC. 23. A medical examiner who fraudulently neglects or refuses to deliver any such property to such person within three days after due demand upon him therefor shall be punished by imprisonment in the jail or house of correction, not exceeding two years, or by fine not exceeding five hundred dollars.

SEC. 24. Every medical examiner shall return an account of the expenses of each view or autopsy, including his fees, to the county commissioners having jurisdiction over the place where the examination or view is held, or in the county of Suffolk to the auditor of the city of Boston, and shall annex to his return the written authority under which the autopsy was made; such commissioners or auditor shall audit such accounts, and certify to the treasurer of the commonwealth or to the treasurer of the county, as the case may be, what items in such accounts are deemed just and reasonable, and such items shall be paid by said treasurer to the person entitled to receive the same. [Amended 1887, 310, § 2.]

SEC. 25. The fees of trial justices for the services specified in this chapter shall be as follows, namely: for receiving and filing a duly-attested copy of the record of an autopsy, fifty cents; for each subpœna issued, ten cents; for each day's attendance in holding the inquest, five dollars; for the recognizance of witnesses, twenty cents; and for drawing up and filing a report in superior court, five dollars; the said fees, having been audited by the district-attorney, shall be paid from the treasury of the county.

IMPORTANT AMENDMENTS ENACTED IN 1885 AND 1887.

SEC. 2. When a medical examiner deems it necessary to have a physician present at an autopsy as one of the witnesses, as provided in section eleven of chapter twenty-six, of the Public Statutes, such physician shall be allowed five dollars for his services; other witnesses required by law to be present at an autopsy shall be allowed two dollars each.

SEC. 3. Every medical examiner shall, annually, on or before the first day of March, transmit to the secretary of the commonwealth certified copies of the records of all deaths which have occurred during the year ending on the last day of the preceding December, the cause and manner of which he has investigated, in accordance with the requirements of chapter twenty-six of the Public Statutes; *provided, however*, if the term of office of any medical examiner shall end before the said last day of December, he shall send to the secretary of the commonwealth, within the sixty days next ensuing upon the expiration of his commission as a medical examiner, certified copies of the records of all deaths officially investigated by him

during that part of the then current calendar year in which he continued in office.

SEC. 4. Each medical examiner shall be entitled to receive from the treasury of the commonwealth, for recording and returning the facts relating to deaths as herein provided, twenty cents for each of the first twenty entries, and ten cents for each subsequent entry in any year, as certified by the secretary of the commonwealth, and such allowance and payment shall be made to the medical examiners in Suffolk County for record and returns pursuant to this section, notwithstanding the limitation to the salary fixed by section nine of chapter twenty-six of the Public Statutes as amended by this act; any medical examiner shall forfeit not less than ten nor more than fifty dollars for each refusal or neglect to fulfill the requirements of section three of this act.

SEC. 5. The secretary shall, at the expense of the commonwealth, prepare and furnish to the several medical examiners, blank books of suitable quality and size, to be used as books of record under this act, and blank forms for returns, on paper of uniform size.

SEC. 6. The secretary shall cause the returns received by him for each year, in accordance with this act, to be bound together in one volume, with indexes thereto; he shall prepare or cause to be prepared from the said returns such tabular results as will render them of practical utility, and shall make report thereof annually to the general court in connection with the report of the registry and return of births, marriages and deaths required by section fifteen of chapter thirty-two of the Public Statutes.

SEC. 7. Every medical examiner shall forthwith file with the district attorney of the district, a report of each autopsy made by him and of his view and personal inquiry in such case under the provisions of chapter twenty-six of the Public Statutes; and shall certify in such report that, in his judgment, the cause and manner of death could not be ascertained by view and inquiry, and that an autopsy was necessary for that purpose; the district attorney shall examine such report, and if of the opinion that such autopsy was necessary shall, except in the county of Suffolk, so certify to the county commissioners having jurisdiction over the place where the autopsy is held, and no fee for any autopsy shall be certified by the commissioners for payment until such certificate by the district attorney shall have been filed with said commissioners.

SEC. 8. This act shall take effect upon its passage.

Approved June 19th, 1885.

[Statutes 1887, Chapter 310.]

AN ACT RELATING TO MEDICAL EXAMINERS.

Be it enacted, &c., as follows:

SEC. 2. Section twenty-four of chapter twenty-six of the Public Statutes is hereby amended so as to read as follows: Every medical examiner shall return an account of the expenses of each view or autopsy, including his fees, to the county commissioners having jurisdiction over the place where the examination or view is held, or in the county of Suffolk to the auditor of the city of Boston, and shall annex to his return the written authority under which the autopsy was made; such commissioners or auditor shall audit such accounts and certify to the treasurer of the county what items in such account are deemed just and reasonable, and such items shall be paid by said treasurer to the person entitled to receive the same.

SEC. 4. This act shall take effect upon its passage.

Approved May 26th, 1887.

This law abolishing the Coroner system in Massachusetts has now stood the test of fourteen years' trial, and about 16,000 cases of violent, sudden and suspicious deaths have been examined in the State under its provisions. The change from the old system to the new was radical and thorough. It is no exaggeration to say that the present law has been one of the most satisfactory in its operation of any that have ever been enacted in the State.

SYNOPSIS OF PRINCIPAL FEATURES AND RESULTS.

The principal features in the foregoing act, which constitute the chief difference between the Medical Examiner system of Massachuetts and the Coroner system, are the following:

1. The separation of the medical from the legal duties involved in the investigation of the cause of death, the former being intrusted to medical officers ("able and discreet men, learned in the science of medicine") (Sections 2–9, 16–21, Acts of 1877, Chapter 200; and the latter to properly-qualified legal magistrates, Sections 10–14).
2. The abolition of the Coroner's office, and also of the jury (Section 1 *et seq.*)
3. The limitation of the number of medical officers (Sections 2, 6).

This law is the result of a successful attempt to introduce into a New England commonwealth, imbued with a traditional adherence to old and firmly-established customs, the plan of continental Europe modified and adapted to a republican form of government.

As may be seen by an examination of Section 8 of the present law of Massachusetts, the medical officer takes the initative steps in the investigation of each case requiring the exercise of his duties. This method of procedure rests upon the assumption of a natural sequence in the investigation of all cases of death by violence.

The *inquest* is held by the court, and is the inquiry into the facts outside the body; the *examination* is made by the (medical) examiner, and it leads the way to the inquest.

The purpose of the law is the detection of crimes; its method, the division of functions among those properly qualified to perform them.*

The operation of this law has been thoroughly tested in Massachusetts since its enactment in 1877, during which time the examination of at least sixteen thousand cases has been carefully conducted, and the advantage gained by the change has been successfully demonstrated.

FINANCIAL RESULTS.

Financially, the Medical Examiner system has also proved successful. Comparing the cost of Coroner's inquests and views in Massachusetts for three years under the old law (1874, 1875, and 1876) with the cost of similar inquiries under the new law for a like period (1878, 1879, and 1880), as nearly as could be ascertained, the result was for the former period, $63,712.04, and for the latter, $54,509.31, leaving a difference of $9,202.73 in favor of the Medical Examiner system, notwithstanding an increase of population between the two periods of at least one hundred thousand, and a consequent increase in the amount of work done.

The chief causes of this diminution in expense are the abolition of the Coroner's jury, and the decrease in the number of inquests. In the three years specified under the old law, there were held in three counties in Massachusetts *one hundred and twenty-four inquests.* In three years, under the new law, with a larger population, the number of inquests held in the same counties was but *seventy-five.*

Under the old law the ratio of inquests to cases of all sorts examined throughout the whole State was about forty per cent. Under the Medical Examiner law the ratio has not been more then twenty-two per cent. "The reasons for this change may be found in the appointment, to fill the offices formely held by Coroners, of men whose education necessarily fits them for the work which they are expected to perform. Under the old law a man found dead, even without the least suspicion of violence, as in simple cases of heart disease or apoplexy, would in all probability be reported to the village Coroner, provided the most common hypostatic marks of post-mortem dis-

* Tyndale.

coloration were observed by a bystander, and interpreted by him as significant of a violent death. Hence the Coroner sets in motion the cumbrous machinery of his office. In the first place he sends for a Constable. The Constable summons a jury. The witnesses come next; and last of all, the nearest physician is summoned, whose evidence finally shows that the man died a natural death. Under the working of the present law the order of procedure is reversed. The medical officer first views the body, and in a case like that just cited he simply reports it as a view. If, however, he believes there is reasonable suspicion of violence, as revealed by the evidence shown him from an external examination of the body, and a personal inquiry of the witnesses, and also by an autopsy, if that be requisite, the case is then reported to the proper authorities for inquest.*

After the Medical Examiner law had been in operation for a period of seven years and a half, the Legislature of 1885 carefully considered certain measures which were proposed for the further improvement of the existing law. These were the reporting of cases to some central authority who should be intrusted with the compilation, classification and publication of the returns of the Medical Examiners; the proper remuneration of medical witnesses at autopsies; and a provision for more definite authority for making autopsies on the bodies of persons found dead.

The following condensed summary gives the number of cases investigated under the Medical Examiner system for the five years 1885 to 1889 inclusive.

YEAR.	SEX.						Totals.
	Males.	Per Cent.	Females.	Per Cent.	Unspecified.	Per Cent.	
1885	973	76.1	286	22.4	19	1.5	1,278
1886	1,027	74.5	319	23.2	32	2.3	1,378
1887	1,191	76.5	350	22.5	15	1.0	1,556
1888	1,261	76.4	373	22.6	17	1.0	1,651
1889	1,253	75.8	388	23.4	13	0.8	1,654
Totals	5,705	75.9	1,716	22 8	96	1.3	7,517

The expenses of the four years 1885 to 1889 were as follows:

YEAR.	Total Number of Cases Examined.	Autopsies.	Total Expenses.	Average Expense of Each Case.
1885	1,260	165	$16,322 54	$12 95
1886	1,378	202	18,024 22	13 08
1887	1,556	188	18,626 26	11 97
1888	1,651	219	19,611 53	11 88
1889	1,654	216	19,489 69	11 78

*Transactions of Mass. Medico-Legal Society, Vol. 1, p. 207.

Similar laws, although modified in some degree, have been passed more recently by Connecticut and Rhode Island. The American Medical Association and the Medico-Legal Society of New York City have expressed themselves fully as to their views of the inadequacy of the old system. Indeed, we have yet to find physicians, jurors or lawyers, who have investigated the subject, who do not agree as to the need of change. We quote as follows from the "Medical Record" of June, 1891:

"Our Coroner system is a vicious one, though it is better than it used to be. We live in expectation that someday the New York Medico-Legal Society and the New York Society of Medical Jurisprudence will amalgamate, and then united efforts to promote medico-legal science may be undertaken. One of the first things to happen in this millennial time will be the death of our present antiquated, political Coroner system."

In an able paper recently read before the New York Academy of Medicine, Prof. Stephen Smith, M.D., says: "The Coroner system is a relic of the past and should become as obsolete as it is ancient." He then discusses the system in full and presents as a substitute slight modifications of the Massachusetts law.

II.

SYNOPSIS OF PRESENT NEW JERSEY LAWS AS TO CORONERS, COUNTY PHYSICIANS AND INQUESTS.

BY CARROLL ROBBINS, COUNSELOR-AT LAW.

The act entitled "An act respecting coroners," approved March 27th, 1874, with its several supplements provides that there shall be elected three Coroners for each county, the election to be held at the time of the election of members of the Assembly, and their term of office three years.

Whenever a vacancy occurs in the office the Governor may fill it by appointment, such appointee's term expiring at the ensuing general election (P. L. 1882, p. 12).

No qualification is required except that the candidate be an inhabitant of the county, and before entering upon his office he shall take an oath to discharge his duty properly.

(For form of oath, see Rev., p. 169, Section 2.)

Every Coroner shall have power, upon view of the body, to take inquests of deaths in prison, and of all violent, sudden or casual deaths within his county, and the manner of such deaths (Rev., p. 170, Section 3).

A Justice of the Peace may act when a Coroner cannot be had in due time (Ib., Section 4).

The Coroner on being informed of the violent, sudden or casual death of any person within his county shall immediately view the body and make inquiries, and if he is satisfied that no person has been guilty of causing or procuring said death and that there are no suspicious circumstances attending the same, he shall deliver up the body to the friends for interment, or shall bury it if the dead person have no friends to take charge of it and no property to pay the expenses (Ib., Section 5).

Where inquests are not taken, the Coroner shall make a certificate to the effect that he deems an inquest unnecessary, and in case no friends take charge of the body and the decedent had no property, he shall further certify that he buried the same (Ib., Section 6).

If after view and inquiry the Coroner shall have reason to suspect that the decedent has been foully dealt with, he shall make out a precept to a Constable, requiring him to summon a jury of not less than nine nor more than fifteen men.

Of the jurors who shall appear the Coroner shall swear six or more as a jury to inquire into the facts, and they shall find (Ib., Section 11) whether the decedent died by murder, manslaughter, misadventure, misfortune, accident or otherwise, and when and where and by what means, and in what manner; and if by murder, who were principals and who were accessories; and if by manslaughter, who were the perpetrators, and with what instrument the stroke or wound was in either case given, and so of all prevailing circumstances which may come by presumption; and if by misadventure, misfortune, accident or otherwise, whether by the act of God or man, and whether by hurt, fall, stroke, drowning or in any other way; to inquire what persons were present at the death, from whence the deceased came, and who he or she was, and his or her parents, relatives or neighbors; who were the finders of the body; whether killed in the same place where he or she was found, or if elsewhere, by whom and how he or she was brought from thence, and of all circumstances relating to said death; and if he or she died in prison, whether by hard usage there or not, and if so, how and by whom; and if he or she put an end to his or her own life, then to inquire of the manner, means or instrument, and of all the circumstances concerning it.

The Coroner has power to summon witnesses (Ib., Section 12).

He is also required to return his inquisition to the next Court of Oyer and Terminer and General Jail Delivery in his county, and the court is to proceed against the offenders.

The Coroner is further required to reduce to writing all of the evidence which is material, and to bind over as witnesses those declaring anything material to prove murder or manslaughter, or to prove persons accessories, to appear at the next court, and if accused is not already in custody he may issue a warrant for his arrest as Justices of the Peace do.

Section 15 of the same act provides that the Coroner, when he deems it necessary to have a post-mortem examination, shall call to his aid one or more licensed physicians or surgeons of the State for the purpose, and on certificate of the Coroner the Freeholders of the county where the body was found shall pay the physicians a reasonable compensation.

Where dead bodies are thrown upon shores or coasts by shipwreck the Coroner of county shall make written statement containing name of ship, date of wreck, place where it occurred together with full description of body as he can give, and also time and place of burial, and shall file statement under oath with the State Treasurer.

If no Coroner or Justice of the Peace can be had in due time, a Commissioner of Wrecks may discharge the duty of the Coroner in case of shipwrecks.

A person finding a dead body and giving notice to proper officers is entitled to a fee of fifty cents and five cents a mile as mileage.

It is the duty of the Coroner to provide graveclothes for bodies found in a state of nudity.

For neglect of duty a Coroner or Justice of the Peace, who under the circumstances is bound to discharge the duties of the Coroner's office, may be fined a sum not exceeding five hundred dollars.

The expenses of inquests are borne by the county where the body is found, though inquest held in another county, except in cases of shipwreck, shall be paid by the State Treasurer.

The fees of a Coroner are taxed by the County Clerk, and Coroners must be sworn as to the correctness of bills presented and amounts paid for jurors' and witness fees.

If in any case it appears to the Coroner necessary to have a chemical analysis made of a substance suspected of having occasioned death, he shall report to a Justice of the Supreme Court, who shall have power in his discretion to order such analysis to be made and to certify the expense, which shall then be paid.

(For Coroners' fees and other expenses incident to the holding of inquests, see Supplement to Revision, pp. 141, 142, 796)

This is a brief statement of the salient features of the law respecting Coroners in this State as it is applicable to all counties where there are no County Physicians; and it is also in force in all counties where there are County Physicians, except as modified by the acts creating and relating to such office.

By the act of April 21st, 1876 (P. L. 1876, p. 379), it was provided that the Board of Chosen Freeholders of any county in the State, whenever they deem it best to do so, may elect a County Physician from the number of licensed physicians residing in such county, who shall hold office for three years and on such salary as they deem just, to be fixed from time to time, as such elections shall be made.

Before entering upon his duties said County Physician shall be sworn faithfully and fairly to perform the duties of his office.

It is his duty in all cases of death in prison, and all violent, sudden or casual deaths within his county, to take a view of the body, and make all proper inquiry respecting the cause and manner of the death, for the purpose of ascertaining whether an inquest should be held ; and if upon such view and inquiry he shall be of opinion that there is cause to suspect that the person whose body he has been called to view, came to his or her death by murder or manslaughter, or by the contrivance, aiding, procuring or other misconduct of any person or persons, then it shall be his duty to call upon one of the Coroners of the county, or if such Coroner cannot be had, upon a Justice of the Peace of said county, and request him in writing to issue the precept for the summoning of a jury of inquisition, to consist of not more than fifteen nor less than nine, and to hold an inquest and make return of the same according to law, and any post-mortem examination or other medical service required upon said inquest shall be performed by said County Physician (Rev., p. 818, Section 2).

In case of vacancy in office of County Physician the Coroners and Justices of the Peace shall perform the duties and exercise the powers prescribed by law (Ib., Section 3).

When the County Physician is sick or unable to discharge any duty of the office, he may nominate and appoint in writing under his hand any other licensed physician in the county to act for him, and the County Physician shall pay him (Ib., Section 4).

In all cases where a County Physician shall be elected and qualified and fulfilling his office, he shall have exclusive right and power to make all views and inquiries heretofore made by Coroners and Justices of the Peace; and no precept for the summoning of a jury of inquest shall be issued by any Justice or Coroner of any county where a County Physician shall be acting as aforesaid, except by the written request of said physician made as aforesaid; and the request so made by such physician shall be annexed to the inquest made and returned by said Coroner or Justice (Ib., Section 5).

By the act of April 5th, 1878 (Sup. Rev., p. 795), the former act respecting County Physicians was so extended as to compel the election of such an officer in all counties having a population of not less than 50,000 inhabitants.

(As to disposition of personal property of decedent by County Physician or Coroner, see Supplement to Revision, page 796, Section 3.)

We quote briefly from Mr. Robbins' letter of transmittal as follows:

"I think the matter one of such importance that it should be placed in the hands of thoroughly competent officers to deal with it, and while the appointing of County Physicians may have been a step in advance of the old methods there certainly is room for great improvement yet in the system. I think the Coroner or person presiding at an inquest should be a man of legal education and experience, and competent to deal with the matters and questions arising there with considerable skill. It appears that the act creating the office of County Physician merely takes from the Coroner the power of deciding whether there shall be an inquest in any case, and names a person who shall do and perform any medical service which may be needed at such inquest."

It may be claimed by some that our present law is an approach toward the Massachusetts law. So it is, but yet so imperfect as to preserve some of the worst features of the former law.

I. It retains the office of Coroner and the jury system.

II. It does not recognize that in many cases at a very early stage the District Attorney or other legal officer should be identified with the case.

III. It does not diminish expense.

IV. It leaves a conflict of authority between County Physicians and Coroner, unless in their mutual interest they have some understanding as to how far one or the other is to be recognized and paid.

V. It causes an overlapping of methods of proceeding often unnecessary and complicating.

Of the fourth item we have had the past year a full exemplification in the contest in Camden between the County Physician and Coroner. (See "Philadelphia Press," July 22d, 1891.)

Of the fifth, the Kniffin case, 1890, in Trenton, was a good example. Here two juries, the Coroner's jury and the grand jury, were sitting and taking testimony at the same time, and it came to be fully recognized what an unnecessary and expensive addition the Coroner's jury system is.

It must be fully realized that in cases of inquest all that is needed before presentment to the grand jury, is expert medical and expert legal inquiry, for which a proper medical and legal expert are all that is required. The physician should be selected not only because he is a physician and practitioner, but from his special acquaintance with pathology and medico-legal jurisprudence and his ability to make a thorough autopsy. It must be recognized that many excellent practitioners are not versed in the details of ante-mortem or post-mortem appearances. Some of our County Physicians and especially those of our larger cities, have by reason of special study and long experience, illustrated the difference between expert and non-expert medical men. Our present law should be modified, especially in the following particulars:

The office of Coroner and the Coroner's jury should be abolished and the Massachusetts plan substituted.

The County Inquest Physician or Examiner should be appointed by the Presiding Judge of the county, the Law Judge, or the Director of the Board of Freeholders. Where there is no Law Judge the senior Lay Judge can serve in his stead. The body should be in charge of the first physician called, or of an undertaker, until the County Physician arrives. He should be at once telegraphed or sent for.

We thus beg to call the attention of the Legislature to this subject, in order that the interest of life, of justice and of economy may be better conserved.

COMMENTS ON SELECTED DISEASES.

ENTERIC FEVER.

The experience of the year as to enteric and typhoid fever has been serious and widespread. It is not merely that such cities as Jersey City, Newark and Camden have suffered, but we have had reports of a few cases here and there throughout the State. Those who have before studied the relations of continued drought and low ground-water levels to outbreaks of enteric fever, and as often aided and increased by the after sudden rise of ground-water, were prepared to anticipate that we should have an unusual prevalence of the disease. As our vital statistics only extend to July 1st, its chief record will be in the tables of next year. As before, enteric fever seems to find its chief vehicle through lowered wells and rivers used as water-supply. The evidence as to this is constantly accumulating.

Here, for instance, are some more recent facts given by Dr. Brouardel, the distinguished authority of Paris:

"As regards typhoid fever the deaths due to this disease in France amount to 23,000 per annum. Dr. Brouardel gives a great variety of statistics to show that the liability to typhoid is in direct proportion to the imperfections in the water-supply, and that in proportion as a sufficient supply of pure water is provided typhoid abates. Thus, at Vienne the typhoid mortality was 200 per 100,000 while the inhabitants drank surface, hence often polluted, water; but this mortality fell to 10 per 100,000 on a thoroughly good supply being obtained. At Angoulême the introduction of a new supply of pure water reduced the number of cases of typhoid in the proportion of 0.063 to 18. At Amiens, among the military population, the typhoid mortality fell from 111 per 10,000 to 7 when a pure supply of water was secured by artesian wells. At Rennes the inhabitants formerly drank from contaminated wells, with the result that typhoid fever was always endemic. The introduction of pure water reduced the deaths from typhoid among the military population from 43 per

10,000 to 2. Investigations carried out at Besançon, Tours, Carcassonne, Paris and Bordeaux entirely corroborate the above striking figures. Typhoid fever is responsible for the deaths of 1 soldier in 335 in France, or 298 per 100,000, and this in time of peace. In war its ravages are even far greater. Thus the expeditionary corps to Tunis in 1881, consisting of 20,000 men, had 4,500 cases of typhoid, with 844 deaths."

He urges it as the plain duty of Government "to secure the public health against the dangers which arise from using polluted water." We will in another connection discuss how far it is possible that this and other diseases depend first of all upon general lack of cleanliness or the reception of articles into the system, whether as air, food or drink, charged with zymotic particles. The defense against infective particles divide themselves into two classes: First, defense against the most common and ascertained causes, such, for instance, as in typhoid fever, against fæcal excretions and specifically-polluted water-supplies, &c., and, second, against all kinds of filth and uncleanliness, since thus we attack the breeding-places of all infective diseases.

We refer to former recent reports as to some important facts as to typhoid fever. We think it must be admitted that the views of Murchison as to the pathogenic and possible *de novo* origin of this disease, as well as its direct derivation from a special bacillus, are fast gaining ground, especially as in some minds modified by evidence of evolution in forms and in virulency. Also, the variations of type are commanding more attention. Thus, in the past summer the fevers that were rife in Jersey City were often puzzling as between malarial, typho-malarial, typhoid and forms of cesspool or mongrel fever not easily defined. Beside the great studies presented to the practitioners by all this, one thing at least is emphasized, viz., that the scope and duties of Health Boards and skilled Inspectors multiply, and that our greatest hope of prevention and limitation is in cleanliness, house-to-house inspection, isolation, the guarding of water and milk-supply and thorough disinfection.

DIPHTHERIA.

This disease continues to be the great menace of child life, and, more than any other one disease, occasionally ravages whole families or neighborhoods. It will be far more successfully combated when each physician comes to feel that the house and the family in which

a case occurs are at once in his charge as much as the particular patient, and require, promptly, sanitary and administrative skill. So, also, there will be great diminution of cases and of mortality when Health Inspectors are prompt and thorough in method, and when parents understand more fully the modes of limitation of the disease.

We have deemed some more recent facts of such importance that recently we have issued a special circular as to it, and distributed it to the physicians of the State. We ask for it the most careful consideration. Particles which transmit diphtheria are conveyed in various ways from the sick-room and by garments, &c., unless close precautions are taken. Its propagation is favored by soil moisture, damp cellars and all mould conditions and by the sudden exposure of masses of decomposable material spread over surfaces. (See recent book of Thorn Thorne, M.D., F.R.S.)

In Montclair and in Chambersburg two families lost several children each from the spreading of cesspool material on garden lawns.

Soyka, of Munich, in an elaborate paper, traces the association of the disease with manure compost or deposits of filth exposed and spread out. Dr. Willoughby presents similar cases. (See report of Epidemiological Society, "London Lancet," May 10th, 1891, and August 8th, 1891.)

Dr. Butterfield and Dr. Thresh confirm these views (British Medical Association, 1891). The handling of strange compounds known as compost and stable manure near Jersey City, and as transported through the State, needs close attention.

It should never be used near dwellings or wells, or left long on car-sidings, but should be plowed under soon after spreading.

Some cases of Dr. Adams, of Maidstone, have been claimed to show that "the diffusion of the infection is often brought about by reason of a rise in the water-level, the soil in which these results take place being one which must also be sufficiently contaminated by soakage of filth to form a suitable breeding-ground for the development and subsequent changes occurring in the pathological organism."

Our defense against it is in clean ground, clean houses, the avoidance of overcrowding, of foul dampness and surface filth, and in the thorough isolation and care of cases, as set forth in Circulars LXXVII. and XLIV. of this Board.

SMALL-POX.

It is very gratifying that for some years past the State has been so far rid of small-pox. The recorded yearly aggregate of deaths for four years past is as follows: 1888, 5; 1889, 3; 1890, 0; 1891, 0. This is in part owing to better attention to vaccination and to more prompt dealing with first cases as they occur. But it has been often noticed that the school age of five years brings many younger children from their homes to new exposures, and for this and perhaps some other causes epidemics seem to occur in cycles.* There is but one thing to do and that is to urge and to secure vaccination, and, in the case of those over fourteen years of age, revaccination. The reasons are fully set forth in our fifth report, and also in subsequent ones, and especially as to revaccination in the twelfth report (1888), pages 27–29.

A French authority recently points out "that while Germany loses only 110 persons per annum from small-pox France actually loses 14,000. He attributes this astounding difference to the rigid way in which vaccination is enforced in Germany, and to the carelessness of his own countrymen in this matter. Statistics show that in 1865, when vaccination was not obligatory in Prussia, the mortality was 27 per 100,000 inhabitants. After vaccination was enforced the mortality fell in 1874 to 3.60 per 100,000, and in 1886 to 0.049. At the present time the mortality from this cause in France is 43 per 100,000."

English and American reports present similar facts. While we have no law of compulsory vaccination, our School law and the Health law of 1887, Chapter LXVIII., Sections 21, 22, 23, give such power to Health and School Boards as make it imperative for them to see that unvaccinated children do not attend public schools and thus expose themselves and the public at large.

We ask that special attention be given to the enforcement of these laws, and that we be not compelled to wait for actual outbreaks of the disease to scare parents into propriety as to the vaccination of children within a few months after birth.

There is no longer any difficulty in securing reliable vaccine lymph if well-known producers are relied upon.

For further details we refer to Circular XLIV. of the Board.

*Since this was written, this is illustrated in Trenton, Newark, &c.

INFLUENZA.

The great pandemic, influenza, which made such a visitation of almost all the world in 1890, again recurred in 1891 with some important variations. In its course it was as vagrant as before. It visited persons and countries where it prevailed last year, and sometimes, although not generally, affecting the whole population and proving fatal to many. In its symptoms it was quite similar. The description of it in our last report will apply. China and Japan seem to have suffered throughout their immense populations. In England, it is thus noticed by the London "Lancet" so late as May 9th, 1891:

"The outbreak of influenza, which first made its appearance in this country about a month ago, and was for a few weeks confined within a comparatively limited area, has now spread over the whole country. The disease has gained considerable footing in the metropolis, but not to the extent that it did in January of last year.

"The Registrar-General's mortality returns for the week ending May 9th show an increase of 433 deaths in London above the average number in the corresponding week of the last ten years. The deaths primarily attributed to influenza, which had been 10 and 37 in the preceding two weeks, rose to 148, or 21 in excess of the highest weekly number during the 1890 outbreak. The deaths from diseases of the respiratory organs were 584, or 240 in excess of the average; of them, 230 were attributed to pneumonia and 302 to bronchitis.

"Dr. Wightwick, the medical officer of health to St. Olave's district, in a report presented to the Board, stated that, so far as his experience went, the nervous type of the disease, complicated with severe lung symptoms, was more frequent than last year. This is borne out by the exceptional rise in the mortality from bronchitis and pneumonia in the towns which have been most affected. Sheffield still holds an unenviable pre-eminence in this respect, its mortality rate having last week advanced to the extraordinary figure of 70 per 1,000; but we are glad to learn that the virulence of the epidemic is now on the decline in that town. It has now spread to all parts of Yorkshire, but is especially prevalent in the East Riding. There does not appear to be much abatement of it in Leeds and Bradford and the surrounding districts.

"From all parts of Wales accounts have been received of its extension to country districts as well as in the towns.

"So far, then, as compared with the epidemic of 1889–90, its spread has not been so rapid, but it has been none the less sure; and

there has been considerable variation in the severity of the type of disease, some districts which furnish many sufferers having a much lower mortality than others. On the whole, however, we fear that there can be little doubt as to its virulence being greater than last year's epidemic, which, contrasted with previous outbreaks was comparatively mild, and was not responsible, either directly or indirectly, for so great a mortality as has occurred in this country during the past few weeks, especially from acute diseases of the respiratory system."

The record of English towns also showed a great increase of mortality, especially for respiratory diseases.

In the United States it was not so widespread as last year. Yet it traveled hither and thither, and in Pittsburgh and Chicago reached a greater prevalence than in the previous year. In New Jersey it caused considerable sickness and increase of mortality, chiefly from respiratory diseases, but not to the same extent as in 1890. In Princeton there were an unusual number of cases, many of them severe. It was reported from various points in the State, especially in March and April. No new facts as to it were elicited. In its source and conduct it is a puzzle more than in its treatment. There is fear that it may become a more frequent visitor than formerly. The great error is that so many think it not necessary to stay within doors until the symptoms have fully subsided. We are constantly hearing of those who, because of undue exposure, have had permanent impairment of some organ.

The most thorough summary as to the disease is to be found in the official report of the Local Government Board of England for 1889–90. As the disease showed no peculiar features as it appeared in the United States, this report is equally of value here. Dr. Parsons, the chief author of this voluminous report, takes strong ground as to its infectivity, and, in the absence of any equally labored presentation of the opposite view, seems to make out his contention. This, too, notwithstanding that the most labored and repeated bacteriological research has failed to find any specific form of microbe or microphyte,* and that the evidence of atmospheric or aërial prevalence, independent of persons and of its outbreak therefrom, has had many illustrations. He regards the contagium to be unstable and having a varying incubatory period of from one to four days.

Taking capillary congestion of the conjunctiva as one of the commonest of the early symptoms, he gives great prominence to the

*It is now claimed that the bacillus has been discovered.

views of Dr. B. Thorne and a few others, that "the conjunctiva is the structure which the infecting material—microbe or not—most generally, if not always, attacks. His contention that the disease tends especially to manifest itself as an infection operating on the central-spinal nerve centers—a view which many share with him—is also put forward." It behooves all physicians to know thoroughly the history and facts as to the disease, since, if it continues to return, it will rank among the most serious of pandemic diseases.

TUBERCULOSIS, PHTHISIS, ETC.

The years 1890 and 1891 have been most remarkable as regards all those diseases which are ranged under the general head of Tuberculosis. In August, 1890, Dr Koch announced that he had discovered a remedy capable of curing a large number of cases of this disease in various forms. The high scientific reputation of Koch, the apparent support given to his views by those of high distinction in medicine, and the wonderful pilgrimage to Berlin by physicians, reporters and patients from many lands, gave to the remedy a kind of consideration quite new in the annals of modern medicine. It seemed to matter little that the medicament was a secret one, and that when its composition was announced it was not really a revealing of its constituency. It was not until Virchow, from the standpoint of a pathologist, grappled with the facts in evidence as to the results that some moderation was given to the unwonted enthusiasm, and that the profession fell back into those lines of patient inquiry, and those methods of testing alleged biological discoveries which are more in accord with the true laws of science and the testimonies of applied art.

It must be said of tuberculin, that while it is still subject to experimentation, and may have some possible and hopeful relation to some forms of tuberculosis, it has not proven to be an agent of value in the treatment of phthisis pulmonalis or any known form of bacillary consumption. Amid the hundreds of trials and testimonies we select that of the Brompton Hospital for Consumptives, as given by C. Theodore Williams, M.D., the senior physician to the hospital, in a lecture in June last:

"Koch's treatment of phthisis has been selected partly because a considerable number of cases have been for some time under this

treatment in the hospital, and some estimate may therefore be formed of its specific action in consumption, and partly because it is a subject which lends itself specially to clinical demonstration; and, as the ten cases under my charge have been carefully recorded with a view of testing the method, you will be able, after examining the patients, to form your own judgment on the matter. Moreover, a visit to Berlin last December enabled me to investigate a large number of cases under the Koch treatment in the German hospitals, and especially those in which it had been carried out under the personal supervision of Professor Koch himself, and to take note of any necessary hints or precautions. In his further communication Professor Koch informs us that tuberculin is a glycerine extract of pure cultivation of tubercle bacilli in which the parasites have been killed. His general conclusions may thus be summed up: 1. That the hypodermic injection of tuberculin in tuberculous patients is followed in a few hours by a reaction, characterized by rigors, fever, pain in limbs, languor and great fatigue, often vomiting, increase of cough and expectoration, and occasionally by an eruption like measles, the reaction lasting from twelve to fifteen hours, and the patient returning at the close of it to his ordinary state. 2. That the tuberculin penetrates to, and causes necrosis of, the tubercular tissue wherever situated in the body, but does not necessarily destroy the tubercle bacilli themselves, and that its penetrative action is extremely valuable for diagnostic purposes, but that it has no effect on necrotic cheesy masses. 3. That patients in the first stage of phthisis, after being under treatment for from four to six weeks, were free from every symptom of disease, and might be pronounced cured. 4. That patients with cavities not too highly developed improved rapidly and were almost cured. 5. That only in those whose lungs contained many large cavities could no improvement be found objectively, but even in these the expectoration diminished, and there was subjective improvement. Professor Koch concludes that he is led to suppose that phthisis in the beginning can be cured with certainty by this remedy, though he admits that the cure cannot be considered lasting until longer time has elapsed. The clinical evidence as to the action of Koch's remedy in phthisis has been abundant. Professors Gerhardt, Leyden, Senator and Ewald have spoken, but not on the whole favorably—nay, in many cases the reverse; but the most important evidence which has as yet been furnished is the pathological, supplied in sundry and valuable communications of Professor Virchow, the greatest living pathologist, who examined sixteen phthisical patients who had died at the Charité Hospital whilst undergoing the Koch treatment. The results appear to be: (1) colossal hyperæmia of the pia mater and brain substance, with tubercular meningitis, in a boy aged two years and nine months, after four injections; (2) intense reddening of the granular layers on the surface of old phthisical cavities and swelling of lymphatic glands; (3) caseous pneumonia, induced, as appeared in five out of sixteen

necropsies, in one case after six injections; (4) a characteristic form of catarrhal pneumonia in seven cases, termed by Virchow 'injection catarrhal pneumonia;' (5) eruption of miliary tubercles. He also noted that there was no necrosis of individual tubercles throughout the body, but they generally remained *unaffected*."

After giving, with clinical accuracy, the details of all the cases, he thus presents the results:

"Let us now summarize the results of the treatment in these fourteen patients. We must bear in mind that five were first-stage or tuberculization cases; in one softening had commenced, and the rest were patients with cavities, five with single cavities and three with double cavities, though of limited extent.

"*General condition.*—Six improved, of whom three improved greatly, seven deteriorated, and one remained in a stationary condition.

"Of twelve patients whose weights were recorded, four gained in weight (the greatest gain being ten pounds), five lost and three were stationary. Loss of weight is almost invariable if there is much reaction, and we must bear in mind that all these patients reacted at one period or another of the treatment.

"*Influence on pulse, respiration and temperature.*—As a rule, during a reaction there was a simultaneous rise of pulse, respiration and temperature, and a corresponding fall to the normal at the close of it, but this was not invariable, for in some of the slighter reactions there was a rise of pulse and respiration, accompanied by headache and languor, without any elevation of temperature. In the pyrexial cases, such as case 6, and in two of the private patients, the effect of the tuberculin was to intensify the pyrexia, raising the temperature by several degrees. In some of these cases, where fresh tubercular and pneumonic changes followed the injections, the pyrexia remained more or less persistent for weeks. Where, however, extensive excavation took place, there was a tendency to subsidence of fever. The patients described as improved all stated that they could breathe more easily after the treatment. The remedy seemed to have no permanent effect on pulse-rate or respiration-rate.

"*Digestive organs.*—The patients, as a rule, lost appetite, and in two cases diarrhœa came on, but there was no suspicion of its being due to intestinal ulceration.

"*Skin and kidneys.*—No special effect was noticed on the kidneys, although some observers have noted the presence of albumen in the urine after injections. In two patients affected with night sweats these occurred during the reactions.

"*Blood.*—The blood was carefully examined in two patients during the reaction for tubercle bacilli, but with negative result.

"*Cough and expectoration.*—Cough, as a rule, increased after the first injections, and occasionally there was slight aphonia; after a while cough diminished, unless the lung condition showed advance of the disease. Expectoration invariably increased in quantity, in some cases threefold, was generally purulent, and contained often caseous material visible to the naked eye. In the hospital the sputum was examined for tubercle bacilli by our able assistant medical officer, Dr. Allden, before the treatment commenced, and examinations were carried on every other day during its continuance. All observers of any experience have come to the conclusion that no great stress can be laid on the variations in the number of tubercle bacilli in the sputum, and that they are often dependent simply on the quantity of expectoration; so that their increase does not always mean increase of disease, especially where cavities exist, nor does their diminution mean arrest of disease.

"Professor Koch lays great stress on their diminution under the treatment, stating that it takes place when the expectoration begins to present a mucous appearance. Out of thirteen cases in which they were detected they diminished in one case, increased at first and diminished afterwards in two cases, remained abundant throughout in four, and increased in six. In many cases the injections appear to be immediately followed by increase in the number of tubercle bacillus.

"*Lung tissue.*—The appearance of lung tissue in the sputum seemed to be the most direct result of the injections. It was found in all but one case at some time or other of the treatment, and generally after the first few injections. In the favorable cases it disappeared later, but in the unfavorable cases it was detected throughout the treatment. It was generally abundant, and presented not only the hooklets, but often almost complete sections of pulmonary alveoli. It is a curious feature in the clinical records of the Berlin consumption cases under the Koch treatment in the hospitals, that, while the observations on the numbers of tubercle bacilli are most carefully recorded, little or no mention is made of the presence or absence of lung tissue in the sputum, assuredly a most important item in determining the progress of lung change.

"*State of the lung as evidenced by physical signs.*—Among the five tuberculization cases, cavities formed in four, and in three extension of tuberculization took place. In the case of softening, a cavity formed rapidly, apparently with great relief to the patient. In the other eight the old cavities either extended or fresh cavities formed, in many cases in regions not commonly the seat of cavities, such as the right middle lobe. The conversion of an apical tubercular mass into a cavity was generally a rapid process, taking place often in three or four weeks, as in cases 1 and 4 and the third private case. The formation of secondary cavities was also rapid, as occurred in the first and second of the private patients. The extension of old cavities was

well marked in two cases. With regard, therefore, to excavation, we must bear in mind that it either took place, or extended, in no less than thirteen out of fourteen cases. In three of the patients contraction of the cavities was noted to be proceeding at the time of our last record, even though extension had originally taken place. As to spread of tuberculization, it took place in six cases, and generally proceeded by continuity, but in two cases infection of the lower lobe appears to have commenced by re-inhalation of cavity secretion. In one case there was tubercular spread without excavation.

"*Larynx.*—Three of the patients had tuberculosis of the larynx, but curiously the lesions appear to have been unaffected by the injections.

"And now it will be seen that the evidence of the cases narrated does not confirm Professor Koch's conclusion, but like those of Professor Virchow, Ewald, and Dr. C. J. Nixon,* they point out some of the difficulties and dangers of the treatment. There is no doubt about the penetrative action of tuberculin, and, possibly, if something were combined with it, this remarkable power of selecting tubercle might be turned to account; as it stands at present in phthisis, its effect is to convert tuberculous masses, which may be perfectly quiescent, into cavities, and the process is by no means always a safe one. As regards the condition of our patients after treatment, all we can say is that they fared worse than the ordinary run of similar consumptives, and, moreover, that several of them improved considerably when transferred from Koch's system to the ordinary treatment of the hospital. There may be, and, indeed, there are, cases of phthisis in which the promotion of excavation is desirable, and for such the Koch method is indicated; but they are, I take it, exceedingly rare, and for the great mass of consumptive patients it is certainly not indicated. I close this lecture by the following conclusions: (1) Professor Koch's fluid has a strong affinity for tubercular material, which it appears to penetrate, and to produce inflammatory changes in and around all parts of the body; (2) that the changes in the lung set up seem to be partly necrotic—*i. e.* destruction of tissue—but partly infective, producing fresh tubercles; (3) that the effect on tubercular consolidations is to cause their softening and excavation, and subsequent removal by expectoration or absorption; that this process of elimination of tubercle by excavation leads to extensive destruction of lung tissue and to the formation of a large number of cavities in lungs formerly the seat of quiescent tubercle, which may give rise to septic infection; (4) that this process is also at times accompanied by fresh tuberculosis in the neighborhood, either by infection of fresh tracts through tubercle bacilli passing down the bronchi, or by their penetrating into neighboring alveoli; (5) that, on the other hand, the removal of the tubercular masses by excavation is

* Dublin Journal of Medical Sciences, March, 1891.

occasionally followed by fibrotic changes in the lung, which cause contraction of the cavities thus formed, and in this way conduce to arrest of the disease, but that such favorable changes cannot be predicted beforehand; (6) that there is no proof of the possibility of the cure of phthisis by this method within the periods mentioned by Professor Koch, and that, as at present administered, its results are less favorable than those of the ordinary methods in use."

There are important lessons, however, which have been taught amid what was at first the wildness of experimental haste. First—

(*a*) When we generalize by associating various allied neoplasms under one name, we need to be careful to know that similarity is not such absolute identity as to make it safe to predicate on it some one treatment and look for identical results. In botany we have families, classes, orders, genera, species, and so there is need for very accurate classification even if we establish the family as the same. For instance, tuberculosis which shows itself in the general form known as scrofula, or in marasmus, or hydrocephalus, or in a joint, on in phthisis pulmonalis, needs to have its type and locality recognized in treatment.

Lupus affords an important example. At the very time that so much of the alleged success at Berlin centered around lupus, Prof. Jonathan Hutchinson, of London, from his standpoint as a surgeon, and from no zeal to combat views just announced, was casting grave doubt upon the question whether lupus is at all tuberculous or a bacillary disease, since in some of its most pathognomonic forms the appearance of the bacillus is after the disease has shown its specific character. Prof. Gibbs and E. L. Shirley, M.D. ("American Medical Journal of Sciences," see "Medical News," December 27th, 1890), like many others, claim "that tuberculosis and phthisis pulmonalis are different disease processes, resting upon distinct pathological and clinical bases."

(*b*) The use of tuberculin has given great prominence to the whole subject of hypodermic medication. Great as is the value and power of this mode of reaching the system rapidly, it is ever to be regarded as furnishing great possibilities for the most serious results. There is no doubt that numbers were killed by tuberculin, as they have been by other substances used for hypodermic medication. This is not against the wise and skillful use of hypodermic method which, indeed, is so promising in various diseases that it must not be trifled with. But the great need of caution must be emphasized.

(*c*) Attention needs to be given to the varieties of hypodermic injections for the purpose of curing tuberculosis which have been and which are likely to be proposed. Dr. J. Russel, of Paris, has long claimed great results from an effort to render the body antiseptic through the use of eucalyptol and other antiseptics. Cases have frequently been brought before the Society of Practical Medicine of Paris, to show their success, and also during the Medical Congress at Berlin, 1890, Dr. Russell showed the treatment on many patients at the Charité Hospital. Liebreich seems to have had good results from the injection of the cantharidate of potash. M. Lannelongue's use of the chloride of zinc is based on the fact that in small quantities (two or three drops of a ten per cent. solution) it excites such sclerotic processes as help to secure that fibrous induration which is thought to be a natural curative process for tuberculosis.

This method has been shown before the Paris Academy of Medicine and at the recent congress for the study of tuberculosis (Paris, July, 1891), and is attracting much attention. Prof. Gibbs, of Michigan, and Dr. Shirley seem to have used pure iodine and chloride of gold with advantage. I. Blake White, of New York City, values chloride of gold and iodide of manganese. At the last meeting of the American Medical Association, Prof. Vaughan said he had made injections of filtered bacterial product in no way connected with tuberculosis (bacteria of water) in healthy persons and consumptives. In the former it increased the temperature gradually up to between 100 and 101; in the tubercular cases about the same amount. The latter said they were improved. He had employed tuberculin in eight cases without apparent benefit ("Medical Record," May 16th, 1891). Bloood serum, especially dogs' serum (Baretta, Paris; Prof. Richet, &c.) has come in also for its share of use, and just now there are important discussions as to the agency of blood serum in destroying micro-organisms. Some claim, however, that this only represents the leucocytes, which Sir Joseph Lister describes as "the scavenger cells or phagocytes discovered by Metchnikoff; the white blood corpuscles which envelop parasitic intruders and render them harmless." The two doctrines, however, are really distinct.

(*d*) Our experience with tuberculosis has emphasized the importance of not relying too much on statistics if they are chiefly generalizations. For instance, it is stated that one-ninth of all deaths

occur from tuberculosis. We need very much to know just what diseases are classified in the enumeration. Then as to age, distribution, locality of disease and history. Phthisis pulmonalis needs very accurate classification by itself, because of the claimed relation of dried sputa to it as distinct from other tubercular disease. Here age distribution is of great importance, since the phthisis of small children differs much from that of adults. Chronic bronchitis and many other lung affections are often loosely classified with bacillary consumption. Not very long since statements were common that very many post-mortem examinations showed recoveries from pulmonary phthisis. Much doubt has recently been thrown upon the pathological accuracy of such statements. The trials of tuberculin show that there is need of more rigid classification of the different varieties of cases. Virchow regards it as acting in a selective way upon tuberculous tissue, but its diagnostic value is limited by the fact that it leads to rapid necrosis, with inflammatory hypermæia and exudation.

(*e*) Some important practical lessons have been taught as to the management of cases of pulmonary consumption. It is significant that Dr. Koch did not base his mode of treatment upon any germicidal methods; his own language is, "the remedy does not kill the tubercle bacilli, but the tuberculous tissue." While inhalation is still used somewhat for local antisepsis or the quieting of cough, we no longer expect to kill bacilli thereby.

(*f*) Our hopes now are more forcibly than ever shown to be in the following lines: Such attention to general vigor and such special methods for increasing lung capacity in those showing lack, as will secure normal power in young life; such regard to *alimentation* and to all habits of self-control as will secure full nutrition to the body both for growth and for the exercise of force; such early diagnosis and such accurate attention to any signs of pulmonary disability as will secure the best advantages of health. There are those who from the first should be enjoined to seek an open-air life and occupation, or who should resort to it at the very first symptoms of pulmonary disease.

"Out of towns and out of crowds," says Dr. Latham, is the first great rule. There can be no doubt that the ravages of consumption can be greatly checked if only prevention is studied as primary. While change of air and resort to "enchanting distances" may be desirable, there must be the most careful study of what can be done in the home or by changes of locality and elevation in easy reach.

BOVINE TUBERCULOSIS.

The relation of bovine and human tuberculosis to each other has long been recognized as of very great importance. Long before Koch discovered the bacillus tuberculosis, Villiman (1866) declared the close relation existing between them, and was followed by Cheveau, Gerlach and others in the claim that the disease is communicable. The subject was alluded to from time to time in the reports of this Board (1881, &c.), was especially noted and described in the circular of 1884, and was in part the subject of an article (Twelfth Report, 1888, pp. 37–40), on the relation of human and animal diseases. In 1890 the Secretary presented the subject quite fully to the State Board of Agriculture in the yearly report required of him as to contagious diseases of animals. We quote briefly from this report as follows:

"Its relations to human tuberculosis are now pretty definitely stated by high authorities, yet not without some opposition of belief. With some difference in size and behavior, it is now agreed by biologists that the bacilli of human and bovine tuberculosis are identical. Even those who are not fully satisfied as to the causative relation of the bacilli to consumption in man and animals, admit the diagnostic value of the bacilli, and agree that in man or beast they are indicative of the presence of tuberculosis. No case of its transfer to a human being through the sputa of cattle is authenticated. It, therefore, thus far is not shown to be communicable to the human being through the breath or sputa or secretions of animals.

"This brings us to another question which agitates the medical and veterinary world, and which has led to the appointment of an investigating commission in Great Britain. What are its effects on the milk and the flesh of animals in which it is found?

"This is equivalent to the question, Can the disease be communicated to human beings through the milk or the flesh of animals? Here again we have some differences of opinion among high authorities. These divide into five sections.

"The first, which is very small, claims it cannot be communicated.

"The second claims it is only communicated through milk when tuberculous disease is found in the udder.

"The third claims that, if tubercle exists in any part of the animal, the milk is unfit for use.

"The fourth claims that, if the tuberculous deposit is found in a part, that part is unfit for human food and should be rejected.

"The fifth claims that not only should the part itself be rejected, but the whole carcass, since tuberculosis is generally a constitutional disease and as such may affect the whole body, although no bacilli have been discovered in the muscles. The best-sustained view is the second, viz., that milk should not be used when the disease is in the udder. However, the view that the milk of all cows that have tubercular lesions in any part of the system should be rejected, is rapidly gaining ground.

"In 1888 there was a General Congress on Tuberculosis in Paris, made up of veterinarians and medical men. It numbered about 300 members and included several distinguished veterinary authorities and three or four medical men who had experience in animal disease. The action of that congress was in favor of the view that neither the milk nor flesh of tubercular animals is fit for human food, that from it there is danger of the direct transfer of tubercular disease, or consumption, and that both milk and meat require inspection. If the milk is used boiled, and if all meat eaten has been subjected to a temperature of 212°, it is claimed that it is safe. About the same time an English Privy Council Commission was appointed, which has taken abundant testimony and concluded in favor of the communicability of the disease. There has also been a very important trial in Glasgow (1889), in which many distinguished authorities were examined as to the condemnation of two carcasses, one of which showed no signs of disease whatever in the flesh, but only in the abdominal cavity and lungs. The decision of the court in both cases was that the carcasses were not salable."

Since then a Congress of Tuberculosis, Paris, 1891, has confirmed these views. A Royal English Commission, which has not yet reported, is investigating the subject. The importance attached to it was signified by a special section as to comparative study of animal diseases, at the International Congress of Hygiene, in London, August, 1890.

Prof. Burden Sanderson, in opening a paper said there are several points which may be accepted as facts, such as the existence of the tubercle bacillus, the identity of bovine and human tuberculosis and the existence of danger in the use of tuberculous meat. Chevaeu and Baumgarten were the first to draw attention to the danger of eating tuberculous meat. We still are in want of more experimental research.

Tubercle should be included in the Infectious Disease Prevention act. We still want information as to the actual presence of tubercle. About 5 per 1,000 cattle are generally condemned as tuberculous. Prof. Bang, of Copenhagen, in an able paper, said he did not think the milk of a tuberculous cow, with udder apparently healthy, is in a great majority of cases dangerous, though it undoubtedly is sometimes, and is always suspicious. At the Berlin Congress (1890) he also contradicted the views of Bollinger (Munich). Out of 28 cows 2 were found with bacilli, although the uddders appeared healthy. In another set of experiments four were found virulent, but in three of these careful examination showed nodules in the udder.

As to meat, Prof. Bang thinks the "experiments by others show that the muscular tissue is so unfavorable a nidus for the tubercle bacilli that they do not multiply in it."

"So long as the tuberculosis is strictly localized the meat is not a source of danger." Prof. McFadyean and G. Sims Woodhead gave instances from personal observation of tuberculous masses in the buttocks of tuberculous cattle, in one case there being only a few nodules in the lung. They are a possible, though perhaps a comparatively rare source of danger; "a résumé of our own and previous experiments indicate that this source of danger is not frequently present, but it may exist in a certain proportion of cases."

As to the danger from milk the view was more pronounced.

Although tuberculous mammitis is readily diagnosticated in advanced cases, it is very obscure in its earlier stages. He claimed that the main cause of tuberculosis was from animals. It was claimed that spontaneous tubercle never occurs in the pig, and tubercle in no form in the sheep. The general sentiment in the long and able addresses was that all dairies should be inspected, that milk was not very rarely a conveyancer of tuberculous disease, and that the meat was often suspicious, although the time had not yet come for rigid condemnation of all parts of carcasses where only localized tubercle could be found. Prof. Crookshank read a paper showing the frequent confusion of actinomycosis or the ray-fungus disease with tuberculosis, and showed specimens and photographs exhibiting the difficulty of diagnosis. So vast are the relations between animal and human diseases, and so critical are all facts bearing on the spread of tuberculosis, that we commend the subject more fully to the interest of physicians, sanitarians and officers of health.

LOCAL EXPERIENCE.

It has been our duty to see the disease from time to time in this State, and to be present at post-mortem examinations where it was necessary to secure accurate diagnosis. It has chiefly been found in two classes of dairies—those in which cattle were kept in city stables under forced and unnatural conditions of filth, overcrowding and excessive food, especially of beer grains, and those in which registered or grade cattle were kept in most excellent condition, generally in cows with little allowance for pasture or exercise, and fed so as to produce the largest quantity or the best quality of milk.

In each case the disease was associated with unnatural conditions. The outbreak could generally be traced to one or two animals, and it seemed more generally to extend to those in adjoining stalls. We have had no direct evidence of ill effects from the milk or the meat of the diseased animals, although generally the use of the milk has been discontinued. The disease has generally shown itself mostly in bunches along the peritoneum and in the lungs. We have never seen evidence of its presence in muscle, although a very few cases are recorded. The udder is by no means uniformly affected.

While the milk or meat of any animal suffering with chronic disease is not to be regarded as equal in quality with that of well and well-fatted animals, it is still premature to assert that the meat of any animal having any sign of tuberculous deposit in any part of the body is so unfit for use as to be prohibited. Those who are disposed to maintain the gravity of the risk insist that all such meats and milk shall be condemned, or that they only be sold and used under such conditions as will secure the most thorough cooking or boiling. Others contend that the risk must be more closely defined, and that at present we can only assert dangers when there is evidence of tubercular deposit in the udder.

Health authorities and many physicians are so throwing their influence on the side of safety as to claim at least the boiling of all milk, unless its source is thoroughly known.

This is universal in Germany, but as boiled milk is somewhat injured in its nutritive qualities by boiling, and greatly changed in taste, our American people do not incline to the substitution. We add the following as to boiled or sterilized milk:

"*The Nutritive Value of Boiled Milk.*—That the sterilization of milk, however important, is not without its disadvantages, has been shown by Randnitz and others ('Medical News,' November 30th, 1889). To determine the comparative assimilability of proteids and fats from boiled and non-boiled milk, Dr. Evsevy V. Vasilieff, of St. Petersburg ('St. Petersburg Inaugural Dissertation,' 1889, No. 33, p. 35), has undertaken a course of most careful experiments on six healthy young men, aged from eighteen to twenty-three years. Each experiment lasted six days, during three of which the men received raw milk, and during the other three boiled milk, the daily amount of the article in either case varying between 1,850 and 4,200 cubic centimeters. The following are the conclusions deduced by the author from his very instructive researches:

"1. The assimilation of nitrogenous ingredients from boiled milk is invariably less than that from the raw article. In the case of raw milk the average percentage of non-assimilated nitrogen amounts only to 7.05, the maximum to 7.62 and the minimum to 6.42; while in the case of boiled milk the respective figures are 8.18, 8.79, 7.76.

"2. The same holds true with regard to the assimilation of fats. When fat is ingested in a raw state the average percentage of non-assimilated fatty acids is 3.89, the maximum 4.85 and the minimum 2.88. In the case of boiled milk, however, the figures rise to 6.01, 6.99 and 4.53 respectively.

"3. Boiling seems to affect especially the assimilation of the fats of milk, since the percentage of fatty acids in relation to the total quantity of dried fæces in those fed on boiled milk is considerably larger than in those fed on non-boiled milk. In the former case, fatty acids constitute 19.03 per cent. of the total amount of dry fæces; but in the latter, not more than 16.81. In other words, when a person ingests his milk boiled, every 100 grammes of his dry fæces contain a surplus of fats amounting to 2.22 grammes.

"4. Therefore, as regards its nutritiousness, boiled milk represents a decidedly inferior dietetic article, compared with raw milk.

"5. As far as proteids are concerned, the difference in their assimilation may find some explanation in Dr. I. Schmidt's researches ('Moscow Inaugural Dissertation,' 1882), according to which, under the influence of boiling, cow's milk undergoes important chemical changes, nearly all the albumen and a part of the casein being transformed into hemialbumose. Schmidt's analysis proves that raw cow's milk contains 8.55 per cent. of casein, 8.4 of albumen and 6.1 of hemialbumose. Under the influence of ten minutes' boiling, the proportion of casein sinks to 7.59 per cent., that of albumen to 0.7, while that of hemialbumose rises to 23.4. ('Provincial Medical Journal,' January, 1890.)"

Another writer says:

"The effect of heat is to thicken the milk and intensify its colloidal (ropy or mucilaginous) character.

"The casein is not coagulated by the heat, but is less readily coagulated by rennet, and yields slowly and imperfectly to the action of pepsin and pancreatin.

"The fat-globules themselves are somewhat affected by the heat, and after standing lumps of butter-fat have sometimes been observed on the surface of the milk. But the coagulated proteid matters attach themselves to the fat-globules and probably have an influence in bringing about that less perfect assimilation of fat which has been noted by various observers as true of infants nourished upon sterilized milk.

"The milk-sugar by long-continued heating is completely destroyed, and is probably affected to a certain extent during the interval ordinarily allowed for sterilization.

"Finally, sterilized milk is less readily and less perfectly digestible than raw milk, and if sterile milk is sought for, the present desideratum is to obtain it either directly from the animal, or by a process not accompanied by such serious drawbacks.

"Such a process is believed to be the heating of the milk, after being rendered feebly alkaline with lime-water, to 155° F. for six minutes; or, still better, the treatment in alkaline solution with pancreatin at 155°, followed. if not used immediately, by momentary heating to the boiling point." (See "New York Medical Record," July, 1891.)

With the present status of facts in evidence we commend the whole subject of bovine tuberculosis to the inquiry of all physicians and especially urge the closest supervision of meat and milk-supply. Also, that sick children, or persons generally needing especial fluid nourishment, should be careful as to their source of milk supply.

During the past summer the attention of the Board was called to a number of sick animals in an excellent, well-kept herd of thirteen cattle, in Sussex county. The disease had begun with the cough and sickness of a single cow about two years since. There is disagreement as to whether a cow brought into the herd at that time, by purchase, had already signs of disease, although the first one to show it severely was one of the cattle raised on the farm. The disease proved to be tuberculosis, both in acute and chronic forms, and it became necessary to destroy ten of the cattle.

All such cases are of vital interest both to the profession and the public, and so we here subjoin the report of Professor H. F. Formad, of Philadelphia, on some specimens submitted to him for biological examination:

EXAMINATION OF MILK AND VISCERA FROM CASES OF TUBERCULOUS CATTLE.

REPORT MADE TO THE STATE BOARD OF HEALTH AND THE DAIRY COMMISSIONER OF NEW JERSEY BY DR. H. F. FORMAD.

UNIVERSITY OF PENNSYLVANIA,
PATHOLOGICAL DEP'T,
PHILADELPHIA, Aug. 1st, 1891.

GENTLEMEN—I beg leave to give the results of my examinations of the specimens from three tuberculous cows and one calf, the specimens being certain viscera, including the udder, and various samples of milk from the same cattle.

The viscera examined were sent to me on June 24th and on July 11th, while the specimens of milk were received on June 11th and during the early part of July, said to have been taken from the same cattle.

SPECIMENS RECEIVED JUNE 24TH, 1891.

I. *Specimens from tuberculous cow.*

A. *Lung* shows fully-developed tuberculosis with caseation, and microscope revealed numerous tubercle bacilli. Bronchial lymph-glands swollen and showing cheesy necrosis and tubercle bacilli.

B. *Udder* from the same cow carefully examined microscopically, but no trace of tuberculosis or bacilli found.

C. *The milk* from this cow was submitted to careful tests, such as will be detailed below, but no tubercle bacilli were discovered.

D. *Lungs from calf* carried by this cow for eight months. Microscopical examination failed to reveal any trace of tuberculosis. The lung-structure was perfectly crepitant and without any foci of hepatization or any enlargement of bronchial glands. Tubercle bacilli absent.

SPECIMENS RECEIVED JULY 11TH.

II. *Specimens from tuberculous cow sick two years.*

A. *Lung* shows the advanced tuberculous affection with caseous degeneration; tubercle bacilli in abundance. The masses in the costal

pleura (which accompanied this specimen) are also tubercular, but show only few tubercle bacilli, and but slight cheesy change.

B. *Udder* is perfectly normal. Careful microscopical examination of all parts of the piece received did not show any tubercle bacilli and no tubercle granulations. Portions of the tissue were submitted to culture methods, but these failed to reveal bacilli, as well as the staining methods.

C. *The milk* from this cow failed also to show tubercle bacilli, both on staining and culture methods. The milk appeared to be of good quality.

III. *Specimens from tubercular cow sick two months.*

A. *Lung* shows one well-developed tubercular mass and numerous smaller foci, all containing tubercle bacilli in limited number.

B. *The udder* is perfectly normal and free from tubercular lesions. No trace of bacilli found in microscopical section properly stained nor upon culture.

C. *The milk* from same cow (sample in blue bottle) is absolutely free from bacilli; it seems, however, to be of poor quality, being watery and poor in fat.

SUMMARY.

Collectively the results of the examination of all the samples of milk (of which seven were examined), and of the viscera from tuberculous cattle, sent to me, may be summed up as follows:

1. *Milk.*—Not one of the specimens so far examined showed any trace of the tubercle bacillus, and with two exceptions the milk appeared to be of excellent quality.

2. *The udders* in each case were normal and showed no trace of tuberculization.

3. *The lungs* in each instance (save from the lung of the calf carried eight months) showed typical bovine tuberculosis (pearl disease).

4. *The bronchial* lymph-glands of the adult cattle examined showed, as well as the lungs, tuberculosis and tubercle bacilli.

REMARKS.

These observations, as far as they went, revealed facts that are absolutely conclusive. The examination was conducted with all means known to science, and I was assisted in the work by my brother, Robert Formad, V.M.D., of the Veterinary Department of the University. Special attention was paid to the milk and udders of the cattle. After failing to find tubercle bacilli (the milk and udder) by microscopic and staining methods, we resorted to culture experiments by the glycerine-agar, and by Koch's blood-serum method, as well as by Woodhead's method. We also inoculated twelve guinea pigs into the anterior chamber of the eye with each of the samples of milk, and one with each of the three specimens of udder under examination. After watching the experiments of from three to eight weeks' duration, we found that nothing developed which in the least would indicate the presence of tubercle bacilli.

We think it now safe to conclude, from the experiments as far as carried out, that neither the milk nor the udder in the three tuberculous cattle examined showed any trace of tubercle bacilli.

COMMENTS.

In my experience the udder is rarely affected, even in fully-developed internal tuberculosis of cattle. I have found tubercle bacilli (in cases *other than those referred to above*) once in fifty cases, in both milk and udder of tuberculous cattle. In the meat I never found bacilli, even in highly-tuberculized cattle.

I am fully convinced that the dangers from the use of milk from cows affected by tuberculosis are much overdrawn, notwithstanding the contrary statements of some good authorities. Opinions among scientists on this subject are much divided, as is well known.

The tubercle bacilli being the established poison of tuberculosis, the observations in the three cases above recorded conclusively prove that in spite of tuberculosis of internal organs the milk was not contaminated. The reason for this is, I think, that the udders were normal. I think that only when the udder is tubercular (which fact could be easily established in the living animal by examining the udder and its surroundings for enlarged lymph-glands), there would be risk from the milk.

Naturally the milk from tuberculous animals must be of inferior quality. It is probably less nourishing, less rich in fat, and hence is an imperfect and improper article of food, and in this way the milk is harmful. I would recommend that a few more observations be made.

Respectfully,

HENRY F. FORMAD, M.D.

CLIMATOLOGY.

In order to afford data by which variation in diseases may be compared with variations in climate, the reports of this Board give various climatological records in localities chosen as representative. In such a plan it is not needful to survey all the scope of the meteorologist, who studies the science which treats of the atmosphere and its phenomena, but rather to deal with climate and causes which modify it in a particular place, or with weather as denoting different degrees of temperature, humidity, winds, cloudiness, rains, snows. While various facts appear in all the reports, attention is particularly called to the division "Climatology," in the fifth report, and to the article on "Comparative Facts in Climatology and Geology," in the sixth report, pages 269–284. It is to be remembered that climate is not the mere expression of atmospheric condition, but has to do with distance from the equator, elevation, the distance from the sea or large bodies of water, prevailing winds, the character and contour of the geological structure and of the soil, the natural or artificial drainage, the amount of forests, the cultivation of the soil, the access of light and heat, &c.

Under the recent law, and because of decided improvements in methods and in instruments of precision, we have reason to hope that these records will ere long be more informatory as to the relations between climate and health.

STATION, BEVERLY, BURLINGTON COUNTY, N. J.

Latitude, 44° 4′ N.; Longitude, 74° 55′ W. Height of Barometer Cistern above Sea Level, 40 feet.

OBSERVER, C. F. RICHARDSON.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July				100	39	73.1	78.2	S.	4.92		11	7
August				99	45	72.6	83.4	N. W.	5.60		13	5
September				88	41	66.0	85.3	W.	3.97		10	11
October				81	28	55.0	84.0	N. W.	6.50		16	13
November				74	19	40.2	75.2	W.	1.07		6	4
December				53	8	30.8	89.3	N. W.	3.40		11	9
1891.												
January				56	15	34.6	83.1	N.	6.23		11	8
February				70	10	38.8	81.7	N. W.	5.10		15	13
March				64	11	38.8	77.9	N. E.	5.87		14	14
April				84	24	52.9	70.8	N. W.	2.12		9	5
May				91	31	60.3	72.0	W.	2.30		10	10
June				97	43	70.6	75.9	S.	5.81		7	6
For the year.				100	8	52.8	78.9	N. W.	52.89		133	105

* Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	50.1	10.29
Summer	72.1	16.33
Autumn	53.7	11.54
Winter	34.7	14.73

STATION, PATERSON, PASSAIC COUNTY, N. J.

Latitude, 40° 55′ N.; Longitude, 74° 11′ W. Height of Barometer Cistern above Sea Level, 142 feet.

OBSERVER, J. H. BOLTON.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July												
August												
September												
October												
November												
December												
1891.												
January												
February				65	11				4.21		12	
March				68	10	39.6			2.05		7	
April				85	22	53.6			3.19		10	
May				88	31	57.3			3.76		9	
June				96	46	68.8						
For the year.												

* Including melted snow.

STATION, NEWARK, ESSEX COUNTY, N. J.

Latitude, 40° 29′ N.; Longitude, 74° 27′ W. Height of Barometer Cistern above Sea Level, 35 feet.

OBSERVER, F. W. RICORD.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July	30.28	29.76	30.05	94	63	73.0	.....	S. E.	5.40	.....	8	.....
August	30.22	29.59	30.01	88	50	72.0	.....	S. E.	5.30	.....	13	.....
September	30.33	29.81	30.11	84	46	65.0	.....	S. W.	3.13	.....	12	.....
October	30.31	29.35	29.88	72	32	54.0	.....	N. E.	6.69	.....	14	.....
November	30.35	29.62	30.06	60	17	43.0	.....	N. W.	0.78	.....	8	.....
December	30.53	29.470	30.05	48	13	30.0	.....	N. W.	3.71	1	9	.....
1891.												
January	30.51	29.05	30.03	50	16	33.0	.....	N. W.	4.71	.....	12	.....
February	30.71	29.40	30.09	60	12	36.0	.....	N. W.	4.62	4	16	.....
March	30.57	29.48	30.11	58	10	36.0	.....	N. E.	4.61	1	11	.....
April	30.56	29.39	30.00	77	29	51.0	.....	N. W.	2.11	1	6	.....
May	30.44	29.75	30.04	85	35	59 0	.....	S. W.	2.95	.....	8	.....
June	30.22	29.74	29.95	94	50	69.0	.....	S. W.	2.02	.....	11	.....
For the year.	30.71	29.05	30.03	94	10	51.7	.....	N. W.	51 78	7	130	.....

* Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	48.7	9.67
Summer	71.3	12.62
Autumn	54.0	12.40
Winter	33.0	17.09

STATION, NEW YORK CITY, N. Y.

Latitude, 40° 33′ N.; Longitude, 70° 0′ W. Height of Barometer Cistern above Sea Level, 185 feet.

OBSERVER, E. B. DUNN, U. S. SIGNAL SERVICE.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July	30.28	29 75	30.04	95	56	73 0	72.0	S.	3.96	.....	10	10
August	30.26	29 59	30.03	89	51	72.0	77.0	N. W.	4 06	.....	12	11
September	30.39	29,83	30.14	86	46	67.0	79.0	S. W.	7.21	.....	11	13
October	30.36	29.35	29 91	74	38	56 0	72 0	N. W.	6.46	.....	15	15
November	30.37	29.61	30.07	71	18	46 0	76.0	N. W.	0.82	.....	5	5
December	30.60	29.56	30.07	54	13	31.0	72 0	N. W.	5.43	.....	13	8
1891.												
January	30.52	29 01	30 04	60	16	35.0	81.0	N. W.	5.73	.....	16	10
February	30.72	29 42	30 04	61	13	38.0	77.0	N. W.	4 69	.....	16	13
March	30 59	29.53	30.10	61	9	38.0	73.0	N. E.	4.22	.....	13	15
April	30 56	29 39	30.00	80	28	52 0	69.0	N. W.	2.37	.....	10	6
May	30.45	29.74	30.03	84	38	60.0	68.0	N. W.	3.10	.....	11	12
June	30.22	29.74	29.96	94	51	70.0	73.0	N. W.	1.18	.....	11	8
For the year.	30 72	29.01	30.04	95	9	53.2	74.1	N. W.	49.23	.....	143	126

* Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	50.0	9.69
Summer	71.7	9.20
Autumn	56.3	14.49
Winter	34.7	15.85

STATION, NEW BRUNSWICK, MIDDLESEX COUNTY, N. J.

Latitude, 40°·29′ N.; Longitude, 74° 10′ W. Height of Barometer Cistern above Sea Level, 90 feet.

OBSERVER, CHAS. V. MEYERS.

	BAROMETER, Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July				98	45	71.7	.....	S. W.	7.30	.....	11	10
August				92	45	71.0	.....	N. W.	3.55	.....	12	10
September				86	37	63.6	.....	S. W.	3.26	.....	10	8
October				73	27	52.0	.....	S. W.	4.34	.....	13	18
November				71	16	42.0	.....	N. W.	0.93	.....	3	6
December				50	7	27.4	.....	N. W.	4.71	.....	8	18
1891.												
January				57	12	32.6	.....	N. W.	2.50	.....	11	14
February				66	9	35.8	.....	N. W.	4.56	.....	16	11
March				63	6	36.4	.....	N. W.	5.83	.....	12	14
April				83	25	52.6	.....	N. W.	1.75	.....	6	6
May				93	31	61.3	.....	N. W.	3.20	.....	8	17
June				100	44	71.6	.....	S. E.	1.62	.....	4	7
For the year				100	6	51.5	.....	N. W.	56.45	.....	130	132

* Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	50.1	10.78
Summer	71.4	14.37
Autumn	52.5	14.53
Winter	32.1	16.77

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. SIGNAL SERVICE.

	BAROMETER, Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July	30.29	29.72	30.06	97	54	74.6	68.0	S. W.	4.03	.....	11	10
August	30.26	29.68	30.05	94	51	73.6	76.0	N. W.	3.36	.....	12	13
September	30.38	29.88	30.15	88	45	67.2	78.0	N. E.	2.31	.....	11	14
October	30.37	29.43	29.93	79	36	55.5	74.0	N. W.	4.82	.....	15	20
November	30.41	29.66	30.10	70	23	46.4	70.0	N. W.	0.80	.....	7	7
December	30.62	29.42	30.10	52	17	32.2	69.0	N. W.	2.33	.....	13	15
1891.												
January	30.55	29.22	30.07	56	17	36.4	74.0	N. W.	3.65	.....	10	15
February	30.71	29.48	30.11	69	15	39.6	73.0	N. W.	4.71	.....	15	14
March	30.58	29.54	30.11	61	12	38.0	70.0	N. E.	4.42	.....	15	16
April	30.54	29.48	30.02	83	30	54 3	59.0	N. W.	2.34	.....	10	9
May	30.42	29.76	30.05	90	36	61.0	63.0	N. W.	1.74	.....	12	17
June	30.23	29.73	29.97	96	49	71.8	68.0	S. W.	2.51	.....	7	8
For the year	30.71	29.22	30.06	97	12	54.2	70.2	N. W.	37.02	.....	138	158

* Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	55.1	8.50
Summer	73.3	9.90
Autumn	56.4	7.93
Winter	36.1	10.69

STATION, VINELAND, CUMBERLAND COUNTY, N. J.

Latitude, 39° 29′ N.; Longitude, 75° 0′ W. Height of Barometer Cistern above Sea Level, —— feet.

OBSERVER, WM. W. AUSTIN.

	BAROMETER. Reduced to 32°.			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July												
August												
September												
October												
November												
December												
1891.												
January												
February												
March				71	15	40.5		N. W.	5.43			13
				64	13	39.0		N. E.	7.05			13
April												
May				84	28	53.6		N. W.	2.54			8
June				88	29	59.8		S. W.	2.79			7
				94	41	70.2		N. W.	3.62			12
For the year												12

*Including melted snow.

STATION, NEWTON, SUSSEX COUNTY, N. J.

Latitude, 41° 2′ N.; Longitude, 74° 43′ W. Height of Barometer Cistern above Sea Level, —— feet.

OBSERVER, D. L. FOSTER.

	BAROMETER. (Reduced to 32°.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1890.												
July												
August												
September				83	33	60 8			4.52		8	
October												
November												
December				59	16	38.6			0.61		2	
1891.												
January												
February												
March				59	6	34.5			4.50		11	
April				76	25	51.3			2.50		11	
May				85	33	59.1			2.23		9	
June				90	47	70.0			1.39		6	
For the year												

*Including melted snow.

STATION, ATLANTIC CITY, ATLANTIC COUNTY, N. J.

Latitude, 39° 32′ N.; Longitude, 74° 25′ W. Height of Barometer Cistern above Sea Level, 53 feet.

OBSERVER, WM. T. BLYTHE, U. S. SIGNAL SERVICE.

	BAROMETER. Reduced to 32°.			THERMOMETER.								
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
1890.												
July	30.26	29.76	30.06	89	52	71.0	80.1	S. W.	5.46	.....	10	4
August	30.25	29.70	30.04	90	48	71.0	84.0	S. W.	7.51	.....	11	4
September	30.35	29.35	30.14	78	48	66.0	85.0	S. W.	5.01	.....	12	9
October	30.33	29.45	29.92	74	35	56.0	79.5	N. W.	4.66	.....	13	10
November	30.37	29.62	30.10	70	18	46.0	79.2	S. W.	0.58	1	4	6
December	30.62	29.42	30.08	54	17	34.0	80.1	N. W.	3.53	6	8	7
1891.												
January	30.51	29.23	30.06	55	16	35.0	84.6	N. W.	4.41	1	11	8
February	30.69	29.43	30.11	68	14	39.0	81.2	N. W.	5.49	.....	17	11
March	30.54	29.48	30.09	55	14	37.0	78.4	N. E.	3.37	3	14	12
April	30.52	29.48	30.03	79	28	49.0	74.9	S. W.	2.28	.....	11	5
May	30.47	29.76	30.05	83	33	57.0	78.4	N. E., S.	3.93	.....	13	11
June	30.23	29.73	29.98	91	48	66.0	81.8	S.	1.67	.....	4	6
For the year.	30.69	29.23	30.05	91	14	52.2	80.6	S. W.	47.24	11	128	102

*Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	47.7	9.53
Summer	69.3	14.64
Autumn	56.0	9.44
Winter	38.3	13.63

STATION, CAPE MAY C. H., CAPE MAY COUNTY, N. J.

Latitude, 38° 56′ N.; Longitude, 74° 58′ W. Height of Barometer Cistern above Sea Level, —— feet.

OBSERVER, J. F. LEAMING, M.D.

	BAROMETER. Reduced to 32°.			THERMOMETER.							
	Max.	Min.	Mean.	Max.	Min.	Mean.	Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equaled 0.01.	Cloudy Days.
1890.												
July	.....	.....	.....	96	50	72.8	.....	S.	3.89	.....	10	.....
August	.....	.....	.....	89	48	70.7	.....	S.	3.52	.....	10	.....
September	.....	.....	.....	86	43	67.1	.....	S. W.	4.80	.....	12	.....
October	.....	.....	.....	78	36	56.0	.....	N. W.	4.58	.....	12	.....
November	.....	.....	.....	71	17	46.8	.....	N. W.	0.52	.....	4	.....
December	.....	.....	.....	55	16	34.3	.....	N. W.	4.43	.....	9	6
1891.												
January	.....	.....	.....	57	18	35.8	.....	N. W.	6.16	.....	8	3
February	.....	.....	.....	70	11	40.7	.....	S. W.	6.31	.....	16	16
March	.....	.....	.....	61	13	38.8	.....	N. W.	6.39	.....	19	12
April	.....	.....	.....	83	30	53.2	.....	S.	2.50	.....	11	6
May	.....	.....	.....	83	34	59.1	.....	E	3.54	.....	13	11
June	.....	.....	.....	89	41	67.9	.....	S. W.	1.24	.....	6	10
For the year.	.....	.....	.....	96	11	53.6	.....	N. W.	47.91	.....	130	.....

*Including melted snow.

OF THE SEASONS.

	Temperature.	Precipitation.
Spring	50.4	12.43
Summer	70.5	8.65
Autumn	56.6	9.99
Winter	36.9	16.92

METEOROLOGICAL SUMMARY FOR THE STATE.

July, 1890.

TEMPERATURE (degrees F)—The mean temperature for July, 1890, 72.5, is 2.0 below the normal, and 0.9 below the mean of the corresponding month of 1889. The chief maxima observed were: 101 at Woodbury, 100 at Beverly, 99 at Billingsport, 98 at Locktown and New Brunswick, and 97 at Egg Harbor City, Tenafly, Moorestown, Rancocas, Trenton and Imlaystown. Temperatures below 40 degrees were recorded at Beverly, Madison and Oceanic. The cool periods of the month were the 10th to 13th and 20th to 23d inclusive.

PRECIPITATION.—The average precipitation for the month, 5.62 inches, is 1.30 inches above the normal, and 4.57 inches below the average for the corresponding month of 1889. All stations, except those in the counties of Cape May, Cumberland and Burlington, report an excess varying from 0.69 to 3.23 inches. The greatest excess is reported from the counties of Atlantic, Middlesex and Monmouth The average number of clear days was 11.5, fair days, 11.0, and cloudy, 8.5. The weather predictions for the month have been verified as follows: For weather, 89 3 per cent.; for temperature, 81.3 per cent.; for weather and temperature combined, 85 3 per cent.

ATMOSPHERIC PRESSURE (in inches)—Monthly mean, 30.05; maximum observed, 30.287, at Philadelphia, on the 21st; minimum observed, 29.716, at Philadelphia, on the 3d; range for the State, 0.571.

TEMPERATURE (degrees F)—Monthly mean, 72.4; highest monthly mean, 73 0, at Trenton, Mercer county; lowest monthly mean, 69 3, at Newton, Sussex county. maximum, 101, at Woodbury, Gloucester county, on the 8th; minimum, 38, at Oceanic, Monmouth county, on the 12th; range for the State, 63; greatest local monthly range, 61, at Beverly, Burlington county; least local monthly range, 30, at Ocean City, Cape May county; greatest daily range, 44, at Madison, Morris county, on the 22d; least daily range, 2, at Bridgeton, Cumberland county, on the 2d and 13th.

PRECIPITATION (in inches).—Average for the State, 5.62; greatest, 7 55, at Egg Harbor City, Atlantic county; least, 3.60, at Ocean City, Monmouth county Three stations report a total exceeding 7 inches (New Brunswick, Egg Harbor City and Oceanic), six exceeding 6 inches, and ten 5 inches. The stations reporting the greatest deficiency were Bridgeton, Cape May and Ocean City. Average number of days on which precipitation equaled 0.01 inch, 9.2; average number of days on which cloudiness was 8 or more on a scale of 10, 8.5. *Wind*—Prevailing direction, southwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder storms* are reported as follows: Beverly, 3d, 4th, 8th, 9th, 12th, 13th, 15th, 16th, 17th and 18th; Locktown, 17th; South Orange, 3d; Freehold, 4th and 12th; Imlaystown, 4th and 17th; Billingsport, 4th, 15th and 17th; Woodbury, 3d, 4th, 13th, 15th and 17th; Rancocas, 3d and 17th; Cape May, 27th; Ocean City, 5th and 26th; Egg Harbor City, 2d, 4th, 5th, 12th, 13th and 17th; Madison, 17th; Oceanic, 3d, 4th, 12th, 13th and 17th; Tenafly, 3d and 17th; Readington, 3d, 4th and 17th; Highland Park, 3d, 4th and 17th. *Hail*—Locktown, 17th; Hopewell, 17th; Imlaystown, 17th; Lambertville, 17th; Woodbury, 17th; Rancocas, 17th; Cape May C. H., 13th. *Solar Halos*—Beverly, 27th; Woodbury, 1st, 2d, 27th and 28th; Rancocas, 27th and 28th. *Lunar Halos*—Egg Harbor City, 24th and 26th. *Meteors*—Beverly, 5th and 6th. *Polar Bands*—Beverly, 12th, 18th and 26th.

OBSERVERS' NOTES.

TRENTON.—No person, except he may have seen the damage to property and crops from a severe hail storm, can form any idea of the great destruction and loss which was sustained by the farmers of that section of Hamilton township, Mercer county, in the direction of Hamilton Square and on towards Yardville and Allentown, by the storm of the 17th. In many places trees and bushes are stripped of leaves and fruit, and often of their bark; corn has been rendered leafless and the stalks cut off from six to eighteen inches from the ground; potatoes are killed, except for a little spark of green at the ends of the flattened vines; oats are flattened down so that the fields appear as though a heavy roller had been run over the ground, and the oats entirely threshed out by the destructive hail. So far as could be learned, this district extends from Dogtown towards Yardville and Allentown, in a strip about half a mile wide. The storm appeared to move from the northwest to southeast, and lasted about half an hour. The wind was very severe, but the destruction was caused mainly by hail. The stories told regarding the hail storm seem to be exaggerated and unreasonable, but after seeing what has been done, seem very reasonable. Along the road from Yardville to Newtown, and in various other places, the fences and buildings bear the marks and impressions of the hail-stones as though riddled with grapeshot. The discolored wood of the posts and rails has been knocked off so that the natural color of the wood is seen. Trees are broken and barked, and peach trees so bruised and barked that they are withering and dying. Orchards in places are almost entirely stripped of fruit and leaves. Even the blackberry bushes have nothing left but stems. The committee appointed to appraise the damage in Hamilton township by this storm have fixed the amount at $30,902.

CAPE MAY C. H.—The scanty rainfall during the first three weeks of the month, retarded early truck, but rain came in time to save the late truck and corn. On the morning of the 13th a very severe hail storm visited the sea-coast (throughout Upper township and a part of Dennis). It extended but a short distance inland. The hail-stones demolished windows and tore the curtains into shreds, and were also very destructive to crops. Pieces of ice penetrated half-grown watermelons to the center, as if a handle of a hoe had been plunged into them.

HOPEWELL.—A very destructive storm passed over this station on the afternoon of the 17th, blowing down many buildings, uprooting trees and prostrating fields of corn.

BILLINGSPORT.—A severe thunder storm occurred on the evening of the 17th, commencing at 7 P. M., ending at 10:30 P. M. The lightning was almost incessant and several buildings were struck in this vicinity.

RANCOCAS.—The severe thunder storm which passed over this place on the evening of the 27th was accompanied by a high wind, which prostrated some corn, but no other injury was done. The lightning was one incessant glare and the rainfall very heavy, one inch falling in fifteen minutes. During the storm a few hail-stones fell the size of filberts.

LOCKTOWN.—While the hail storm of the 17th did no damage in this vicinity, three or four miles to the west and south many fields of corn, oats and tomatoes were nearly destroyed.

NEWARK.—While still suffering under the oppressive heat of the last two days of the month just closed, it is hard to believe that it was a comparatively cool July. Its mean temperature was but 73 degrees, while the mean temperature for the month of

July for the last forty-seven years is placed by our record at 74.12. The month has been a remarkably pleasant one, with many cool nights for slumber, and many delightful days when the fierce rays of the summer sun were tempered by clouds that did not bring the rains with which they drenched us a year ago.

August, 1890.

TEMPERATURE (degrees F.)—The mean temperature for the month of August, 1890, 71.5, is 0.5 below the normal, and 1.9 above the mean for the corresponding month of 1889. The chief maxima observed were 99, at Beverly; 96, at Egg Harbor City; 94, at Billingsport, Woodbury and Philadelphia; 93, at Bridgeton, Trenton and Madison, and 92, at Moorestown, Rancocas, New Brunswick and Imlaystown. The chief minimum reported was 40, at Newton, Sussex county. The warmest days of the month were the 1st, 2d and 4th, and the coolest the 23d and 24th. On the latter date a light, harmless frost occurred at Egg Harbor City. The mean temperature of the summer season just closed was 71.6, which is 0.4 below the normal of the season.

PRECIPITATION (in inches).—The average precipitation for the month, 4.90 inches, is 0.16 inches above the normal, and 0.28 inches above the average for the corresponding month of 1889. The largest total reported for the month was 7.51 inches at Atlantic City, and the least, 2.89 inches at Woodbury. The rainfall of the summer of 1890, 14.11 inches, is 4.89 inches less than the amount received during the same period in 1889, and 1.07 above the normal for the summer months. The weather conditions of the month, and of the season, have been most favorable to the agricultural interest of the State, no extended periods of drouth occurring. The staple crops were all harvested and housed under most favorable conditions. The average number of clear days was 8.3; fair days, 15.3, and cloudy, 7.4. The weather predictions for the month have been verified as follows: For weather, 75.9 per cent.; for temperature, 85 8 per cent.; for weather and temperature combined, 80.9.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30 044; maximum observed, 30.260, at Philadelphia and New York City, on the 16th; minimum observed, 29 590, at New York City and Newark, on the 27th; range for State, 0.670.

TEMPERATURE (degrees F.)—Monthly mean, 71.5; highest monthly mean, 76 0, at Trenton, Mercer county; lowest monthly mean, 68.5, at Newton, Sussex county; maximum, 99, at Beverly, on the 1st; minimum, 40, at Newton, on the 23d; range for State, 59; greatest local monthly range, 54, at Beverly; least local monthly range, 28, at Ocean City; greatest daily range, 33, at Tenafly and Gillette, on the 17th; least daily range, 3, at Asbury Park, on the 13th.

PRECIPITATION (including melted snow, in inches).—Average for the State, 4.90; greatest, 7.51, at Atlantic City, Atlantic county; least, 2.89, at Woodbury, Gloucester county. Average number of days on which precipitation equaled 0.01 inch, 11.4; average number of days on which cloudiness was 8 or more on a scale of 10, 7.4. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder storms* are reported as follows: Beverly, 1st, 5th, 8th, 9th, 10th, 14th, 17th, 19th, 20th, 21st, 22d, 26th and 29th; Egg Harbor City, 1st, 6th, 10th, 13th, 19th, 20th and 21st; Trenton, 1st, 21st, 22d and 26th; Madison, 10th, 14th, 17th, 19th, 21st, 22d and 28th; Imlaystown, 10th, 20th, 21st and 22d; South Orange, 19th, 21st and 22d; Rancocas, 1st, 21st, 22d and 29th; Woodbury, 1st, 9th, 17th, 19th, 21st, 22d and 29th; Tenafly, 6th, 16th and 29th; Bridgeton, 19th and 20th; Cape May C. H., 1st, 5th and 25th; Oceanic, 1st, 9th, 10th, 19th, 20th and 21st; Billingsport, 1st, 19th, 21st, 22d and 30th; Highland Park, 1st, 10th, 17th, 19th, 20th and 21st. *Hail*—Beverly, on the 8th. *Solar Halos* were observed at Woodbury on the 6th; Egg Harbor City, 26th, and at Beverly, Moorestown, Rancocas and Woodbury on the 28th. *Lunar Halos* were observed at Billingsport, Oceanic, Tenafly, Woodbury, Rancocas, Madison, Egg Harbor City and Beverly on the 28th. *Meteors* were observed at Beverly on the 4th, 5th, 10th and 20th; at Trenton on the 7th and 9th, and at Woodbury on the 9th and 20th. *Light Frost* at Egg Harbor City on the 24th. *Polar Bands* were observed at Beverly on the 7th, 10th and 28th.

OBSERVERS' NOTES.

NEWARK.—The mean temperature of the summer, which has just closed with the month, was 71.67, while that of its forty seven immediate predecessors was 71.72. The summer waterfall was 15.04 inches, while the average of the same predecessors was 13.112 inches. The summer of 1889 gave us 22.47 inches.

The total number of deaths by wind storms and lightning since January last is estimated at 1,100, as compared with only 163 deaths from the same causes during the whole of 1889. This is a record which will make this year memorable in the annals of meteorology.

September, 1890.

TEMPERATURE (degrees F.)—The mean temperature for the month of September, 1890, 64.4, is 0.9 below the normal for the month, and 0.4 below the mean of the corresponding month of 1889. The chief maxima observed were 91 at Woodbury, Gloucester county; 90 at Oceanic, Monmouth county, and 89 at Madison, Morris county. The chief minima observed were 33 at Tenafly, Bergen county; Newton, Sussex county; Gillette and Madison, Morris county, and 37 at Highland Park, Middlesex county, and Locktown, Hunterdon county. The warmest days of the month were the 3d, 5th and 6th, and the coolest the 24th, 25th and 30th. The first light frost of the season was very generally reported on the mornings of the 24th and 25th, and the first killing frost on the mornings of the 25th and 30th, from the counties of Morris, Bergen and Sussex.

PRECIPITATION (in inches).—The average precipitation for the month, 4.75 inches, is 0.86 inches above the normal for the month, and 0.28 inches above the average for the corresponding month of 1889. One station (Egg Harbor City) reports a total exceeding 8.50 inches, 2 exceeding 7.00 inches, 1 exceeding 6.00 inches and 8 exceeding 5.00 inches. During the month rains were quite general throughout the State, on the 6th, and from the 11th to 17th, inclusive, and on the 26th and 27th. The average number of clear days was 10.2; fair days, 9.8, and cloudy, 9.9. The weather predictions for the month have been verified, as follows: For weather, 83.4 per cent.; for temperature, 88.9 per cent.; for weather and temperature combined, 86.2.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.136; maximum observed, 30.390, at New York City, on the 25th; minimum observed, 29.810, at Newark, on the 17th; range for the State, 0.580.

TEMPERATURE (degrees F.)—Monthly mean, 64.4; highest monthly mean, 68.5, at Bridgeton, Cumberland county; lowest monthly mean, 60.8, at Newton, Sussex county; maximum, 91, at Woodbury, Gloucester county, on the 5th; minimum, 33, at Tenafly, Bergen county; Madison, Morris county; Newton, Sussex county, and Gillette, Morris county, on the 24th, 25th and 30th; range for the State, 58; greatest local monthly range, 56, at Madison, Morris county; least local monthly range, 26,

at Ocean City, Cape May county; greatest daily range, 37, at Madison, Morris county, on the 30th; least daily range, 1, at Newark, Essex county, and Moorestown, Burlington county, on the 14th and 22d respectively.

PRECIPITATION (including melted snow, in inches).—Average for the State, 4.75; greatest, 8 61, at Egg Harbor City, Atlantic county; least, 2.59, at Locktown, Hunterdon county; average number of days on which precipitation equaled 0.01 inch, 10.1; average number of days on which cloudiness was 8 or more on a scale of 10, 9.9. *Wind*—Prevailing direction, southwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder storms* were reported at Trenton on the 6th, 12th, 13th, 16th; Imlaystown, 13th; Highland Park, 5th, 12th, 13th, 15th, 16th, 17th; Rancocas, 13th; Readington, 13th; Oceanic, 5th, 6th, 12th, 13th, 14th, 15th, 16th, 17th; Beverly, 5th, 6th, 13th, 15th, 16th; Billingsport, 6th; Bridgeton, 6th; Madison 12th, 13th, 16th; Cape May, 6th, 13th, 14th, 27th; Egg Harbor City, 6th, 12th, 13th, 14th, 15th, 16th, 17th; Philadelphia, 6th, 15th; New York City, 5th, 12th, 13th, 16th, 17th. The first light frost of the season was reported from the following stations: Woodbury, 24th, 25th; Newton, 24th, 25th; Readington, 25th; Tenafly, 24th, killing, 25th, 30th; Moorestown, 25th, 30th; Gillette, 25th, 26th, killing, 30th; Junction, 25th; Madison, 25th, ice forming in low places; Trenton, 25th; Locktown, 25th, 29th; Philadelphia, 25th, 29th; Woodbury, 6th, 15th, 16th, 17th. *Solar Halos*—Woodbury, 2d, 20th, 28th; Rancocas, 2d; Egg Harbor City, 10th, 16th; Madison, 28th; New York City, 2d, 3d. *Lunar Halos*—Trenton, 25th, 28th; Imlaystown, 25th; Woodbury, 22d; Beverly, 25th, 28th, 29th, 30th; Oceanic, 28th; Madison, 25th; New York City, 2d, 3d, 25th, 26th, 3 th.

OBSERVERS' NOTES

NEWARK.—The mean temperature of the month was 65.41 degrees, while the mean temperature of September during the past 47 years has ranged from 59 98 degrees to 73.72 degrees. The temperature, then, of the past month may be regarded as about the average for September. The first seventeen days were comparatively warm, but continuous rains from the 10th to the 18th, followed by a lower temperature, gave the impression that the month was far cooler than it really was. The first four days were exceedingly beautiful, and these were followed at intervals by thirteen days of very enjoyable weather. The waterfall of the month was 5.13 inches, and came to us on 12 days, varying in quantity from 0.04 of an inch to 1 75, the latter fall occurring on the 12th, and being the greatest waterfall within 24 successive hours. The total precipitation occupied but 53 hours, 47 of which were recorded between the 10th and 18th. The month's waterfall was considerably above the average for September, which, according to our record is 3 58 inches. On the morning of the 25th, the first frost of the season was observed in this vicinity

CAPE MAY C. H.—The month has been unusually genial, the thermometer marking above 70 degrees on 21 days. The rains have been copious. The fall crops are in excellent condition.

October, 1890.

TEMPERATURE (degrees F.)—The mean temperature for the month of October, 1890, 53.9, is 0.4 below the normal for the month, and 3.1 above the mean of the corresponding month of 1889. The chief maxima observed were 81 at Beverly, Burlington county; 79 at Moorestown, Burlington county, and 78 at Cape May C. H., Trenton,

Mercer county, and New Brunswick, Middlesex county. The chief minima observed were 24 at Tenafly, Bergen county; 25 at Allaire, Monmouth county, and Gillette, Morris county; 26 at Madison, Morris county, and 27 at Egg Harbor City, Atlantic county, and New Brunswick, Middlesex county. The warmest days of the month were the 1st, 3d, 4th, 5th and 10th, and the coldest the 22d, 30th and 31st. The first light frost of the season is reported from the following stations: Moorestown, Burlington county, 22d (general and heavy on upland, blackened foliage, but did not destroy vines of tomatoes and sweet potatoes; ripe raspberries were gathered on 31st); Allaire and Imlaystown and Oceanic, Monmouth county, on 22d, and Billingsport, Gloucester county, on the 31st.

PRECIPITATION (in inches).—The average total precipitation for the month of October, 1890, 6.33, is 3.14 above the normal for the month, and 2.53 above the average for the corresponding month of 1889. The stations receiving the greatest amount were those in Monmouth, Bergen and Middlesex counties. In the former the excess (above normal) was 6.79. During the month rains were quite general throughout the State on the 2d, 3d, 6th, 7th, 14th, 16th, 17th, 19th, 20th, 23d, 24th and 29th. The average number of cloudless days was 8.4; partly cloudy, 8.4, and cloudy, 14.2. The average number of days upon which rain fell was 13.1. The weather predictions for the month have been verified as follows: For weather, 83.2 per cent.; for temperature, 88.2 per cent.; for weather and temperature combined, 85.7.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29.909; maximum observed, 30.370, at Philadelphia, Pa., on the 9th; minimum observed, 29.348, at New York city, on the 29th; range for the State, 1.022.

TEMPERATURE (degrees F.)—Monthly mean, 53.9; highest monthly mean, 57.0, at Bridgeton, Cumberland county, and Trenton, Mercer county; lowest monthly mean, 50.0, at Princeton, Mercer county; maximum, 81, at Beverly, Burlington county, on the 1st; minimum, 24, at Tenafly, Bergen county, on the 31st; range for the State, 57; greatest local monthly range, 53, at Beverly, Burlington county; least local monthly range, 33, at Ocean City, Cape May county; greatest daily range, 35, at Beverly, Burlington county, on the 1st; least daily range, 2, at Oceanic, Monmouth county, on the 19th and 23d.

PRECIPITATION (including melted snow, in inches).—Average for the State, 6.33; greatest, 10.18, at Oceanic, Monmouth county; least, 3 40, at Ocean City, Cape May county. Average number of days on which precipitation equaled 0.01 inch, 13.1; average number of days on which cloudiness was 8 or more on a scale of 10, 14.2. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder Storms*—Trenton, 19th and 29th; Moorestown, 29th; Beverly, 3d, 19th, 29th; Tenafly, 19th; Allaire, 19th, 29th; Rancocas, 3d, 19th, 29th; South Orange, 19th; Woodbury, 29th; Imlaystown, 18th, 29th; Oceanic, 3d, 19th, 29th; Madison, 3d, 19th; Billingsport, 29th; Princeton, 29th. *Hail*—Oceanic, 19th; Woodbury, 29th; Rancocas, 29th; Beverly, 29th; Moorestown, 29th; South Orange, 30th; Philadelphia, 30th. *Solar Halos*—Woodbury, 16th, 22d, 27th, 28th; Rancocas, 22d, 27th; Egg Harbor City, 16th, 22d; Beverly, 28th. *Lunar Halos*—Trenton, 22d, 25th; Moorestown, 23d; Beverly, 22d, 25th, 26th; Tenafly, 28th; Egg Harbor City, 22d; Rancocas, 22d, 26th; Woodbury, 22d, 26th, 28th; Imlaystown, 22d; Oceanic, 22d, 26th; Madison, 26th. Frosts were quite general throughout the State on the 9th, 10th, 13th, 15th, 18th, 22d and 31st. Auroras were observed at Madison, 5th; Egg Harbor City, Beverly, Moorestown, Rancocas and Madison on the 17th.

November, 1890.

TEMPERATURE (degrees F.)—The mean temperature for the month of November, 1890, 43 8, is 1.7 above the normal and 1.9 below the corresponding month of 1889. The chief maxima observed were 74 at Beverly, Burlington county; 73 at Egg Harbor City, Atlantic county; 72 at Bridgeton, Burlington county, and Trenton, Mercer county; 71 at Moorestown, Burlington county, and New Brunswick, Middlesex county; 70 at Atlantic City, Atlantic county, South Orange, Essex county, Woodbury, Gloucester county, Locktown and Readington, Hunterdon county, and Madison, Morris county. The chief minima observed were 11 at Freehold, Monmouth county, and 15 at Egg Harbor City, Atlantic county. The warmest days of the month were the 6th, 7th, 8th and 9th, and the coldest the 27th and 28th. The highest and lowest temperatures during the month were recorded on the 8th and 28th respectively.

PRECIPITATION (in inches).—The average total precipitation for the month of November, 1890, 0.82, is 2.60 below the normal for the month, and 7.66 below the average for the corresponding month of 1889. The stations bordering on the seacoast receiving the least and those in the counties of Middlesex, Mercer, Burlington and Hunterdon receiving the greatest amounts. The former report totals varying from 0.38 to 0.56 of an inch, and the latter amounts slightly in excess of 1.00 inch. The average amount received for the month is the smallest of which we have any record. The snowfall was very light, only a trace being reported. The average number of cloudless days was 12.8, partly cloudy 11.9, and cloudy 5.5. The average number of days upon which rain fell was 4.2. The weather predictions for the month have been verified as follows: For weather, 89.1 per cent.; for temperature, 82.8 per cent.; for weather and temperature combined, 85.9 per cent. The average temperature for the autumn season just closed was 54.0 degrees, the average for the previous autumn being 54.2 degrees. The average precipitation for the same period was 11 90 inches, as against 16.75 inches for the autumn of 1889.

ATMOSPHERIC PRESSURE (in inches)—Monthly mean, 30.086; maximum observed, 30.410, at Philadelphia, on the 12th; minimum observed, 29.608, at New York City, on the 30th; range for State, 0.802.

TEMPERATURE (degrees F.)—Monthly mean, 43.8; highest monthly mean, 47.2, at Ocean City, Cape May county; lowest monthly mean, 38.6, at Newton, Sussex county; maximum, 74, at Beverly, Burlington county, on the 8th; minimum, 11, at Freehold, Monmouth county, on the 28th; range for State, 63; greatest local monthly range, 58, at Egg Harbor City, Atlantic county, and Freehold, Monmouth county; least local monthly range, 40, at Lambertville, Hunterdon county; greatest daily range, 38, at Readington, Hunterdon county, on the 14th; least daily range, 1, at Egg Harbor City, Atlantic county, on the 11th.

PRECIPITATION (including melted snow, in inches).—Average for the State, 0.82; greatest, 1.10, at Trenton, Mercer county; least, 0.38, at Atlantic City, Atlantic county. Average number of days on which precipitation equaled 0.01 inch, 4.2. Average number of days on which cloudiness was 8 or more on a scale of 10, 5.5. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder Storm* (distant)—Moorestown, 2d. *Hail*—Tenafly, 11th; Highland Park, 19th; Egg Harbor City, 20th and 27th; South Orange, 11th; Woodbury, 20th. *Solar Halos*—Woodbury, 8th; Rancocas, 8th, 15th, 26th. *Lunar Halos*—Imlaystown, 25th and 29th; Rancocas, 24th; Egg Harbor City, 25th; Moorestown, 24th, 25th; Beverly, 17th, 19th, 23d, 24th, 25th, 26th, 27th, 29th. *Meteors*—Beverly, 5th, 15th, 28th; Trenton, 13th, 19th, 29th; Egg Harbor City, 5th, 6th, 18th; Woodbury, 13th. *Auroras*—Rancocas, Madison, Egg Harbor City, Readington, on the 7th.

OBSERVERS' NOTES.

CAPE MAY C. H.—The weather during the month was particularly fine. No high winds or heavy rain storms passed over this station. The precipitation was unusually small.

BEVERLY.—A very pleasant month. Weather more autumnal-like than November generally.

FREEHOLD.—The minimum temperature recorded on the morning of the 28th, 11.0, is five degrees lower than that recorded during November, 1888, and six degrees lower for the same month of 1889. The mean temperature for the month, 43.7, is 1.7 lower than that for 1888, and 0.7 lower than the mean for 1889. Dense fog prevailed on the 6th, 7th, 8th, 13th and 30th.

NEW BRUNSWICK.—The month of November, 1890, will go on record as remarkable for its equability of temperature, abnormally small precipitation and great number of fair days (26). My records date back to 1854, and in comparison with same month of other years I find that the average maxima temperature for this month is but 52.1, while in other years it has been much higher. The average minima temperature for this month was 32.0, which is higher than any other previous year, the next highest being 31.0, in 1873, thus showing the smallest range of temperature since 1854. The rainfall for the month was only 0.93 inches, which is the least for any November upon my records. The next smallest amount being 1.49 inches in 1883. Only three stormy days during the month, while other Novembers have considerably more. Only a trace of snow fell during the month, while on the 7th of November, 1862, we had a violent snow storm, which measured 10 inches in depth. The coldest day in November since 1854 was the 30th, 1875, on which day the minimum thermometer recorded 12 and the maximum 19.5; mean temperature of the day, 15.8. On this date the Raritan river was frozen solid from edge to edge.

RANCOCAS.—The aurora of the 7th inst. was very brilliant from 8 to 9 P. M. The arch reached an altitude of 40 degrees, and corruscations 5 to 10 higher. The lunar halo observed on the night of the 24th was very uncommon, being composed of the rainbow colors.

WOODBURY.—Ice formed on the 1st, 5th, 21st, 27th, 28th, 29th and 30th. The ground was frozen hard on these dates. Paraselenes (mock moons) were observed on the nights of the 22d and 23d.

OCEANIC.—The month closes with the ground free from frost and grain still growing and pasture good. Some indications of budding on the maple, cherry and plum trees, but not to a dangerous degree as yet.

MOORESTOWN.—Indian summer. Dense haze on the 5th, 6th, 8th and 9th, and quite frequently during the month. Heavy snow squalls on the 20th, the first of the season, melting as it fell. A perfect rainbow, the arch being entire, was observed on the morning of the 25th.

December, 1890.

TEMPERATURE (degrees F.)—The mean temperature for the month, 30.9, is 1.6 below the normal for the month and 10.6 below the mean for the corresponding month of 1889. The chief maxima observed were 56, at Bridgeton, Cumberland county; 55 at

Egg Harbor City, Atlantic county, and Cape May C. H.; 54, at Atlantic City, Atlantic county; Trenton, Mercer county; Allaire, Freehold and Imlaystown, Monmouth county. The chief minima observed were 3, at Tenafly, Bergen county; 5, at Madison, Morris county, and Locktown, Hunterdon county; 8, at Beverly, Burlington county, and 9, at Allaire, Monmouth county, and New Brunswick, Middlesex county. The warmest days of the month were the 2d, 3d, 11th, 15th, 17th and 23d, and the coolest the 28th and 29th. The mean temperature for the month is the lowest recorded since December, 1886, when it was 2.2 below the normal.

PRECIPITATION (in inches).—The average total precipitation for the month, 3.89 inches, is 0.27 inches above the normal for the month and 2.27 above the average for the corresponding month of 1889. During the month precipitation, in the form of rain or snow, was quite general throughout the State on the 1st, 3d, 6th, 8th, 17th, 21st, 26th and 29th. On the 17th all stations except three, Moorestown, Lambertville and Asbury Park, report the heaviest rainfall of the month, varying from 1.60 to 2.41 inches. The depth of snow on the ground at the close of the month was from one-half to five inches.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.073. Maximum observed, 30.62, at Atlantic City on the 20th. Minimum observed, 29.420, at Philadelphia on the 17th. Range for State, 0.653.

TEMPERATURE (degrees F.)—Monthly mean, 30.9. Highest monthly mean, 35.4, at Bridgeton, Cumberland county. Lowest monthly mean, 27.4, at Madison, Morris county. Maximum, 56, at Bridgeton, Cumberland county, on the 23d. Minimum, 3, at Tenafly, Bergen county, on the 30th. Range for State, 53. Greatest local monthly range, 46, at Tenafly, Bergen county. Least local monthly range, 30, at Ocean City, Cape May county. Greatest daily range, 41, at Egg Harbor City, Atlantic county, on the 3d. Least daily range, 1, at Tenafly, Bergen county, on the 31st.

PRECIPITATION (including melted snow, in inches).—Average for the State, 3.89. Greatest, 5.74, at Oceanic, Monmouth county. Least, 2.34, at Lambertville, Hunterdon county. Average number of days on which precipitation equaled 0.01, 8.5. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Solar Halos* were observed at Beverly on the 25th; Oceanic on the 30th, and at New York on the 1st, 9th, 11th, 14th, 16th, 25th and 30th. *Lunar Halos* were observed as follows: Beverly, 20th, 22d and 27th; Rancocas, 6th, 20th and 22d; Moorestown, 20th and 29th; Egg Harbor City, 20th, 21st and 22d; Tenafly, 25th; Trenton, 27th; Oceanic, 25th; Madison, 25th; New York, 25th, 30th and 31st; Billingsport, 22d. *Lunar Corona*—Moorestown, on the 25th, at 9 P. M. *Meteors*—Beverly, 10th. *Polar Bands*—Beverly, 21st. *Hail*—Moorestown, 10th and 26th. *Sleet*—Rancocas, 3d, 23d, 26th; Moorestown, 5th; Cape May, C. H., 26th; Readington, 25th. *Snow* fell at nearly all stations on the 1st, 2d, 3d, 8th, 26th and 29th. The average number of cloudless days was 11.3; partly cloudy, 9.5, and cloudy, 10.3.

OBSERVERS' NOTES.

NEWARK.—The mean temperature of the month was two and a half degrees below the mean of December for the last forty-seven years. It was the coldest December we have had in this vicinity since 1880, and strongly in contrast with December of last year with its mean temperature of 41 degrees. The mean temperature of the year, 52.8, is more than a degree and a half above the mean of the preceding forty-six years,

though a trifle less than that of 1889. The waterfall of the year, 50.88 inches, is 14 inches less than the waterfall of 1889, but, still, is 4 inches above the average of former years.

MOORESTOWN.—The normal temperature for the month of December, determined from tri-daily observations made during the past twenty-six years, is 32.6, which is 2.3 above the mean for the past month. The highest mean temperature for the month, 41.0, was recorded in 1889, and the lowest mean temperature, 23.9, in 1876. The average precipitation of the past twenty-six Decembers is 3.33 inches, and the total for the month just closed, 2.99 inches. The greatest amount recorded was 5.77 inches in December, 1862, and the least, 0.90 inches in December, 1877.

CAPE MAY C. H.—The snow on the 8th gave us two or three days of the finest sleighing we have had for several years. The mean temperature of the month, 34.3, is 3.3 below the normal for the month, and the total precipitation, 4.43, is only 0.09 inches below the normal for the month.

OCEANIC.—At the close of the month the ground is covered with two inches of snow. Navigation on the North Shrewsbury river is closed. The ice is about three inches thick.

TRENTON.—Rain fell on one hundred and ten days during the year and measured 50.80 inches. The greatest monthly total was 7.56 inches for October, and the least, 1.10 inches, during November. Twenty-six thunder storms passed over the station. The first frost occurred on September 25th and the first ice formed on October 31st.

TEMPERATURE (degrees F.)—Annual mean, 53.2. Highest annual mean, 56.7, at Bridgeton, Cumberland county, and Trenton, Mercer county. Lowest annual mean, 50.4, at Tenafly, Bergen county. Highest temperature, 101, at Woodbury, Gloucester county, July 8th. Lowest temperature, zero, at Tenafly, Bergen county, March 7th. Range for the State, 101.

COMPARATIVE MEAN TEMPERATURE BY SEASONS.

	1889.	1890.	NORMAL.
Mean winter temperature	35.1	40.9	31.2
Mean spring temperature	51.3	49.6	48.1
Mean summer temperature	71.0	71.6	70.0
Mean autumn temperature	53.3	54.0	53.9

PRECIPITATION (including melted snow, in inches).—Average for the year, 49.34. Greatest, 62.23, at Oceanic, Monmouth county. Least, 41.17, at Woodbury, Gloucester county. Greatest monthly, 9.97, at Freehold, Monmouth county, September. Least monthly, 0.38, at Atlantic City, Atlantic county, October. Average number of days on which rain or snow fell, 117.6. Average number of days on which cloudiness was 8 or more on a scale of 10, 116.4.

COMPARATIVE PRECIPITATION BY SEASONS.

	1889.	1890.	NORMAL.
Average winter	9.50	8.08	10.27
Average spring	13.08	12.97	11.64
Average summer	19.65	11.11	12.86
Average autumn	21.11	11.90	11.68

January, 1891.

TEMPERATURE (degrees F.)—The mean temperature for the month, 34.2, is 4.7 above the normal for the month and 7.1 below the mean for the corresponding month of 1890. The chief maxima observed were 59 at Egg Harbor City, Atlantic county; 57 at Cape May Court House, Cape May county, Bridgeton, Cumberland county, New Brunswick, Middlesex county, and Freehold, Monmouth county. The chief minima observed were 10 at Tenafly, Bergen county; 12 at New Brunswick, Middlesex county, Gillette and Madison, Morris county; 14 at Asbury Park, and Freehold, Monmouth county, South Orange, Essex county, and Egg Harbor City, Atlantic county. The warmest days of the month were the 2d at stations bordering on the sea-coast, and the 22d in the remaining districts of the State. The coldest days were the 4th and 6th. The average daily range of temperature determined from self-registering thermometers was 14.6, the greatest being 18.6, at New Brunswick, and the least, 10.4, at Oceanic.

PRECIPITATION (in inches).—The average total precipitation for the month, 6.57 inches, is 2.93 inches above the normal and 4.28 inches above the average for January, 1890. Rain or snow was general throughout the State on the 1st, 2d, 11th, 12th, 17th, 18th, 22d, 25th, 29th and 31st. The storm of wind, rain, sleet and snow on the 25th caused great damage to telegraph lines, especially between Monmouth Junction, and Trenton. Between these points nearly every telegraph pole was prostrated to the ground. Communication was completely cut off for nearly a week, and is not yet fully restored.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.036; maximum observed, 30.550, at Philadelphia, on the 9th; minimum observed, 29.015, at New York City, on the 12th; range for the State, 1.535.

TEMPERATURE (degrees F.)—Monthly mean, 34.2; highest monthly mean, 37.8, at Bridgeton, Cumberland county; lowest monthly mean, 30.8, at Tenafly, Bergen county; maximum, 59, at Egg Harbor City, Atlantic county, on the 2d; minimum, 10, at Tenafly, Bergen county, on the 6th, 9th, 20th; range for the State, 49. Greatest local monthly range, 45, at Egg Harbor City, Atlantic county; least local monthly range, 31, at Ocean City, Cape May county; greatest daily range, 31, at Gillette, Morris county, on the 28th; least daily range, 1, at Franklinville, Gloucester county, on the 17th.

PRECIPITATION (including melted snow, in inches).—Average for the State, 6.57; greatest, 10.55, at South Orange, Essex county; least, 4.41, at Atlantic City, Atlantic county. Average number of days on which precipitation equaled 0.01 inch, 10.5. Average number of days on which cloudiness was 8 or more on a scale of 10, 10.2. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder Storms*—Rancocas, distant lightning on the evening of 11th; Lambertville, distant lightning on the evening of 11th; Beverly, 11th; Tenafly, 3d; Madison, 11th. *Solar Halos*—Oceanic, 9th; Beverly, 21st; Egg Harbor City, 21st, 24th, 28th; Rancocas, 21st. *Lunar Halos*—Rancocas, 18th, 20th, 26th, 31st; Egg Harbor City, 15th, 20th, 21st; Beverly, 15th, 20th, 21st, 22d, 26th; Trenton, 21st; Imlaystown, 21st; Madison, 15th, 20th, 21st; Billingsport, 20th; Oceanic, 15th, 22d; Moorestown, 15th. *Sleet*—Moorestown, 17th, 18th (covering the trees heavily until the 20th); Allaire, 17th; Tenafly, 1st, 17th; Oceanic, 17th; Billingsport, 17th, 31st; Highland Park, 25th; Madison, 17th; Trenton, 1st, 17th, 31st; Beverly, 17th, 25th; Egg Harbor City, 31st; Rancocas, 17th. *Snow*—Franklinville, 25th; Asbury Park, 5th, 25th; Rancocas, 25th; Lambertville, 17th, 25th; Trenton, 1st, 4th, 5th, 18th, 24th, 25th; Madison, 4th, 5th, 25th; Freehold, 21st; Highland Park, 4th, 5th, 17th, 25th; Oceanic, 4th, 5th, 25th; Tenafly, 4th, 5th, 19th, 25th; Allaire, 5th, 25th; New Brunswick, 5th, 13th, 25th; Junction, 17th, 25th; Locktown, 1st, 18th, 25th; Moorestown, Gillette, Imlaystown, Beverly, 25th. *Meteors*—Beverly, 16th. *Polar Bands*—Franklinville, 30th.

OBSERVERS' NOTES.

BEVERLY.—The month was noted for its excessive rains. The heavy storm of the 25th was preceded by heavy "hoar frosts." No interference to navigation from ice after the 20th.

FRANKLINVILLE.—At the close of the month the ground was free from frost and farmers were plowing. Ice was stored between the 3d and 5th of a thickness from three to five inches.

FREEHOLD.—Dense fogs on the 2d, 28th and 29th. High winds on the 11th and 12th. Hail and sleet on the 17th, clinging to the trees and breaking down the limbs of pines and evergreens.

BILLINGSPORT.—At the close of the month the Delaware river was entirely free from ice. The farmers are plowing.

NEWARK.—The month was replete with discomforts, and so variable in temperature as to fill with apprehension the vigorous as well as the feeble. Its mean temperature, 33.3, was considerably above the mean of its forty-seven predecessors, but it was much below that of January, 1890, and even of January, 1889. The waterfall of the month, 7.11 inches, was much above the average for corresponding months. In fact it was the largest waterfall in this locality during the last forty-seven years.

CAMDEN.—The rivers were free from ice after the middle of the month. The storm of wind and snow on the 25th caused great damage to the telegraph lines, cutting off all communication for two days.

CAPE MAY C. H.—Excepting the large amount of precipitation the month has been remarkable for its negative phenomena. No snows, no sleet, no severe storms, and only two winds that could be marked as "high," and that of short duration. The cold wave between the 4th and 12th afforded a moderate harvesting of ice.

February, 1891.

TEMPERATURE (degrees F.)—The mean temperature for the month, 38.0, is 6.5 above the normal for the month, and 1.9 below the mean for the corresponding month of 1890. The chief maxima observed were 71 at Vineland, Cumberland county; 70 at Cape May C. H., Cape May county, Bridgeton, Cumberland county, and 69 at Egg Harbor City, Atlantic county, and Camden, Camden county. The chief minima observed were 1 at Tenafly, Bergen county; 2 at Dover, Morris county, and 5 at Madison, Morris county. The warmest days of the month were the 17th, 18th and 25th, and the coldest the 5th and 28th. The average daily range of temperature, determined from self-registering thermometers, was 15.9. The greatest being 19.3 at Beverly, Burlington county, and the least 12.1 at Oceanic, Monmouth county.

PRECIPITATION (in inches).—The average total precipitation for the month, 5.11, is 1.65 above the normal and 0.94 above the average for February, 1890. Precipitation, in the form of rain or snow, was very general throughout the State on the 1st, 3d, 6th, 7th, 8th, 9th, 10th, 16th, 17th, 20th, 21st, 22d, 25th, 26th and 27th.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.088; maximum observed, 30.720, at New York City, on the 15th; minimum observed, 29.400, at Newark, on the 26th; range for the State, 1.320.

TEMPERATURE, (degrees F.)—Monthly mean, 38.0; highest monthly mean, 42.5, at Bridgeton, Cumberland county; lowest monthly mean, 33.6, at Dover, Morris county; maximum, 71, at Vineland, Cumberland county, on the 28th; minimum, 1, at Tenafly, Bergen county, on the 28th; range for the State, 70; greatest local monthly range, 60, at Beverly, Burlington county; least local monthly range, 42, at Pochunk Mt. (Deckertown), Sussex county; greatest daily range, 41, at Vineland, Cumberland county, on the 16th; least daily range, 2, at Billingsport, Gloucester county, South Orange, Essex county, and Dover, Morris county, on the 2d, and Atlantic City, Atlantic county, on the 19th.

PRECIPITATION (including melted snow, in inches).—Average for the State, 5.11; greatest, 7.20, at Egg Harbor City, Atlantic county; least, 3.70, at Junction, Hunterdon county; average number of days on which precipitation equaled 0.01 inch, 14.0; average number of cloudless days was 6.1; partly cloudy, 9.2, and cloudy, 12.7. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder storms*—Egg Harbor City, 17th; Salem, 17th; Franklinville, 17th; Bridgeton, 17th; distant lightning was observed at the following stations on the evening of the 28th: Oceanic, Lambertville, Dover, Beverly, Trenton, Moorestown, Rancocas, Madison and Highland Park. *Solar Halos*—Rancocas, 18th and 28th; Trenton, 19th; Dover, 19th and 28th; Billingsport, 12th; Egg Harbor City, 12th, 23d and 24th. *Lunar Halos*—Junction, 17th, 19th and 23d; Egg Harbor City, 15th and 23d; Salem, 22d; Highland Park, 22d; Oceanic, 18th, 22d and 24th; Beverly, 15th, 16th, 17th, 19th and 22d; Trenton, 19th; Rancocas, 2d, 15th, 22d and 25th. *Sleet*—Madison, 17th; Rancocas, 20th; Trenton, 20th; Beverly, 17th; Dover, 26th; Billingsport, 16th, 20th; Camden, 20th; Highland Park, 20th; Salem, 12th and 20th; Egg Harbor City, 20th; Tenafly, 6th, 7th and 20th. *Polar Bands*—Beverly, 15th and 22d; Madison, 23d. *Auroras*—Madison, faint beams observed at 10:30 P. M.

WINTER MEAN TEMPERATURE AND PRECIPITATION.—The mean temperature of the winter of 1890–91, 34.4 degrees, is 3.2 degrees above the normal, and 6.5 degrees below the mean for the winter of 1889–90. The average precipitation for the winter of 1890–91, 15.57 inches, is 4.85 inches above the normal, and 7.49 inches above the average for the winter months of 1889–90.

OBSERVERS' NOTES.

MOORESTOWN.—Bluebirds singing on 14th and 17th; blackbirds, 17th and 18th, Bees feeding on open maple blossoms, 24th. Mean winter temperature 1890–91, 34.1, is 3.0 above the mean of previovs twenty-seven winters. The average precipitation for the winter of 1890–91, 13.34 inches, is 3.22 inches above the average of previous twenty-seven winters.

DOVER.—The weather during the month was particularly noted for its light rains, which fell on fifteen days during the month. Notwithstanding the frequency of the rain, the average rainfall was slightly below the normal for February. The snowfall was a little in excess of the average, but did not remain long enough for sleighing.

RANCOCAS.—February went out with a record that follows closely that of the

corresponding month of 1890. No frost in the ground, grass growing quite perceptibly, buds swelling, bluebirds and song sparrows warbling their spring melodies. Fruit buds are not advanced to a dangerous degree. Maple trees were in bloom on the 18th.

BILLINGSPORT.—Frogs were piping on the 17th. Blackbirds in large flocks on the 16th.

IMLAYSTOWN.—Robins quite numerous on the 26th. Frogs were heard from the 18th to 26th, inclusive.

FRANKLINVILLE.—The weather has been comparatively mild and moist and the ground unfrozen throughout the month. Robins appeared on the 4th and blackbirds on the 10th. The first piping of frogs was heard on the 17th. Bluebirds and killdeer plover made their appearance. By the 18th lily bulbs had sent up sprouts an inch or so. On the 21st numerous castings of earthworms were seen.

SOUTH ORANGE.—Frogs piping on the 25th.

SALEM.—At the close of the month dandelions were in bloom in the fields. Peach and other buds are swelling. Continued warm weather, followed by a cold snap, would endanger the peach crop.

CAPE MAY C. H.—The rainfall has been heavy and almost continuous. The springs are unusually high, some cellars being flooded with water from the rise of the springs. The high average temperature has swollen the buds of nearly all fruit trees. Winter grain and grass are putting on the appearance of spring. How much damage will result from the early development cannot now be determined.

March, 1891.

TEMPERATURE (degrees F.)—The mean temperature for the month, 37.2, is 0.4 above the normal and the mean for the corresponding month of 1890. The chief maxima observed were 68 at Paterson, Passaic county; 65 at Salem, Salem county, Bridgeton, Cumberland county, and South Orange, Essex county; 64 at Beverly and Moorestown, Burlington county, Vineland, Cumberland county, and Trenton, Mercer county. The chief minima observed were 4 at Dover, Morris county, and Pochunk Mt., Sussex county; 6 at Tenafly, Bergen county, Locktown, Hunterdon county, New Brunswick, Middlesex county; 10 at Newark, Essex county; 11 at Allaire, 12 at Asbury Park and Imlaystown, Monmouth county; 13 at Cape May C. H. and Vineland, Cumberland county. The warmest days of the month were the 16th, 23d, 25th, 29th and 30th, and the coldest the 2d, 6th and 15th. The average daily range of temperature determined from self-registering thermometers was 15.2. The greatest being 21.1, at New Brunswick, Middlesex county, and the least 7.8, at Newark, Essex county. The average number of cloudless days was 7 3; partly cloudy 10.1, and cloudy 13.2.

PRECIPITATION (in inches).—The average total precipitation for the month, 5.06, is 1.47 above the normal and 1.02 below the average for the corresponding month of 1890. It was very unevenly distributed, the stations in the extreme southern portion of the State receiving the greatest and those in the northern and central portions the least excess. Only one station reports a deficiency, while remaining stations report an excess (above the average) of from 0.10 to 4.43 inches.

WEATHER AND TEMPERATURE SIGNALS.—The weather predictions for the month have been verified as follows: For weather, 85.0 per cent.; for temperature, 88.0 per cent.; for weather and temperature combined, 86.6 per cent.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.103; maximum observed,

30.59, at New York, on the 2d; minimum observed, 29.48, at Newark and Atlantic City, on the 13th and 22d respectively; range for the State, 1.11.

TEMPERATURE (degrees F.)—Monthly mean, 37.2; highest monthly, 42.0, at Readington, Hunterdon county; lowest monthly mean, 34.5, at Newton, Sussex county; maximum, 68, at Paterson, Passaic county, on the 23d and 24th; minimum, 4, at Dover, Morris county, and Pochunk Mt., Sussex county, on the 2d; range for the State, 64; greatest local monthly range, 59, at Dover, Morris county; least local monthly range, 37, at Ocean City, Cape May county; greatest daily range, 38, at Paterson, Passaic county, on the 18th; least daily range, 1, at Newton, Sussex county, and Trenton, Mercer county, on the 5th and 20th respectively.

PRECIPITATION (including melted snow, in inches).—Average for the State, 5.06; greatest, 8.02, at Bridgeton, Cumberland county; least, 2.05, at Paterson, Passaic county; average number of days on which precipitation equaled 0.01 inch, 11.7. *Wind*—Prevailing direction, northeast.

MISCELLANEOUS PHENOMENA (dates observed)—*Thunder Storms*—Imlaystown, 9th; Tenafly, 9th; Moorestown, 9th; Beverly, 9th; Franklinville, 9th; Salem, 9th; Madison, 9th; Trenton, 9th; New Brunswick, 9th; Lambertville, 9th; Highland Park, 9th; Billingsport, 9th; Camden, 9th; Pochunk Mt., 9th; Oceanic, 9th; Mount Holly, 9th; Bridgeton, 9th; Rancocas, 9th; Dover, 9th; South Orange, 9th; Cape May C. H., 9th; Locktown, 9th. *Solar Halos*—Dover, 2d and 6th; Rancocas, 2d, 6th, 11th, 18th, 24th and 26th; Beverly, 2d, 5th, 11th, 18th, 25th and 26th; Moorestown, 2d and 26th; Imlaystown, 7th; Trenton, 25th and 26th; Salem, 25th; Egg Harbor City, 2d, 6th, 11th, 25th and 26th. *Lunar Halos*—Madison, 15th, 18th and 26th; Salem, 15th and 18th; Trenton, 23d, 24th and 26th; Beverly, 15th, 18th, 25th and 26th; Moorestown, 6th, 15th, 18th and 26th; Imlaystown, 15th, 18th and 26th; Junction, 26th; Highland Park, 18th and 26th; Billingsport, 15th and 18th; Egg Harbor City, 26th; Rancocas, 15th, 18th and 26th. *Sleet*—Pochunk Mt., 8th; Camden, 20th; Highland Park, 4th; Moorestown, 6th. *Meteors*—Madison, 25th; Beverly, 5th; Freehold, 24th.

OBSERVERS' NOTES.

SALEM.—At the close of the month the springs are higher than ever known here; ground is thoroughly saturated, the majority of cellars having from one to three feet of water in them. The wet condition of the ground has put farm work back, greatly delaying spring plowing.

CAPE MAY C. H.—Excessive precipitation still continues. No such excess has been experienced since the spring of 1867, when it equaled or exceeded the present. The ground is saturated, low lands submerged, rendering early plowing impracticable. Early truckers very gloomy.

MOORESTOWN.—Robins in flocks, 17th; kingfisher, 19th; killdeer plover, 31st.

LAMBERTVILLE.—First blackbirds, 9th; robins, 15th; plowing quite general from 27th to 31st.

FREEHOLD.—On the evening of the 24th a brilliant meteor was observed in the northeast. It was brighter than the moon, which was rising at the time, and disappeared just above the horizon.

POCHUNK MT.—The first robins of the season were seen on the 8th. First frogs heard on evening of 23d; on this date the ice in Lake Pochunk broke up.

DOVER.—Frost was entirely out of the ground by the end of the month. Bluebirds and robins made their appearance on the 15th. The Morris canal opened for navigation on the 30th. An aurora, a bright, diffused light, was observed in the northeast horizon at 10 P. M. of the 30th.

NEWARK.—The month just closed might be called an average March, with a mean temperature, just a trifle more than one degree below the mean of its forty-seven predecessors, and for that reason the more promising, perhaps, of health, strength and beauty throughout the vegetable kingdom, for nothing therein during the first half of the month was so forward as to receive injury from even the severest winter weather. There was a difference of nearly ten degrees between the temperature of the first fifteen days and that of the last sixteen, the mean of the first fifteen being a trifle above freezing point, while that of the last sixteen was more than ten degrees above that point.

April, 1891.

TEMPERATURE (degrees F.)—The mean temperature for the month, 52.0, is 4.1 above the normal for the month and 1.6 above the mean for the corresponding month of 1890. The chief maxima observed were 88 at Camden, Camden county; 86 at Tenafly, Bergen county; 85 at Paterson, Passaic county, and Lancewood, Ocean county; 84 at Beverly and Moorestown, Burlington county, Bridgeton and Vineland, Cumberland county, and Trenton, Mercer county. The chief minima observed were 20 at Hanover and Dover, Morris county, Tenafly, Bergen county, and Allaire, Monmouth county; 22 at Pochunk Mt., Sussex county, and Paterson, Passaic county; 24 at Egg Harbor City, Atlantic county, and Beverly, Burlington county. The lowest recorded in the extreme southern portion of the State was 30 at Cape May C. H. The warmest days of the month were the 15th, 18th, 19th, 27th, 29th and 30th, and the coldest the 6th, 7th, 8th and 9th. The average daily range of temperature determined from self-registering thermometers was 20.9, an increase of 5.7 over preceding month. The greatest was 29.1, at Tenafly, Bergen county, and the least 13, at Atlantic City, Atlantic county. The average number of cloudless days was 13.4; partly cloudy, 10.7, and cloudy, 5.9.

PRECIPITATION (in inches).—The average precipitation for the month, 2.19, is 1.28 below the normal and 0.46 below the average for the corresponding month of 1890. It is also the smallest average for the month since the establishment of this service. It was very unevenly distributed. Two stations report an amount exceeding three inches; 18 exceeding two, and 14 exceeding one inch. The only stations reporting an excess (above normal) were Paterson, South Orange and Pochunk Mt.

Correction—In Bulletin No. 53, in column of "mean of maximum temperature," the mean for station Dover should read 43.5 instead of 35.5.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.020; maximum observed, 30.560, at New York City, on the 10th; minimum observed, 29.410, at Newark, on the 3d; range for the State, 1.150.

TEMPERATURE (degrees F.)—Monthly mean, 52.0; highest monthly mean, 55.0, at Trenton, Mercer county; lowest monthly mean, 49.0, at Atlantic City, Atlantic county; maximum, 88, at Camden, Camden county, on the 15th; minimum, 20, at Tenafly, Bergen county, on the 7th and 9th; Allaire, Monmouth county, on the 8th; Dover, Morris county, on the 7th, and Hanover, Morris county, on the 8th; range for the State, 68; greatest local monthly range, 66, at Tenafly, Bergen county; least local monthly range, 48, at Newark, Essex county; greatest daily range, 66, at

Tenafly, Bergen county, on the 30th; least daily range, 2, at Asbury Park, Monmouth county, on the 16th.

PRECIPITATION (including melted snow, in inches).—Average for the State, 2.19; greatest, 3.80, at South Orange, Essex county; least, 1.39, at Lambertville, Hunterdon county. Average number of days on which precipitation equaled 0.01 inch, 7.8. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder Storms*—Camden, 16th and 18th; Ocean City, 16th; Allaire, 16th; Rancocas, 16th and 18th; Moorestown, 15th, 16th, 18th, 22d and 23d; Belleville, 18th, 22d and 23d; Mount Holly, 16th, 18th and 23d; Highland Park, 15th (distant), 16th, 17th; Bridgeton, 11th, 16th; Imlaystown, 18th and 22d; Franklinville, 11th, 18th and 22d; Junction, 17th and 18th; Trenton, 16th, 18th and 22d; Dover, 18th, 22d and 23d, distant on the 14th, 15th and 16th; Billingsport, 16th and 18th; Beverly, 11th, 15th, 16th, 18th and 22d; Cape May C. H., 11th and 23d; Newton, 14th, 16th, 18th and 21st; Tenafly, 14th, 18th, 22d and 23d; Egg Harbor City, 16th, 18th and 23d; Freehold, 17th, 18th and 22d; Pochunk Mt., 14th, distant on the 22d; Philadelphia, 16th and 18th; New York, 18th and 22d. *Solar Halos*—Egg Harbor City, 9th and 10th; Beverly, 5th; Dover, 14th; Rancocas, 5th and 14th. *Lunar Halos*—Rancocas, 22d; Moorestown, 17th; Beverly, 15th and 17th. *Hail*—Newton, 25th; Dover, 4th; Bridgeton, 4th; Vineland, 4th.

OBSERVERS' NOTES.

POCHUNK MT.—The snowfall of the 2d and 3d measured 5.8 inches. The first whip-poor-will was heard on the 20th.

FREEHOLD.—Large flocks of wild geese noticed flying north on the 1st and 2d. Peach trees bloomed on the 19th.

EGG HARBOR CITY.—Peach, pear, cherry and apple trees in bloom on the 16th. A heavy frost on the night of the 26th did much damage to early vegetables and fruit. The damage from the heavy forest fires of the 28th, 29th and 30th will amount to nearly $53,000 in this vicinity.

CAPE MAY C. H.—Fruit and other trees somewhat early in bloom and foliage. Ice in a few localities on the nights of 25th and 26th, but the injury was very slight.

DOVER.—The temperature and precipitation were slightly above the normal for April. Vegetation is progressing favorably.

LANCEWOOD.—No injury from frost during the month. Fruit trees never so full of blossoms. Wild strawberries in bloom on the 15th.

MOORESTOWN.—Migration of birds. Wood pewee, 6th; turtle doves, 14th; bat, 15th; whip-poor-will, 15th; song thrush, 17th; wren and barn swallows, 20th; chimney swallow and sand piper, 22d.

LOCKTOWN.—Rye showing head on the 29th.

NEWARK.—The month just closed gave us a mean temperature of more than two and a half degrees above that of the forty-seven corresponding months immediately preceding it. Its first ten days were, however, very cool, with a mean of only 38.80 degrees. On the morning of the 5th we had ice nearly half an inch thick, the mercury having descended in the early hours to 29 degrees. In fact, it did not rise above 42 degrees during the four successive days, and was twice below the freezing point during that time. To the remaining twenty days, with their mean temperature of more than 57 degrees, we are indebted to an April whose warmth has been equaled but ten times during nearly half a century. The number of its fair days was unusually large. We had but six cloudy afternoons throughout the entire month.

NEW BRUNSWICK.—The month just closed gives us ten clear days, the first pleasant clear day being the 8th. It is true that we had but little rain, the greatest amount falling on any one day being 0.60 of an inch, which occurred on the 2d, between the hours of 4 and 9 P. M. It was cloudy and threatening many days, while the stars generally made their appearance at night. The rains of April generally come in showers, and are greeted as the predecessors of a plentiful harvest, the old saying, "April showers make May flowers," but during the last month we had but two thunder showers, one on the 16th, at 10 P. M., when but .04 of an inch of water fell, and the other on the 18th, at 9 P. M., with but .02 inches falling.

May, 1891.

TEMPERATURE (degrees F.)—The mean temperature for the month, 59.5, is 0.2 below the normal for the month, and 1.2 below the average for the corresponding month of 1890. The chief maxima observed were 93, at New Brunswick, Middlesex county; 92, at Moorestown, Burlington county, Imlaystown, Monmouth county, and Lancewood, Ocean county; 91, at Dover, Morris county, Woodbury, Gloucester county, Beverly, Burlington county, and Tenafly, Bergen county; 90 at Egg Harbor City, Atlantic county, Camden, Camden county, Highland Park, Middlesex county, Freehold, Monmouth county, and Somerville, Somerset county. The chief minima observed were 24, at Allaire, Monmouth county; 26, at Somerville, Somerset county; 28, at Lancewood, Ocean county, Dover, Morris county, Franklinville, Gloucester county; 29, at Egg Harbor City, Atlantic county, and Vineland, Cumberland county, Pochunk Mt., Sussex county, and Blairstown, Warren county. The warmest days of the month were the 9th, 10th, 11th, 21st and 22d. The coldest days were the 6th and 7th. The average daily range of temperature determined from self-registering thermometers was 21.3, the greatest being 29.9, at Tenafly, Bergen county, and the least, 12.4, at Atlantic City, Atlantic county.

PRECIPITATION (in inches)—The average total precipitation for the month, 2.97, is 0.77 below the normal and 1.27 below the average for the corresponding month of 1890. Like the previous month the rainfall was very unequally distributed, the stations in Monmouth county, bordering on the sea-coast, receiving the largest (about five inches), and those in Burlington and the southeastern portion of Hunterdon county receiving the least amounts (less than two inches). The average number of cloudless days was 8.9; partly cloudy, 11.5, and cloudy, 11.0.

WEATHER AND TEMPERATURE SIGNALS.—The weather predictions for the month have been verified as follows: For weather, 79.3 per cent.; for temperature, 90.3 per cent.; for weather and temperature combined, 84.8 per cent.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.041. Maximum observed, 30.470, at Atlantic City, on the 20th. Minimum observed, 29.740, at New York City, on the 1st. Range for the State, 0.730.

TEMPERATURE (degrees F.)—Monthly mean, 59.5. Highest monthly mean, 62.3 at Bridgeton, Cumberland county, and Woodbury, Gloucester county. Lowest monthly mean, 56.6, at Pochunk Mt. (Deckertown), Sussex county. Maximum, 93, at New Brunswick, Middlesex county, on the 11th. Minimum, 24, at Allaire, Monmouth county, on the 6th. Range for the State, 69. Greatest local monthly range, 64, at Lancewood, Ocean county, and Somerville, Somerset county. Least local monthly

range, 46, at Oceanic, Monmouth county. Greatest daily range, 48, at Tenafly, Bergen county, on the 9th. Least daily range, 1, at Gillette, Morris county.

PRECIPITATION (including melted snow, in inches).—Average for the State, 2.97. Greatest, 5.39, at Oceanic, Monmouth county. Least, 1.78, at Mount Holly, Burlington county. Average number of days on which precipitation equaled 0.01 inch, 9. *Wind*—Prevailing direction, southwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder Storms*—Moorestown, 11th, 20th, 21st, 22d and 31st; Cape May C. H., 11th and 22d; Highland Park, 12th, 20th, 22d, 31st; Woodbury, 12th, 20th, 22d, 31st; Camden, 11th, 20th, 22d; Billingsport, 20th; Bridgeton, 22d; Beverly, 11th, 20th, 31st; Allaire, 16th, 22d; Dover, 11th, 20th, 22d; Junction, 20th; Imlaystown, 22d, 31st; Blairstown, 31st; Rancocas, 20th; Trenton, 20th, 22d; Tenafly, 11th; Oceanic, 20th, 22d, 29th; Egg Harbor City, 3d, 6th, 15th 22d. *Solar Halos*—Oceanic, 14th, 27th, 28th; Trenton, 8th; Rancocas, 8th, 27th, 28th; Pochunk Mt., 27th; Dover, 2d, 27th; Woodbury, 13th; Moorestown, 14th; New York City, 23d, 27th, 28th. *Lunar Halos*—Pochunk Mt., 13th; New York City, 14th, 17th, 21st, 22d, 28th. *Meteors*—Pochunk Mt., observed at midnight on the 20th; very large and brilliant, of varied colors.

June, 1891.

TEMPERATURE (degrees F.)—The mean temperature for the month of June, 1891, 69.7, is 0.3 below the normal and 1.0 below the average for the corresponding month of 1890. The chief maxima observed were 102 at Tenafly, Bergen county; 101 at Somerville, Somerset county; 100 at New Brunswick, Middlesex county, and 98 at Imlaystown, Monmouth county. The chief minima observed were 38 at Hanover, Morris county; 40 at Blairstown, Warren county, Gillette, Morris county, and Allaire, Monmouth county; 41 at Franklinville, Gloucester county, Vineland, Cumberland county, and Cape May C. H., Cape May county. The warmest days were the 16th, 17th and 26th. The coolest the 5th, 6th, 7th and 8th. The average daily range of temperature, determined from self-registering thermometers, was 22.3, the greatest being 29.7, at Tenafly, Bergen county, and the least 12.8, at Asbury Park, Monmouth county.

PRECIPITATION (in inches).—The average total precipitation for the month, 2.92 inches, is 1.06 below the normal and 0.67 below the average for the corresponding month of 1890. The stations receiving the largest amount were Imlaystown, Monmouth county, 6.71; Beverly, Burlington county, 5.81, and Freehold, Monmouth county, 5.33. These stations report an amount exceeding the average: Imlaystown, Beverly, Freehold, Lancewood, Camden, Bridgeton and Asbury Park. The stations receiving the least amount were: Cape May C. H., 1.24; New Brunswick, 1.62; Hanover, 1.37; Pochunk Mt., 1.36; Oceanic, 1.45; Atlantic City, 1.67; South Orange, 1.78, and New York City, 1.18. The average number of cloudless days was 13.6; partly cloudy, 9.0, and cloudy, 7.5.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29.964. Maximum observed, 30.230, at Atlantic City on the 9th. Minimum observed, 29.730, at Philadelphia on the 17th. Range for the State, 0.500.

TEMPERATURE (degrees F.)—Monthly mean, 69.7. Highest monthly mean, 74.0, at Trenton, Mercer county; lowest monthly mean, 66.1, at Atlantic City, Atlantic county; maximum, 102, at Tenafly, Bergen county, on the 16th; minimum, 38, at Hanover, Morris county, on the 8th; range for the State, 64; greatest local monthly range, 59, at Tenafly, Bergen county; least local monthly range, 42, at Asbury Park,

Monmouth county; greatest daily range, 46, at Hanover, Morris county, on the 15th; least daily range, 0, at Lambertville, Hunterdon county, on the 18th.

PRECIPITATION.—Average for the State, 2.92; greatest, 6.71, at Imlaystown, Monmouth county; least, 1.24, at Cape May C. H.; average number of days on which precipitation equaled 0.01 inch, 5.1. Prevailing direction of the wind, southwest.

MISCELLANEOUS PHENOMENA (dates observed).—*Thunder Storms*—Imlaystown, 17th, 21st, 26th (2); Oceanic, 2d, 16th and 17th; Tenafly, 26th; Bridgeton, 21st, 22d; Locktown, 16th, 17th, 21st; Moorestown, 12th, 17th, 21st, 26th; Ocean City, 17th; Cape May C. H., 12th, 26th Readington, 16th, 17th; Trenton, 17th, 21st; Billingsport, 17th, 21st; Junction, 2d, 16th, 17th, 21st; Dover, 2d, 16th, 22d; Rancocas, 17th, 26th; New Brunswick, 16th, 17th, 21st; Camden, 17th, 21st, 26th; Beverly, 2d, 11th, 16th, 21st, 22d, 26th; Egg Harbor City, 1st, 12th, 17th, 21st, 26th; Woodbury, 17th, 21st, 22d, 26th; *Solar Halos*—Rancocas, 11th; Oceanic, 11th; Moorestown, 11th. *Polar Bands*—Moorestown, 27th.

NUMBER OF MARRIAGES, BIRTHS AND DEATHS,

BY COUNTIES, CITIES AND TOWNSHIPS, AND TOTALS FOR THE STATE, FOR THE YEAR ENDING JUNE 30TH, 1891.

ATLANTIC COUNTY.

	M.	B.	D.
Absecon, Town of	5	8	10
Atlantic City	197	313	288
Buena Vista	6	9	7
Egg Harbor City	25	52	34
Egg Harbor Township	26	60	62
Galloway	10	40	24
Hamilton	11	35	23
Hammonton	27	85	63
Mullica	2	9	13
Weymouth	1	5	1
	310	616	525

BERGEN COUNTY.

	M.	B.	D.
Boiling Spring	4	23	26
Englewood	45	47	96
Franklin	27	41	34
Harrington	24	25	46
Hohokus	15	42	48
Lodi	48	134	82
Midland	6	38	28
New Barbadoes	47	150	91
Orvil	7	28	26
Palisade	10	34	39
Ridgefield	21	78	90
Ridgewood	11	24	28
Saddle River	6	35	34
Union	28	59	54
Washington	16	72	52
	315	830	774

BURLINGTON COUNTY.

	M.	B.	D.
Bass River	8	19	19
Beverly	24	23	39
Bordentown	39	96	88
Burlington	82	116	151
Chester	15	71	62
Chesterfield	16	12	15
Cinnaminson	29	53	51
Delran	18	38	36
Eastampton	.....	7	13
Evesham	10	22	22
Florence	5	37	28
Little Egg Harbor	11	40	20
Lumberton	1	15	12
Mansfield	9	34	26
Medford	7	32	34
Mount Laurel	1	22	10
New Hanover	30	25	27
Northampton	47	110	126
Pemberton	17	14	31
Randolph	5	4	4
Shamong	3	16	9
Southampton	11	14	9
Springfield	3	15	14
Washington	.....	11	4
Westampton	1	1	10
Willingboro	.....	8	5
Woodland	.....	.....	2
	392	855	867

CAMDEN COUNTY.

	M.	B.	D.
Camden City	*3,939	1,276	1,407
Center	5	58	45
Delaware	2	18	20
Gloucester City	50	114	146
Gloucester	6	72	82
Haddon	33	92	54
Stockton	51	132	144
Waterford	13	75	35
Winslow	5	55	30
	4,104	1,892	1,963

* Marriages of non-residents, 3,073.

CAPE MAY COUNTY.

	M.	B.	D.
Cape May City	23	51	35
Dennis	22	31	33
Lower	15	39	31
Middle	10	51	36
Upper	15	40	35
	85	212	170

CUMBERLAND COUNTY.

	M.	B.	D.
Bridgeton	116	315	228
Commercial	26	37	3
Deerfield	12	26	33
Downe	18	19	9
Fairfield	5	25	21
Greenwich	5	8	19
Hopewell	11	18	37
Landis	79	168	116
Lawrence	5	28	28
Maurice River	7	38	39
Millville	85	233	170
Stoe Creek	6	5	16
	375	950	719

ESSEX COUNTY.

	M.	B.	D.
Belleville	16	86	68
Bloomfield	41	137	115
Caldwell	13	39	42
Clinton	18	60	40
East Orange	103	267	189
Franklin	13	46	28
Livingston	3	15	11
Millburn	8	52	41
Montclair	52	212	121
Newark	1,704	4,810	4,420
Orange	173	485	397
South Orange	24	68	63
West Orange	15	59	65
	2,188	6,386	5,590

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton	22	16	34
Deptford	7	45	30
East Greenwich	6	14	19
Franklin	12	37	22
Glassboro	22	74	33
Greenwich	9	32	31
Harrison	9	34	25
Logan	6	23	15
Mantua	22	26	32
Monroe	30	40	38
South Harrison	7	15	8
Washington	9	35	21
West Deptford	4	31	18
Woodbury	50	106	63
Woolwich	16	52	40
	231	580	429

HUDSON COUNTY.

	M.	B.	D.
Bayonne	117	510	412
Guttenberg	23	88	53
Harrison	34	249	274
Hoboken	447	1,306	1,139
Jersey City	1,187	3,140	4,386
Kearny	19	182	171
North Bergen	26	56	262
Town of Union	120	168	289
Union	7	58	42
Weehawken	6	27	50
West Hoboken	90	323	271
	2,076	6,137	7,349

HUNTERDON COUNTY.

	M.	B.	D.
Alexandria	5	10	17
Bethlehem	7	36	36
Clinton	18	34	19
Delaware	13	41	47
East Amwell	16	16	16
Franklin	13	20	19
Frenchtown	10	15	16
High Bridge	21	31	27
Holland	19	12	26
Kingwood	8	15	18
Lambertville	54	77	87
Lebanon	30	43	34
Raritan	24	35	49
Readington	25	17	30
Tewksbury	27	24	21
Union	7	15	17
West Amwell	2	12	16
	299	453	515

MERCER COUNTY.

	M.	B.	D.
East Windsor	37	33	38
Ewing	7	19	98
Hamilton	13	33	95
Hopewell	24	45	66
Lawrence	7	18	20
Princeton	30	68	78
Trenton	*642	667	929
Washington	3	1	19
West Windsor	10	14	15
	773	898	1,358

* Marriages of non-residents, 88.

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury	9	23	26
East Brunswick	24	46	35
Madison	5	20	12
Monroe	6	39	33
New Brunswick	137	294	327
North Brunswick	11	28	17
Perth Amboy	88	180	234
Piscataway	27	53	56
Raritan	24	49	70
Sayreville	27	60	42
South Amboy	25	83	75
South Brunswick	16	47	43
Woodbridge	10	101	84
	409	1,023	1,054

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic	2	15	23
Eatontown	15	24	36
Freehold	46	106	90
Holmdel	12	18	26
Howell	41	62	35
Long Branch	75	125	93
Manalapan	16	16	19
Marlboro	8	11	28
Matawan	22	60	74
Middletown	32	98	103
Millstone	6	25	24
Neptune	129	109	190
Ocean	4	5	12
Raritan	41	98	62
Shrewsbury	72	111	155
Upper Freehold	29	56	48
Wall	88	101	83
	588	1,039	1,101

MORRIS COUNTY.

	M.	B.	D.
Boonton	25	27	32
Chatham	32	61	80
Chester	6	29	32
Hanover	23	54	129
Jefferson	14	26	23
Mendham	9	19	14
Montville	8	6	24
Morristown	62	194	135
Mount Olive	11	29	31
Passaic	12	14	32
Pequannock	17	62	37
Randolph	57	147	119
Rockaway	40	106	78
Roxbury	14	68	54
Washington	9	40	32
	339	882	852

OCEAN COUNTY.

	M.	B.	D.
Berkeley	1	12	13
Brick	37	77	71
Dover	28	64	37
Eagleswood	7	13	20
Jackson	19	19	21
Lacey	5	11	10
Manchester	7	17	15
Ocean		9	4
Plumsted	8	26	11
Stafford	11	12	27
Union	14	22	13
	137	282	242

PASSAIC COUNTY.

	M.	B.	D.
Acquackanonk	10	22	34
Little Falls	11	59	31
Manchester	5	47	32
Passaic	91	352	332
Paterson	773	2,040	1,867
Pompton	23	45	25
Wayne	10	26	24
West Milford	14	14	42
	937	2,605	2,387

SALEM COUNTY.

	M.	B.	D.
Alloway	14	20	27
Elsinboro	1	1	9
Lower Alloways Creek	15	22	20
Lower Penns Neck	7	17	15
Mannington	4	9	29
Oldmans	6	32	14
Pilesgrove	14	49	70
Pittsgrove	6	83	35
Quinton	7	28	25
Salem	59	95	93
Upper Penns Neck	30	52	22
Upper Pittsgrove	15	24	15
	178	432	374

SOMERSET COUNTY.

	M.	B.	D.
Bedminster	7	33	32
Bernards	15	26	29
Branchburg	2	11	19
Bridgewater	74	182	180
Franklin	22	51	75
Hillsborough	11	27	45
Montgomery	7	13	26
North Plainfield	27	78	57
Warren	6	4	17
	171	425	430

SUSSEX COUNTY.

	M.	B.	D.
Andover	6	14	16
Byram	9	33	11
Frankford	8	20	32
Green	7	19	18
Hampton	2	9	9
Hardyston	22	4	32
Lafayette	11	10	15
Montague		2	7
Newton	31	37	38
Sandyston	8	11	15
Sparta	15	15	27
Stillwater	8	14	5
Vernon	6	16	16
Walpack		2	12
Wantage	25	35	47
	159	241	300

UNION COUNTY.

	M.	B.	D.
Clark		2	3
Cranford		2	16
Elizabeth	338	975	755
Fanwood	8	18	16
Linden	9	11	35
New Providence	2	13	21
Plainfield	92	280	198
Rahway	77	70	126
Springfield	9	23	14
Summit	16	50	46
Union	4	19	33
Westfield	13	46	43
	568	1,459	1,306

WARREN COUNTY.

	M.	B.	D.
Allamuchy	.....	10	8
Belvidere	28	35	22
Blairstown	11	29	18
Franklin	12	18	13
Frelinghuysen	4	10	9
Greenwich	12	17	18
Hackettstown	24	32	42
Hardwick	2	8	7
Harmony	7	22	13
Hope	6	16	12
Independence	13	18	9
Knowlton	122	24	18
Lopatcong	.....	39	18
Mansfield	12	20	25
Oxford	31	95	73
Pahaquarry	.....	2	3
Phillipsburg	*328	172	138
Pohatcong	7	40	24
Washington	52	78	65
	671	685	535

*Marriages of non-residents, 250.

TOTALS OF MARRIAGES, BIRTHS AND DEATHS FOR ALL THE COUNTIES.

	M.	B.	D.
Atlantic	310	616	525
Bergen	315	830	774
Burlington	392	855	867
Camden	4,104	1,892	1,963
Cape May	85	212	170
Cumberland	375	950	719
Essex	2,188	6,386	5,590
Gloucester	231	580	429
Hudson	2,076	6,137	7,349
Hunterdon	299	453	515
Mercer	773	898	1,353
Middlesex	409	1,023	1,054
Monmouth	588	1,039	1,101
Morris	339	882	852
Ocean	137	282	242
Passaic	937	2,605	2,387
Salem	178	432	374
Somerset	171	425	430
Sussex	159	241	300
Union	568	1,459	1,306
Warren	671	685	535
	15,305	28,882	28,840

RETURNS OF DEATHS FROM ALL CAUSES.

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, 1891, by Counties.

COUNTIES. Statistical Divisions.	DEATHS AT ALL AGES.													PRINCIPAL CAUSES OF DEATHS.																		
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population of 1891 *	Death-rate per 1,000.	Death-rate per 1,000 without cities of over 5,000.	Deaths under five in each 100, or comparison of these with total deaths.	Number of deaths from chief preventable diseases.	Comparative number of deaths in each 100 from chief preventable diseases.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Atlantic	130	62	50	150	130	3	525	30,132	17.42	14.76	36.57	194	36.95	.....	9	3	5	5	29	2	66	37	38	57	26	35	18	46	23	18	5	3	30
Bergen	166	60	65	252	228	3	774	48,695	15.90	.....	29.19	229	29.59	4	16	4	4	10	24	1	83	40	43	141	40	51	39	82	33	19	4	19	46
Burlington	165	89	87	250	270	6	867	58,722	14.76	13.33	29.30	287	33.10	5	30	11	.....	14	44	2	75	60	46	110	40	63	41	76	57	30	8	10	40
Camden	517	292	230	547	365	12	1,963	89,887	21.84	17.22	41.21	811	41.31	11	53	22	.....	32	216	4	265	95	113	168	165	120	61	132	100	48	3	15	89
Cape May	34	9	16	49	59	3	170	11,372	14.95	.....	25.29	55	32 35	1	3	2	1	1	10	1	18	10	8	6	8	10	9	32	19	6	1	.....	7
Cumberland	141	95	93	174	209	7	719	46,129	15.59	13.27	32.82	274	38.11	3	23	5	1	5	78	2	64	51	42	66	45	66	28	64	41	20	1	8	28
Essex	1432	668	448	1957	1074	11	5,590	264,564	21.13	13.24	37.57	2,060	36.85	39	163	50	22	61	273	19	629	465	339	762	440	354	252	420	293	120	10	52	212
Gloucester	113	38	48	99	129	2	429	23,858	14.86	.....	35.20	132	30.77	.....	13	5	.....	3	19	1	46	34	21	43	28	34	19	42	23	9	2	2	23
Hudson	1884	1244	644	2560	1004	13	7,349	282,082	26.05	26.21	42.56	2,725	37.08	56	211	105	114	42	556	26	797	460	358	1253	661	380	279	412	369	119	7	77	378
Hunterdon	86	28	28	141	231	1	515	35,355	14.57	.....	22.14	140	27.18	1	12	3	4	1	16	1	40	35	27	63	14	50	32	89	36	21	1	5	12
Mercer	308	168	112	417	339	14	1,358	82,616	16.44	18.88	35.05	467	34.39	7	29	13	8	17	69	6	147	94	77	145	79	86	76	161	65	33	.....	18	60
Middlesex	227	126	85	322	280	14	1,054	62,863	16.77	14.48	33.49	349	33.11	14	26	11	16	24	41	3	114	48	52	169	51	80	56	89	53	27	5	15	55
Monmouth	270	98	77	309	340	7	1,101	70,488	15.62	16 04	33.42	366	32.21	6	22	2	4	10	32	2	153	64	71	144	53	92	40	115	72	25	3	8	56
Morris	156	69	49	274	297	7	852	54,766	15.56	15.38	27.58	218	25.59	6	8	5	11	7	18	1	62	40	60	112	43	81	32	142	47	22	5	9	40
Ocean	34	26	21	69	90	2	242	16,061	15.07	.....	24.79	80	33.06	.....	3	4	1	5	7	1	31	17	11	20	7	26	8	24	21	8	5	1	18
Passaic	620	405	237	702	418	5	2,387	109,380	21.82	13.33	42.94	908	38.04	8	31	25	42	26	206	7	287	145	131	411	172	160	73	118	126	47	3	19	115
Salem	87	32	24	90	139	2	374	25,151	14.87	14.46	31.82	117	31.28	1	6	2	.....	4	8	...	47	22	27	37	12	40	18	44	32	12	1	4	9
Somerset	78	20	28	124	177	3	430	28,488	15.09	.....	22.79	116	26.98	4	8	4	3	3	6	1	37	25	25	64	12	47	21	53	34	9	1	6	25
Sussex	45	21	23	77	128	6	300	22,259	13.48	.....	21.67	78	26.00	2	6	.....	1	1	6	...	33	13	16	53	10	37	13	39	19	8	1	7	9
Union	337	147	96	421	302	3	1,306	74,592	17.51	13.50	37.06	419	32.08	11	14	10	3	19	69	5	135	83	70	208	96	99	53	107	68	23	8	10	83
Warren	105	54	47	148	179	2	535	36,319	14 73	14.41	29.72	156	29.16	1	9	2	10	9	10	...	62	21	32	69	27	46	32	46	42	18	2	8	30
Totals	6935	3751	2508	9132	6388	126	28,840	1478,784	19 50	15.41	37.05	10,181	35 30	180	695	288	250	299	1737	85	3191	1849	1607	4101	2029	1960	1200	2333	1573	642	76	296	1365

* The population is estimated upon the increase from the State Census of 1885 to the National Census of 1890. Where there was a decrease the population of 1890 is given.

NOTE.—Small-pox is omitted in the tables, because no cases were reported up to July 1st, 1891.

NOTE.—Under the heading "Number of deaths from chief preventable diseases," the first eleven diseases are classified, including consumption, male and female. Of those dying under one year, 2,075 died under one month, of which 1,421 died in the large cities. Of those dying under one year, 4,831 died in the large cities. Of the 10,636 that died under five years, 7,704 died in the large cities. Total death rate from consumption for the State, as compared with the total deaths, 11.98; the deaths being 2,314 in cities, 1,142 outside. Rates for short periods, or which deal with small numbers, are only approximate, since temporary causes may have been in operation, and small numbers do not eliminate or balance errors, which practically disappear in larger aggregates. The number of deaths before twenty, in proportion to the rest, is much more informatory as to local causes affecting health than the total deaths. See, also, number dying from preventable diseases.

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey of Over 5,000 Population, for the Year Ending June 30th, 1891.

CITIES HAVING OVER 5,000 POPULATION. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population, 1891.	Death-rate per 1,000.	Deaths under five in each 100, or comparison of these with total deaths.	Number of deaths from chief preventable diseases.	Comparative number of deaths in each 100 from chief preventable diseases.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous disease of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal	Accident.
Atlantic County.																																
Atlantic City	*77	38	25	96	51	1	288	14,077	†20.46	39.93	93	34.38	.....	7	1	1	4	15	2	42	12	15	32	16	24	11	24	14	9	1	2	19
Burlington County.																																
Bordentown	12	9	5	26	34	2	88	4,232	20.79	23.86	24	27.27	.....	2	2	.....	2	2	...	6	6	4	6	3	10	6	7	7	2	1	.....	9
Burlington	21	17	19	53	41	.....	151	7,386	20.44	25.17	50	33.11	.....	7	.....	.....	1	10	1	7	15	9	19	12	15	12	8	7	3	2	2	8
Camden County.																																
Camden City	369	239	175	389	229	6	1,407	59,398	23.68	43.21	631	44.85	9	33	19	.....	24	192	3	197	67	87	113	121	79	43	81	60	35	3	14	51
Gloucester City	40	16	14	45	30	41	146	6,683	21.85	38.36	53	36.30	.....	5	.....	.....	5	5	...	20	8	10	14	7	9	5	9	10	8	...	.....	15
Cumberland County.																																
Bridgeton	51	35	44	41	52	5	228	11,695	19.50	37.72	98	42.98	2	8	5	.....	2	40	1	19	7	14	18	14	21	8	18	9	8	...	3	8
Millville	39	32	23	42	33	1	170	10,237	16.61	41.76	85	51.76	.....	10	.....	1	1	27	...	20	17	12	14	11	11	3	13	5	2	1	.....	5
Essex County.																																
Newark	1156	545	338	1586	787	8	4,420	186,598	23.69	38.45	1,643	37.17	32	134	45	15	52	196	12	523	366	268	597	370	264	185	332	242	98	6	37	181
Orange	85	67	43	146	55	1	397	19,566	20.29	36.29	161	40.55	1	9	3	2	2	41	2	33	45	23	66	28	19	24	24	9	5	...	3	9
Hudson County.																																
Bayonne	139	60	37	124	52	.....	412	20,223	20.37	48.30	140	33.98	2	7	11	3	1	14	2	62	22	16	60	48	15	15	19	27	1	...	3	27
Harrison	76	44	17	104	33	.....	274	8,644	31.70	43.80	85	32.12	7	2	3	8	5	10	...	31	13	9	56	35	12	8	18	21	3	...	2	15
Hoboken	305	186	83	404	158	3	1,139	44,833	25.41	43.11	423	37.14	2	14	10	14	4	93	4	140	92	50	184	95	75	42	70	52	20	...	9	65
Jersey City	1068	709	418	1618	567	6	4,386	164,901	26.60	40.52	1,571	35.82	33	167	63	70	28	292	14	407	272	232	794	395	230	174	203	223	82	6	54	224
Town of Union	74	84	31	62	38	.....	289	11,092	26.05	54.67	145	50.17	3	5	10	5	.....	53	2	44	12	11	38	25	10	11	15	14	3	1	3	2
Mercer County.																																
Trenton	247	153	88	261	169	11	929	59,896	15.51	43.06	343	36.92	3	15	13	7	10	67	2	116	69	41	104	67	44	48	79	40	28	...	12	35

* Probably due to infants brought to the city sick.

† This death-rate is calculated on the resident population, whereas the real population is often several times larger, and on account of this floating population, the death-rate is not a criterion of health conditions.

Return of Deaths from all Causes and Certain Specified Diseases, in the Cities of the State of New Jersey, of Over 5,000 Population, for the Year Ending June 30th, 1891.

CITIES HAVING OVER 5,000 POPULATION. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population, 1891.	Death-rate per 1,000.	Deaths under five in each 100, or comparison of these with total deaths.	Number of deaths from chief preventable diseases.	Comparative number of deaths in each 100 from chief preventable diseases.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Middlesex County.																																
New Brunswick	52	38	21	112	96	8	327	18,672	17.51	27.52	98	29.97	3	6	4	7	8	5	1	26	21	17	65	15	29	24	29	15	12	2	6	11
Perth Amboy	68	49	28	62	27	.....	234	10,152	23.05	50.00	99	42.31	5	9	1	2	2	29	...	38	6	7	37	14	8	11	7	8	.....	...	3	15
Monmouth County.																																
Long Branch	16	9	5	34	26	3	93	7,649	12.16	26.88	31	33.33	.....	1	.....	.....	.....	6	...	7	9	8	8	4	14	.....	10	4	1	...	2	10
Morris County.																																
Morristown	14	10	7	44	58	2	135	8,156	16.55	17.78	36	26.67	.....	1	.....	.....	.....	5	...	10	7	13	16	3	13	5	24	9	4	3	3	5
Passaic County.																																
Passaic City	99	71	34	81	47	.....	332	13,968	23.77	51.21	135	40.66	2	11	.....	10	.....	32	...	52	21	7	57	34	18	6	13	19	8	...	1	14
Paterson	475	310	186	571	322	3	1,867	81,361	22.95	42.04	715	38.30	3	17	22	31	26	161	7	217	113	118	333	123	124	63	91	93	38	2	14	87
Salem County.																																
Salem City	21	8	3	22	39	....	93	5,516	16.86	31.18	23	24.73	.....	3	.....	.....	1	.....	...	10	6	3	9	6	12	1	13	10	4	...	.....	2
Union County.																																
Elizabeth	221	102	52	251	129	.....	755	38,893	19.41	42.78	240	31.79	5	5	4	.....	15	51	3	79	42	36	138	59	43	26	60	32	9	4	7	50
Plainfield	47	20	15	61	53	2	198	11,737	16.87	33.84	63	31.82	1	3	5	2	4	4	...	24	8	12	27	11	22	10	22	9	4	2	2	10
Rahway	27	8	16	36	39	.....	126	7,153	17.61	27.78	41	32.54	1	2	.....	1	.....	4	1	12	11	9	16	14	12	10	10	4	3	...	.....	10
Warren County.																																
Phillipsburg	32	14	14	44	34	.....	138	8,761	15.75	33.33	47	34.06	.....	4	1	4	1	2	...	19	5	11	13	9	8	7	6	14	6	...	2	11
Totals	4831	2873	1741	6315	3199	63	19,022	841,479	22.37	40.50	7,095	37.30	114	487	222	183	198	1359	67	2161	1272	1042	2828	1539	1141	758	1205	957	391	34	184	898

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, 1891.

ATLANTIC COUNTY. Population, 30,132. 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.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Absecon	4	....	....	3	3	....	10	....	....	....	....	....	....	....	....	....	3	2	2	2	....	....	....	....	....	....	....	....	....
*Atlantic City	77	38	25	96	51	1	288	14,077	20.46	....	7	1	1	4	15	2	42	12	15	32	16	24	11	24	14	9	1	2	19
Buena Vista	7	....	....	....	....	....	7	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Egg Harbor City	8	....	8	6	12	....	34	....	....	....	....	....	....	....	4	....	2	6	1	4	4	2	....	....	....	1	....	....	2
Egg Harbor Township	13	6	3	17	22	1	62	....	....	....	....	....	....	....	2	....	9	6	8	6	4	4	2	4	....	1	....	....	2
Galloway	3	3	3	6	10	....	24	....	....	....	1	....	....	....	1	....	3	....	4	2	1	1	1	8	4	....	....	1	2
Hamilton	4	5	2	3	9	....	23	....	....	....	....	1	....	....	3	....	1	3	1	2	1	....	6	2	2	3	....	....	....
Hammonton	11	8	9	18	16	1	63	....	....	....	1	1	3	....	2	....	3	8	5	2	1	....	....	2	2	....	....	....	4
Mullica	3	2	....	2	6	....	13	....	....	....	....	....	....	1	1	....	2	1	2	....	....	....	....	2	....	1	1	....	....
Weymouth	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
Totals	130	62	50	150	180	3	525	30,132	17.42	....	9	3	5	5	29	2	66	37	38	57	28	35	18	46	23	18	5	3	30

*This and all other cities that are health resorts have an excessive death-rate by reason of temporary increase of population, which also includes a proportion of invalids above the average. Local Boards show this on their record.

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, 1891.

BERGEN COUNTY. Population, 48,695. 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.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Bolling Spring	3	1	3	9	6	....	26	....	....	....	....	....	....	....	....	....	5	3	....	2	....	....	1	....	....	....	....	1	5
Englewood	20	11	8	39	13	....	95	....	....	....	....	....	1	....	....	....	8	2	7	10	2	6	1	4	4	6	....	7	4
Franklin	7	2	1	8	16	....	34	....	....	2	6	....	....	2	2	....	3	....	....	4	....	5	....	7	3	1	....	1	2
Harrington	4	2	6	16	18	....	46	....	....	1	2	....	1	....	....	....	2	1	4	16	2	2	3	6	1	1	....	1	3
Hohokus	11	5	4	10	20	....	48	....	....	....	1	....	1	1	1	1	5	2	4	10	2	7	2	3	1	1	....	1	2
Lodi	25	10	5	24	18	....	82	....	....	....	1	1	1	1	3	....	11	3	4	20	7	5	5	5	1	....	....	1	5
Midland	5	2	1	11	9	....	28	....	....	....	1	....	....	....	....	....	2	1	1	3	1	1	4	7	....	1	....	....	1
New Barbadoes	15	8	10	29	29	....	91	....	....	....	....	....	....	1	4	....	9	5	4	12	4	5	8	12	5	1	1	3	5
Orvil	4	....	3	7	12	....	26	....	....	....	....	....	....	....	2	....	1	2	1	7	....	3	3	3	1	....	....	....	....
Palisade	6	2	2	16	13	....	39	....	....	....	....	....	....	....	2	....	5	3	3	7	....	1	4	7	1	....	....	2	3
Ridgefield	16	8	10	34	22	....	90	....	....	....	....	1	....	....	6	....	9	11	5	19	4	5	2	9	5	1	....	3	5
Ridgewood	7	....	3	13	5	....	28	....	....	1	....	....	....	....	....	....	2	2	1	6	2	2	1	6	....	1	....	....	1
Saddle River	7	3	2	13	8	1	34	....	....	....	2	....	....	....	....	....	6	2	5	2	....	3	1	1	7	1	....	....	1
Union	18	5	6	16	7	2	54	....	....	....	2	2	....	3	....	....	10	....	5	6	3	2	....	3	1	3	....	1	8
Washington	13	3	1	7	28	....	52	....	....	....	1	....	....	2	....	1	5	3	1	8	3	2	6	7	3	3	1	1	1
Totals	166	60	65	252	228	3	774	48,695	15.90	4	16	4	4	10	24	1	83	40	43	141	40	54	39	82	33	19	4	19	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, 1891.

BURLINGTON COUNTY. Population, 58,722. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Bass River	4	3	....	2	9	1	19	....	....	....	....	....	....	....	....	....	....	....	1	....	7	....	....	....	1	....	....	....	....
Beverly	5	2	5	17	9	1	39	....	....	....	2	1	....	....	1	....	2	....	....	....	3	....	....	....	....	....	....	....	3
Bordentown	12	9	5	28	34	2	88	4,232	20.79	....	2	2	....	....	2	....	4	4	6	4	4	6	3	10	4	1	1	....	2
Burlington	21	17	19	53	41	....	151	7,886	20.44	....	7	....	....	1	10	1	7	15	9	19	12	15	12	8	7	3	2	2	8
Chester	15	4	6	17	20	....	62	....	....	....	2	....	....	....	6	....	7	3	2	5	2	4	6	5	2	5	....	1	....
Chesterfield	2	3	7	3	....	....	15	....	....	....	2	....	....	....	1	....	....	1	1	2	5	....	2	5	....	....	....	....	....
Cinnaminson	11	3	4	17	16	....	51	....	....	....	2	2	....	3	1	....	2	7	2	3	2	7	1	6	2	3	....	....	2
Delran	9	3	3	5	16	....	36	....	....	1	1	2	....	....	....	....	2	7	3	7	2	....	1	6	2	4	....	....	2
Eastampton	2	4	2	2	3	....	13	....	....	....	....	....	....	....	3	....	1	1	1	1	2	1	1	2	2	2	1	1	2
Evesham	4	1	4	7	6	....	22	....	....	....	1	....	....	....	2	....	2	1	5	3	....	....	....	3	....	....	....	1	....
Florence	8	4	5	7	3	1	28	....	....	....	....	....	....	....	5	....	4	....	....	3	2	....	....	1	2	1	....	....	....
Little Egg Harbor	6	....	2	6	6	....	20	....	....	....	....	....	....	....	....	....	2	2	2	1	2	1	2	4	1	1	....	1	1
Lumberton	3	3	....	3	3	....	12	....	....	....	....	....	....	....	....	....	5	....	2	....	....	....	....	....	1	1	1	....	....	....
Mansfield	4	2	2	7	10	1	26	....	....	....	....	....	....	....	....	....	2	2	....	2	....	....	....	1	2	....	....	....	1
Medford	8	2	1	6	17	....	54	....	....	....	1	2	....	....	....	....	3	2	1	7	3	....	1	2	3	1	1	....	4
Mount Laurel	3	....	....	2	5	....	10	....	....	....	....	....	....	....	....	....	2	1	....	1	1	....	....	1	1	....	....	....	....	2
New Hanover	8	3	2	10	4	....	27	....	....	....	....	1	....	....	....	....	1	2	....	1	3	....	....	....	2	....	....	....	....	....
Northampton	22	16	14	32	42	....	126	....	....	1	5	2	....	2	11	1	12	8	5	21	5	7	5	15	7	3	2	3	5
Pemberton	4	4	2	12	9	....	31	....	....	1	....	....	....	....	1	....	5	2	....	3	....	1	4	2	3	1	....	1	1
Randolph	1	....	....	1	2	....	4	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	1	....	....	....	....	....
Shamong	3	1	1	2	2	....	9	....	....	1	1	....	....	....	....	....	2	....	....	1	....	....	....	1	1	....	....	....	....	....
Southampton	2	1	....	4	2	....	9	....	....	....	....	....	....	....	....	....	1	3	1	....	1	....	....	....	1	1	....	....	....	....
Springfield	2	2	2	6	2	....	14	....	....	....	1	....	....	....	1	....	1	....	1	1	....	....	....	1	1	....	....	....	....	2
Washington	1	....	1	....	2	....	4	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	1	1	....	1	....	....	....	....
Westampton	3	1	....	1	5	....	10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....
Willingboro	1	1	....	2	1	....	5	....	....	....	....	....	....	....	....	....	2	1	....	1	....	....	....	....	2	....	....	....	....	....
Woodland	1	....	....	....	1	....	2	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....
Totals	165	89	87	250	279	6	867	58,722	14.76	5	30	11	....	14	44	2	75	60	46	110	40	63	41	76	57	30	8	10	40

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, 1891.

CAMDEN COUNTY. Population, 89,887. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Camden City	369	239	175	389	229	6	1,407	59,398	23.68	9	33	19	....	24	192	5	197	67	87	113	121	79	43	81	60	35	3	14	51
Centre	17	4	5	9	11	....	45	....	....	....	....	....	....	....	1	....	8	3	3	1	7	2	1	7	1	....	....	....	2
Delaware	7	1	2	2	8	....	20	....	....	....	....	....	....	....	....	....	4	2	1	1	3	1	....	1	2	....	....	1	....
Gloucester City	40	16	14	45	30	1	146	6,683	21.85	....	5	....	....	5	5	....	20	8	10	14	7	9	5	9	10	3	....	....	15
Gloucester	11	6	6	27	29	3	82	....	....	....	3	....	....	....	6	....	7	2	1	7	3	10	2	16	11	3	....	....	....
Haddon	14	2	7	11	20	....	54	....	....	....	....	....	....	1	2	....	7	1	2	8	3	7	1	5	5	3	....	....	3
Stockton	43	18	16	46	19	2	144	....	....	2	8	3	....	1	7	....	14	9	4	14	17	8	7	4	5	3	....	....	14
Waterford	7	4	5	9	10	....	35	....	....	1	....	....	....	1	....	....	4	2	....	3	4	3	1	4	2	1	....	....	2
Winslow	9	2	1	9	9	....	30	....	....	1	....	....	....	....	1	....	4	1	1	5	3	2	1	3	4	....	....	....	2
Totals	517	292	230	547	365	12	1,963	89,887	21.84	11	53	22	....	32	216	4	265	95	113	168	165	120	61	132	100	48	3	15	89

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, 1891.

CAPE MAY COUNTY. Population, 11,372. 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.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary disease.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
Cape May City	8		1	13	13		35			1					2		5	2		1	2	2	2	8	4	2			2
Dennis	7	2	3	2	3		17				1	2	1		2		3		2	2	2	2	2	5	1				
Lower	7	3	2	6	13		31								2		3	2	3	1	1		2	7	1	1			3
Middle	4	2	2	13	13	1	36				2				2		3	3	1	2	1	1	1	8	6				1
Upper	8	2	7	8	9	1	35							1	3	1	4	1	2		1	1	2	4	7	2	1		1
Totals	34	9	16	49	69	3	170	11,372	14.95	1	3	2	1	1	10	1	18	10	8	6	8	10	9	32	19	6	1		7

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, 1891.

CUMBERLAND COUNTY. Population, 46,129. 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.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary disease.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
Bridgeton	51	35	44	41	52	5	228	11,695	19 50	2	8	5		2	40	1	19	7	14	18	14	21	8	18	8	8		5	8
Commercial				1	2		3																	2					
Deerfield	3	6	2	14	8		33																						
Downe		1	3	3	5		9										5	3		2	2	5	4	2	3	1			4
Fairfield	3	6	3	4	5		21									1		2		1									
Greenwich	6	1	4	4	4		19			1					6		2	1	1	2	2	3		1	2		1			
Hopewell	3	1	3	8	22		37							1			2	1	2	1	2	1			1	1			2
Landis	16	8	11	37	45	1	118																						
Lawrence	9	1		6	12		28				4				3		10	13	8	9	6	15	7	11	7	4		2	2
Maurice River	11	5	1	7	15		39							1			4	1	2	1	1	2	2	6	3				
Millville	39	32	23	42	33	1	170	10,257	16.61		10		1	1	27		20	17	12	14	11	11	3	13	5	2	1		1
Stow Creek			1	7	8		16				1				1				2	3		1	1	2					2
Totals	141	95	93	174	209	7	719	46,129	15.59	3	23	5	1	5	78	2	64	51	42	66	45	66	28	64	41	20	1	5	28

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, 1891.

ESSEX COUNTY. Population, 264,564. 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.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
Belleville	19	4	6	22	12	....	63	....	....	3	5	....	....	....	1	....	10	3	1	4	3	6	3	5	2	2	....	5	
Bloomfield	20	9	11	37	37	1	115	....	....	....	2	....	2	1	9	2	7	8	7	17	3	13	6	15	4	....	....	5	
Caldwell	6	2	1	15	18	....	42	....	....	....	1	....	....	....	....	....	4	5	3	7	2	7	4	1	1	....	1	....	1	
Clinton	12	3	1	6	18	....	40	....	....	....	2	....	....	1	1	2	4	2	5	3	3	1	....	6	4	....	....	....	3	
East Orange	51	11	17	50	59	1	189	....	....	....	4	1	....	4	11	....	14	10	11	32	10	16	11	12	6	3	2	4	2	
Franklin	5	....	1	7	10	....	23	....	....	....	....	....	1	....	....	....	....	2	1	4	3	4	....	2	1	....	....	2	2	
Livingston	4	1	1	2	3	....	11	....	....	....	....	....	....	....	....	....	3	....	....	....	....	2	....	2	....	....	....	....	....	
Millburn	8	3	3	16	11	....	41	....	....	3	....	....	....	....	1	....	5	4	3	1	2	5	....	1	1	....	....	....	2	
Montclair	30	12	13	32	34	....	121	....	....	....	3	....	2	1	9	....	12	12	8	16	5	7	10	12	8	2	....	2	1	
Newark	1156	545	338	1586	787	8	4,420	186,598	23.69	32	134	45	15	52	196	12	523	366	268	697	370	264	185	332	242	98	6	37	181	
Orange	85	67	43	146	55	1	397	19,566	20.29	1	9	3	2	2	41	2	33	45	23	66	28	19	24	24	9	5	....	3	9	
South Orange	20	5	8	17	13	....	63	....	....	....	2	1	....	....	1	1	10	6	3	10	6	3	2	2	....	3	....	1	3	
West Orange	16	6	5	21	17	....	65	....	....	....	1	....	....	....	4	....	4	2	8	9	5	9	7	4	5	....	....	....	2	
Totals	1432	668	448	1957	1074	11	5,590	264,564	21.13	39	163	50	22	61	273	19	629	465	339	762	440	354	252	420	293	120	10	52	212	

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, 1891.

GLOUCESTER COUNTY. Population, 28,858. 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.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.	
Clayton	8	6	7	10	4	....	34	....	....	....	1	....	....	1	....	2	3	3	4	3	3	3	....	3	1	....	....	....	1	
Deptford	10	5	2	9	4	....	30	....	....	....	....	....	....	....	....	2	2	....	....	....	....	....	....	....	....	2	....	....	....	....	
East Greenwich	6	1	2	8	2	....	19	....	....	....	1	....	....	....	....	....	2	2	2	1	2	....	4	2	....	....	....	....	1	
Franklin	7	2	....	8	10	....	27	....	....	....	....	....	....	....	....	....	2	....	....	3	2	....	....	....	....	....	....	....	....	....	
Glassboro	9	5	3	6	10	....	33	....	....	....	1	....	....	....	4	....	2	1	2	3	2	3	1	4	....	....	....	....	....	
Greenwich	9	5	4	7	6	....	31	....	....	....	1	1	....	1	3	....	5	2	3	3	2	5	1	2	1	....	1	....	3	
Harrison	5	....	4	6	10	....	25	....	....	....	2	....	....	....	2	....	1	....	2	3	....	1	2	1	....	....	....	....	....	
Logan	4	....	3	4	4	....	15	....	....	....	....	....	....	....	....	....	2	1	....	....	....	....	....	....	1	....	1	....	....	
Mantua	4	6	3	8	11	....	32	....	....	....	....	1	....	....	....	....	2	4	3	3	4	3	1	5	1	....	....	....	....	
Monroe	11	3	7	7	9	1	38	....	....	....	2	....	....	....	3	....	2	2	....	5	4	....	2	4	1	....	....	....	2	
South Harrison	3	....	....	2	3	....	8	....	....	....	....	....	....	1	....	....	....	....	....	....	1	2	....	....	....	....	....	....	....	
Washington	6	....	4	5	6	....	21	....	....	....	1	....	....	....	1	....	2	....	1	3	....	1	2	2	1	....	....	....	....	
West Deptford	7	1	1	5	3	1	18	....	....	....	1	1	....	....	....	....	....	....	....	3	....	1	....	....	....	....	....	....	....	
Woodbury	10	2	3	13	30	....	63	....	....	....	1	....	....	....	2	1	7	....	1	5	2	1	2	3	2	....	....	....	....	
Woolwich	9	3	5	9	14	....	40	....	....	....	1	1	....	....	....	....	....	7	1	6	....	1	1	3	....	....	....	....	....	
Totals	113	38	48	99	129	2	429	28,858	14.86	....	13	5	....	5	19	1	46	24	21	43	28	24	19	42	23	9	2	2	23	

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, 1891.

HUDSON COUNTY. Population, 282,082. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Bayonne	139	60	37	124	52	.....	412	20,223	20.37	2	7	11	3	1	14	2	62	22	16	60	48	15	15	19	27	1	....	3	27
Guttenberg	22	8	1	13	9	.....	53	.....	.....	.....	.....	.....	.....	.....	3	....	13	3	....	7	5	2	....	4	2	1	....	.....	5
Harrison	76	44	17	104	33	.....	274	8,618	31.70	7	2	3	8	5	16	....	31	13	9	50	35	12	8	18	21	3	....	2	15
Hoboken	305	186	83	404	158	3	1,139	44,833	25.41	2	14	10	14	4	93	4	140	92	50	184	95	75	42	70	52	20	....	9	65
Jersey City	1068	709	418	1618	567	6	4,386	161,901	26.60	33	167	63	70	28	295	14	407	272	232	794	395	230	174	203	223	82	6	54	224
Kearny	42	29	11	64	25	.....	171	.....	.....	3	5	....	1	2	12	....	19	14	2	27	18	10	5	14	4	2	....	2	20
North Bergen	54	41	13	85	66	3	262	.....	.....	2	2	3	9	.....	14	....	28	20	20	38	15	10	10	51	10	6	....	2	7
Town of Union	74	84	31	62	38	.....	289	11,092	26.05	3	5	10	5	.....	53	2	44	12	11	38	25	16	11	15	14	3	1	3	2
Union	15	9	3	11	4	.....	42	.....	.....	1	1	1	....	1	4	1	8	1	2	11	3	....	2	2	2	....	....	.....	.....
Weehawken	11	11	2	21	4	1	50	.....	.....	.....	1	....	.....	.....	6	....	5	1	2	12	3	3	1	1	2	.....	.....	1	10
West Hoboken	78	63	28	54	48	.....	271	.....	.....	3	7	4	4	1	52	3	40	10	14	32	19	13	11	15	12	1	.....	1	3
Totals	1884	1244	644	2560	1004	13	7,349	252,082	26.05	56	211	105	114	42	556	26	797	460	358	1253	661	380	279	412	369	119	7	77	378

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, 1891.

HUNTERDON COUNTY. Population, 35,355. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Alexandria	4	.....	1	5	7	.....	17	.....	.....	.....	.....	.....	.....	.....	.....	1	3	1	.....	.....	1	.....	2	4	4	.....	.....	.....	1
Bethlehem	4	1	3	10	18	.....	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4	3	5	.....	1	2	8	2	.....	.....	.....	.....
Clinton	1	.....	.....	6	12	.....	19	.....	.....	.....	2	.....	.....	.....	.....	.....	1	3	1	3	.....	4	.....	2	2	.....	.....	.....	.....
Delaware	7	4	1	14	21	.....	47	.....	.....	.....	.....	.....	1	.....	2	.....	5	3	6	5	1	2	2	8	5	2	.....	1	.....
East Amwell	4	.....	2	1	9	.....	16	.....	.....	.....	1	1	.....	.....	.....	.....	3	1	1	1	1	.....	.....	3	1	1	.....	.....	.....
Franklin	2	.....	1	6	10	.....	19	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	3	1	.....	3	2	1	.....	.....	1	3
Frenchtown	1	.....	.....	8	6	1	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	1	.....	4	2	3	.....	.....	.....	.....	1
High Bridge	5	3	.....	9	10	.....	27	.....	.....	.....	.....	.....	.....	.....	1	1	.....	1	3	1	2	1	2	5	1	1	.....	.....	2
Holland	3	1	.....	8	14	.....	26	.....	.....	.....	2	1	.....	.....	.....	.....	2	1	2	4	.....	1	2	4	2	.....	.....	1	1
Kingwood	2	1	.....	7	8	.....	18	.....	.....	.....	.....	.....	1	.....	.....	.....	2	1	.....	1	1	2	1	3	2	2	.....	.....	1
Lambertville	13	11	11	23	29	.....	87	.....	.....	.....	3	1	1	.....	6	.....	4	6	3	12	2	4	7	15	6	7	.....	.....	.....
Lebanon	14	3	1	7	9	.....	34	.....	.....	.....	1	.....	1	.....	2	.....	4	2	.....	3	2	4	1	3	2	.....	.....	2	.....
Raritan	7	1	.....	13	28	.....	49	.....	.....	1	.....	.....	.....	.....	3	.....	4	3	2	9	.....	6	5	8	2	4	.....	.....	1
Readington	8	2	4	14	22	.....	50	.....	.....	.....	1	.....	.....	.....	.....	.....	5	3	3	7	1	4	5	8	1	3	.....	1	1
Tewksbury	5	1	1	2	12	.....	21	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	3	2	5	.....	4	2	.....	.....	.....	1
Union	2	.....	1	5	9	.....	17	.....	.....	.....	.....	2	.....	.....	.....	1	2	1	.....	3	.....	4	.....	5	2	.....	.....	.....	.....
West Amwell	4	.....	2	3	7	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	.....	.....	.....	.....	5	.....	1	.....	.....	.....
Totals	86	28	28	141	231	1	515	35,355	14.57	1	12	3	4	1	16	1	40	35	27	63	14	50	32	89	36	21	1	5	12

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, 1891.

MERCER COUNTY. Population, 82,616. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
East Windsor	1	1	4	12	20	.....	38	.....	.....	.....	.....	.....	.....	.....	1	.....	2	.....	5	6	.....	6	4	4	5	.....	.....	.....	.....
Ewing	3	2	1	47	39	1	93	.....	.....	1	3	.....	.....	1	1	1	3	6	12	8	.....	4	5	40	5	.....	.....	.....	3
Hamilton	12	6	4	41	32	.....	95	.....	.....	.....	1	.....	.....	3	.....	.....	5	7	8	9	6	9	8	14	6	3	.....	.....	3
Hopewell	13	1	5	20	27	.....	66	.....	.....	1	4	.....	1	1	.....	.....	6	4	3	3	2	3	2	11	3	.....	.....	2	.....
Lawrence	3	2	5	4	6	.....	20	.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	1	3	1	1	.....	2	2	.....	.....	.....	.....
Princeton	17	1	4	26	30	.....	78	.....	.....	1	2	.....	.....	.....	.....	2	7	5	7	8	2	14	7	6	4	1	.....	4	.....
Trenton	247	153	88	261	169	11	929	59,896	15.51	3	15	13	7	10	67	2	116	69	41	104	67	44	48	79	40	28	12	35	.....
Washington	3	1	.....	4	11	.....	19	.....	.....	.....	.....	.....	.....	1	.....	.....	1	2	.....	3	1	1	1	5	.....	1	.....	.....	1
West Windsor	4	1	1	2	5	2	15	.....	.....	1	1	.....	.....	.....	.....	1	6	.....	.....	1	.....	4	1	.....	.....	.....	.....	.....	.....
Totals	308	168	112	417	339	14	1,358	82,616	16.44	7	29	13	8	17	69	6	147	94	77	145	79	86	76	161	65	33	18	60	.....

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, 1891.

MIDDLESEX COUNTY. Population, 62,868. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Cranbury	4	.....	2	7	12	1	26	.....	.....	.....	1	.....	.....	1	.....	1	4	.....	2	2	.....	3	.....	2	2	1	1	1	.....
East Brunswick	7	4	5	9	10	.....	35	.....	.....	2	1	2	3	2	1	.....	2	3	1	3	1	.....	.....	5	1	.....	.....	.....	1
Madison	.....	2	1	4	5	.....	12	.....	.....	1	.....	1	.....	.....	.....	.....	2	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1
Monroe	9	1	4	9	8	2	33	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	3	2	4	4	6	1	3	2	.....	1	.....	.....
New Brunswick	52	38	21	112	96	8	327	18,672	17.51	3	6	4	7	8	5	1	26	21	17	65	15	29	24	29	15	12	2	6	11
North Brunswick	2	1	2	7	5	.....	17	.....	.....	.....	1	1	.....	.....	.....	.....	.....	1	1	2	2	.....	2	3	2	.....	.....	1	1
Perth Amboy	68	49	28	62	27	.....	234	10,152	23.05	5	9	1	2	2	29	.....	38	6	7	37	14	8	11	7	8	.....	.....	3	15
Piscataway	10	3	3	17	23	.....	56	.....	.....	.....	1	.....	1	2	1	.....	5	.....	1	5	2	9	3	6	3	2	.....	1	6
Raritan	7	2	5	18	37	1	70	.....	.....	.....	1	.....	.....	1	1	.....	4	2	6	15	3	6	2	10	4	3	1	.....	5
Sayreville	7	7	5	15	7	1	42	.....	.....	.....	4	1	.....	1	1	.....	6	3	2	4	3	4	.....	1	4	1	.....	.....	4
South Amboy	32	7	4	19	13	.....	75	.....	.....	2	.....	.....	1	2	1	.....	14	1	3	11	3	5	3	4	5	2	.....	2	3
South Brunswick	11	3	2	12	15	.....	43	.....	.....	.....	.....	.....	.....	1	.....	.....	4	.....	5	9	1	4	2	5	1	2	.....	.....	.....
Woodbridge	18	9	3	31	22	1	84	.....	.....	1	2	1	2	4	2	1	6	8	5	11	3	4	4	8	4	4	.....	.....	7
Totals	227	126	85	322	280	14	1,054	62,868	16.77	14	26	11	16	24	41	3	114	48	52	169	51	80	56	89	53	27	5	15	55

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, 1891.

MONMOUTH COUNTY. Population, 70,488. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Atlantic	4	2	.....	3	14	.....	23	.....	.....	.....	.....	.....	.....	1	.....	.....	3	.....	3	2	.....	1	.....	4	3	.....	.....	.....	1
Eatontown	2	7	4	12	11	.....	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	3	6	8	4	1	2	3	1	.....	.....	.....	2
Freehold	16	3	4	32	35	.....	90	.....	.....	.....	1	.....	.....	.....	.....	.....	10	5	8	13	5	7	2	9	7	2	.....	.....	7
Holmdel	6	1	1	9	9	.....	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	3	1	10	1	2	2	2	.....	.....	.....	.....	1
Howell	8	4	1	9	11	2	35	.....	.....	.....	1	.....	.....	.....	3	.....	6	4	2	5	1	1	1	5	1	.....	.....	.....	2
Long Branch	16	9	5	34	26	3	93	7,619	12.16	.....	1	.....	.....	.....	6	.....	7	9	8	8	4	14	.....	10	4	1	.....	2	10
Manalapan	4	2	1	5	7	.....	19	.....	.....	.....	.....	.....	.....	1	.....	.....	3	1	2	1	1	4	1	.....	2	1	1	.....	.....
Marlboro	5	3	3	8	9	.....	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	1	.....	5	1	2	2	3	5	1	.....	1	1
Matawan	18	6	10	17	23	.....	74	.....	.....	.....	.....	.....	1	1	4	1	5	2	8	11	4	6	1	5	8	.....	1	.....	7
Middletown	26	14	6	31	26	.....	103	.....	.....	3	3	1	1	1	5	.....	11	10	5	21	7	8	3	2	4	5	1	1	3
Millstone	3	1	2	9	9	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	1	5	.....	7	2	1	1	.....	.....	1	.....
Neptune	53	16	12	53	56	1	190	.....	.....	1	4	1	.....	1	5	.....	23	8	12	18	8	11	8	32	12	6	.....	.....	6
Ocean	.....	1	2	4	5	.....	12	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	.....	2	.....	2	.....	2	.....	.....	.....	.....	1
Raritan	16	8	9	16	13	.....	62	.....	.....	.....	.....	.....	.....	5	3	.....	12	2	2	8	3	2	.....	2	5	2	.....	.....	3
Shrewsbury	56	11	6	39	42	1	155	.....	.....	2	3	.....	1	.....	2	1	42	11	6	14	7	15	7	12	7	4	.....	1	5
Upper Freehold	9	2	6	8	23	.....	48	.....	.....	.....	1	.....	.....	.....	.....	.....	2	2	3	10	2	1	3	11	2	.....	.....	2	.....
Wall	28	8	5	20	22	.....	83	.....	.....	.....	2	.....	1	.....	2	.....	16	.....	4	3	5	5	3	9	10	2	.....	.....	7
Totals	270	98	77	309	340	7	1,101	70,488	15.62	6	22	2	4	10	32	2	153	64	71	144	53	92	40	115	72	25	3	8	56

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, 1891.

MORRIS COUNTY. Population, 54,766. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Boonton	9	2	1	12	8	.....	32	.....	.....	1	1	.....	.....	1	.....	1	5	2	1	3	2	1	3	2	1	.....	.....	.....	5
Chatham	13	8	7	27	25	.....	80	.....	.....	1	1	5	1	.....	3	.....	4	2	6	10	5	9	3	6	4	2	1	.....	5
Chester	13	3	4	3	9	.....	32	.....	.....	.....	.....	.....	1	.....	2	.....	1	1	1	5	5	3	.....	3	1	1	1	.....	2
Hanover	4	3	4	57	60	1	129	.....	.....	1	.....	.....	.....	.....	.....	.....	2	4	10	11	2	10	3	67	5	3	.....	1	2
Jefferson	4	4	3	4	8	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	.....	.....	3	3	.....	2	3	.....	.....	2	.....
Mendham	2	.....	1	3	8	.....	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	2	1	.....	1	.....	3	.....	1	.....	.....	.....
Montville	5	1	.....	4	14	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2	1	.....	5	3	6	1	.....	.....	.....	1
Morristown	14	10	7	44	58	2	135	8,156	16.55	.....	1	.....	.....	.....	5	.....	10	7	13	16	3	13	5	24	9	4	3	3	5
Mount Olive	5	1	2	11	11	1	31	.....	.....	.....	.....	.....	.....	1	1	.....	2	2	5	7	.....	2	1	1	2	2	.....	.....	.....
Passaic	7	5	.....	8	12	.....	32	.....	.....	.....	.....	.....	.....	.....	3	.....	4	2	1	6	3	1	2	3	4	.....	.....	.....	1
Pequannock	8	5	2	12	10	.....	37	.....	.....	.....	1	.....	.....	2	.....	.....	2	1	1	7	3	6	.....	4	1	.....	.....	3	1
Randolph	30	10	8	40	31	.....	119	.....	.....	.....	2	.....	4	2	2	.....	13	5	8	21	5	11	3	8	8	3	.....	.....	7
Rockaway	24	9	5	26	14	.....	78	.....	.....	2	1	.....	1	1	2	.....	8	3	3	12	2	7	5	6	4	.....	.....	.....	10
Roxbury	12	4	4	13	18	3	54	.....	.....	1	.....	.....	.....	.....	1	.....	3	1	6	8	3	4	3	4	1	5	.....	.....	4
Washington	6	4	1	10	11	.....	32	.....	.....	.....	1	.....	3	.....	.....	.....	2	.....	1	4	4	4	3	3	3	1	.....	.....	2
Totals	156	69	49	274	297	7	852	54,766	15.56	6	8	5	11	7	18	1	62	40	60	112	43	81	32	142	47	22	5	9	40

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, 1891.

OCEAN COUNTY. Population, 16,051. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Berkeley	3	.....	2	2	6	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	2	.....	.....	1	1	.....	.....	1
Brick	11	4	9	23	22	2	71	.....	.....	.....	.....	.....	.....	1	5	.....	8	8	4	8	2	7	5	3	7	2	2	.....	5
Dover	7	4	.....	12	14	.....	37	.....	.....	.....	.....	.....	.....	1	.....	.....	2	2	3	3	3	3	2	6	2	.....	1	.....	3
Eagleswood	2	7	4	7	4	.....	20	.....	.....	.....	1	.....	.....	1	.....	.....	8	1	.....	.....	.....	2	.....	.....	2	1	.....	1	3
Jackson	3	3	1	4	10	.....	21	.....	.....	.....	.....	1	.....	.....	1	.....	3	1	1	3	1	3	.....	2	1	1	.....	.....	1
Lacey	2	2	2	1	3	.....	10	.....	.....	.....	.....	.....	1	.....	1	.....	3	.....	.....	1	.....	.....	1	1	1	.....	.....	.....	.....
Manchester	.....	1	1	3	10	.....	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	2	2	1	.....	.....	1
Ocean	1	.....	.....	2	1	.....	4	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2	.....	1	1	.....	.....	2	1	1	.....	.....	.....
Plumstead	1	1	1	4	4	.....	11	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	1	3	.....	2	.....	1	1	1	.....	.....	.....
Stafford	1	4	5	11	6	.....	27	.....	.....	.....	1	3	.....	1	.....	1	.....	1	1	1	1	2	.....	3	3	1	.....	.....	4
Union	3	.....	.....	.....	10	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	2	.....	.....	.....	2	.....	3	.....	.....	1	.....	.....
Totals	34	26	21	69	90	2	242	16,051	15.07	3	4	1	5	7	1	31	17	11	20	7	26	8	24	21	8	5	1	18

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, 1891.

PASSAIC COUNTY. Population, 109,380. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Acquackanonk	9	2	5	10	8	.....	34	.....	.....	1	.....	1	.....	.....	3	.....	.....	1	.....	3	2	3	2	5	3	1	.....	1	1
Little Falls	11	6	3	5	6	.....	31	.....	.....	.....	2	.....	.....	.....	1	.....	6	3	1	3	4	2	1	.....	1	.....	1	.....	1
Manchester	10	4	.....	12	6	.....	32	.....	.....	1	.....	.....	.....	.....	1	.....	1	2	.....	3	5	4	1	1	3	.....	.....	1	2
Passaic	99	71	34	81	47	.....	332	13,968	23.77	2	11	.....	10	.....	32	.....	52	21	7	57	34	18	6	13	19	8	.....	1	14
Paterson	475	310	186	571	322	3	1,867	81,361	22.95	3	17	22	31	26	161	7	217	113	118	333	123	124	63	91	93	38	2	14	87
Pompton	5	2	2	7	8	1	25	.....	.....	1	1	.....	.....	.....	2	.....	1	2	1	2	1	2	.....	2	3	.....	.....	1	1
Wayne	2	4	3	5	10	.....	24	.....	.....	.....	.....	.....	2	.....	.....	.....	1	1	1	6	1	3	.....	1	2	.....	.....	1	5
West Milford	9	6	4	11	11	1	42	.....	.....	.....	.....	.....	1	.....	6	.....	9	2	3	3	2	4	.....	6	2	.....	.....	.....	4
Totals	620	405	237	702	418	5	2,387	109,380	21.82	8	31	25	42	26	206	7	287	145	131	411	172	160	73	118	126	47	3	19	115

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, 1891.

SALEM COUNTY. Population, 25,151. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Alloway	3	1	2	5	16	.....	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	2	1	4	.....	2	4	4	3	3	.....	.....	1
Elsinboro	3	.....	.....	4	1	1	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	3	.....	.....	.....	.....	.....	2	.....	.....	.....	.....
Lower Alloways Creek	3	1	4	6	.....	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	1	3	.....	7	2	.....	.....	.....	2
Lower Penns Neck	4	1	.....	6	3	1	15	.....	.....	.....	.....	.....	.....	1	.....	.....	2	1	3	2	.....	.....	.....	.....	2	.....	.....	.....	.....
Mannington	7	3	1	8	11	.....	29	.....	.....	1	.....	.....	.....	.....	1	.....	4	2	2	5	.....	3	1	2	2	.....	1	1	.....
Oldmans	6	.....	1	3	4	.....	14	.....	.....	.....	1	.....	.....	.....	.....	.....	2	.....	1	1	.....	3	.....	1	2	.....	.....	.....	.....
Pilesgrove	13	6	5	19	27	.....	70	.....	.....	.....	.....	.....	.....	1	1	.....	5	7	10	8	2	8	4	8	5	4	.....	.....	1
Pittsgrove	7	3	5	7	13	.....	35	.....	.....	.....	1	2	.....	.....	3	.....	4	1	1	2	1	3	5	6	2	.....	.....	.....	2
Quinton	12	3	3	3	4	.....	25	.....	.....	.....	.....	.....	.....	.....	1	.....	6	2	1	2	1	1	.....	1	1	.....	.....	.....	.....
Salem City	21	8	3	22	39	.....	93	5,516	16.86	.....	3	.....	.....	1	.....	.....	10	6	3	9	6	12	1	13	10	4	.....	2	.....
Upper Penns Neck	4	5	.....	6	7	.....	22	.....	.....	.....	1	.....	.....	.....	1	.....	5	1	2	1	.....	1	1	2	1	.....	.....	1	2
Upper Pittsgrove	4	1	1	1	8	.....	15	.....	.....	.....	.....	.....	.....	1	1	.....	1	.....	.....	.....	1	4	2	1	1	.....	.....	.....	1
Totals	87	32	24	90	139	2	374	25,151	14 87	1	6	2	4	8	4	1	47	22	27	37	12	40	18	44	32	12	1	4	9

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, 1891.

SOMERSET COUNTY. Population, 28,488. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Bedminster	4	1	1	5	19	2	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	2	6	.....	4	1	3	1	.....	.....	1	2
Bernards	2	1	.....	12	14	.....	29	.....	.....	3	1	2	.....	.....	.....	.....	.....	3	2	6	1	4	1	2	3	1	.....	.....	2
Branchburg	3	.....	1	6	9	.....	19	.....	.....	.....	.....	.....	.....	.....	.....	1	1	3	3	4	.....	4	1	2	3	1	.....	1	4
Bridgewater	29	4	10	44	43	.....	130	.....	.....	.....	1	2	1	1	2	.....	11	7	7	23	2	11	6	15	9	5	.....	.....	8
Franklin	13	1	6	22	32	1	75	.....	.....	.....	5	.....	2	.....	.....	1	10	3	4	8	2	9	6	11	6	2	.....	.....	1
Hillsborough	10	3	3	10	19	.....	45	.....	.....	.....	1	.....	.....	.....	2	.....	6	1	2	6	3	4	.....	8	2	.....	.....	.....	5
Montgomery	5	1	1	6	13	.....	26	.....	.....	.....	.....	.....	.....	.....	1	.....	3	2	1	1	.....	3	1	6	3	.....	.....	1	2
North Plainfield	9	9	4	15	20	.....	57	.....	.....	1	.....	.....	.....	2	1	.....	5	5	3	10	3	7	2	4	5	1	1	1	2
Warren	3	.....	2	4	8	.....	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	2	2	.....	3	2	4	1	1	.....	.....	1
Totals	78	20	28	124	177	3	430	28,488	15.09	4	8	4	3	3	6	1	37	25	25	64	12	47	21	53	34	9	1	6	25

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, 1891.

SUSSEX COUNTY. Population, 22,259. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Andover	2	1	2	2	9	.....	16	.....	.....	1	.....	.....	.....	1	1	.....	1	2	.....	1	.....	2	.....	2	3	.....	.....	.....	.....
Byram	2	.....	3	2	4	.....	11	.....	.....	.....	.....	.....	.....	.....	1	.....	1	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
Frankford	3	.....	3	9	16	1	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	6	4	1	3	2	2	1	.....	.....	.....	1
Green	3	3	.....	5	5	2	18	.....	.....	.....	1	.....	.....	.....	1	.....	4	.....	.....	2	1	1	1	4	1	.....	.....	.....	1
Hampton	2	.....	.....	1	5	1	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1	.....	1	1	4	1	.....	.....	.....	1
Hardyston	7	4	5	11	5	.....	32	.....	.....	.....	2	.....	.....	.....	.....	.....	11	2	1	3	1	5	.....	1	3	1	.....	1	1
Lafayette	2	.....	2	5	5	1	15	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	3	.....	.....	2	2	1	1	.....	1	.....
Montague	1	.....	1	5	.....	.....	7	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Newton	6	2	4	11	15	.....	38	.....	.....	.....	.....	.....	1	.....	.....	.....	2	2	1	3	1	3	1	5	2	1	.....	2	2
Sandyston	1	2	.....	3	9	.....	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sparta	3	4	2	4	14	.....	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	2	7	2	4	.....	5	1	.....	.....	1	1
Stillwater	2	.....	.....	1	2	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....
Vernon	4	1	.....	6	5	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	1	4	.....	2	1	.....	.....	.....	.....	.....	.....
Walpack	2	1	1	2	6	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	4	.....	1	1	1	2	.....	1	1	.....
Wantage	5	3	.....	10	28	1	47	.....	.....	1	2	.....	.....	.....	1	.....	3	3	2	6	4	7	1	10	2	2	.....	.....	1
Totals	45	21	23	77	128	6	300	22,259	13.48	2	6	.....	1	1	6	.....	33	13	16	53	10	37	13	39	19	8	1	7	9

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, 1891.

UNION COUNTY. Population, 74,592. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Clark	.....	.....	.....	2	1	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Cranford	2	.....	5	6	3	.....	16	.....	.....	1	2	1	.....	.....	.....	.....	1	1	1	.....	.....	3	.....	.....	1	1	.....	.....	1
Elizabeth	221	102	52	251	129	.....	755	38,893	19.41	5	5	4	.....	15	51	3	79	42	36	138	59	43	26	60	32	9	4	7	50
Fanwood	2	1	1	4	8	.....	16	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	2	3	.....	.....	.....	3	1	2	.....	.....	1
Linden	7	5	1	10	12	.....	35	.....	.....	.....	1	.....	.....	.....	4	.....	1	2	.....	4	4	5	1	3	2	.....	.....	.....	3
New Providence	4	2	.....	6	8	1	21	.....	.....	1	.....	.....	.....	.....	1	.....	1	4	1	4	.....	2	.....	.....	4	.....	.....	.....	.....
Plainfield	47	20	15	61	53	2	198	11,737	16.87	1	3	5	2	4	4	.....	24	8	12	27	11	22	10	22	9	4	2	2	10
Rahway	27	8	16	36	39	.....	126	7,153	17.61	1	2	.....	1	.....	4	1	12	11	9	16	14	12	10	10	4	3	.....	.....	10
Springfield	2	1	.....	7	4	.....	14	.....	.....	1	.....	.....	.....	.....	.....	.....	2	3	2	.....	.....	.....	1	.....	1	3	.....	1	.....
Summit	12	5	2	18	9	.....	46	.....	.....	.....	.....	.....	.....	.....	1	.....	7	6	3	6	6	7	.....	1	1	1	.....	.....	2
Union	6	.....	3	8	16	.....	33	.....	.....	1	.....	.....	.....	.....	1	.....	2	3	.....	3	2	1	3	4	1	.....	.....	.....	5
Westfield	7	3	1	12	20	.....	43	.....	.....	.....	.....	.....	.....	.....	2	1	6	2	3	6	.....	3	2	2	12	.....	1	.....	1
Totals	337	147	96	421	302	3	1,306	74,592	17.51	11	14	10	3	19	69	5	135	83	70	208	96	99	53	107	68	23	8	10	83

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, 1891.

WARREN COUNTY. Population, 36,319. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death-rate per 1,000.	PRINCIPAL CAUSES OF DEATH. Remittent fever, &c.	Typhoid fever.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—male.	Consumption—female.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Digestive and intestinal diseases.	Cancer.	Acute rheumatism.	Puerperal.	Accident.
Allamuchy	1			1	5	1	8											1		1		3			1				1
Belvidere	1		1	8	12		22												1	6	1	2	2	6		1		1	1
Blairstown	3	2	2	5	6		18				1						1		2	2	2	1	3		2			2	1
Franklin	2	2		1	8		13						1							2	2	2	1	2	1				
Frelinghuysen	1		2	6			9											1		1				3	2				1
Greenwich	1	1	2	3	11		18				1						1		2	2	2	3		4	1				1
Hackettstown	8	6	6	7	15		42				1		3				5	3	2	7	1	2	3	3	1		1		1
Hardwick	2		1	1	3		7												1			1	1	1	1				
Harmony	2	2		3	6		13				2		1				2		1	2		1		1	1				1
Hope	3	1	2	4	1	1	12										1			5	1		1	1	2				
Independence	2		1	2	4		9												1				1		1	2		1	
Knowlton	5		1	5	7		18						1				2	1	1	2		2	2	2	2	1			
Lopatcong	5	3	2	5	3		18										3		1	2	3	3	2	1					1
Mansfield	3	1		7	14		25										2	1		3	2	7		4	1	1			1
Oxford	12	14	5	24	18		73			1				6	2		10	3	5	15	2	5	4	5	5	3	1		2
Pahaquarry				2	1		3											1	1				1						
Phillipsburg	32	14	14	44	34		135	8,761	15.75		4	1	4	1	2		19	5	11	13	9	8	7	6	14	6		2	11
Pohatcong	6	3	4	3	8		24								5		2					4		4	2	1			2
Washington	16	5	4	17	23		65					1		2	1		14	5	3	6	2	2	4	3	5	3		2	6
Totals	105	51	47	148	179	2	535	36,319	14.73	1	9	2	10	9	10		62	21	32	69	27	46	32	46	42	18	2	8	30

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(By the Medical Superintendent of Vital Statistics.)

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