THIRTEENTH ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY,

AND REPORT OF THE

BUREAU OF VITAL STATISTICS.

NOTE.

The State Board of Health is not responsible for the typographical errors in this Report, inasmuch as no opportunity for proof-reading was afforded.

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THE STATE BOARD OF HEALTH.

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REPORT OF THE SECRETARY OF THE BOARD.

To His Excellency Robert S. Green:

GOVERNOR—On behalf of the State Board of Health of New Jersey, I have the honor to present to your Excellency this, its 13th report. During all these years it has been our pleasure to witness the increasing recognition of the claims of sanitary science and art as subjects for governmental attention and oversight.

It has only been in more recent periods that there has been any adequate conception of the degree to which health and life are within the range and the duty of public as well as personal administration and control.

There are many risks to health over which the private citizen can exercise little or no restraint, and for defence from which he must look to the influence and direction of constituted authorities, and if need be, to the strong arm of the law.

It was a great advance, only made in this State in the past few years, when we came to have what may now be called a system of sanitary jurisprudence. The voice of the people and of the executive and legislative departments of our government has been sustained by such legal decisions as plainly affirm the propriety of large powers being committed to competent Boards of Health and the need of conferring powers of summary proceedings in order to enforce their ordinances.

Well may this be so. Statesmanship has no higher aim than the highest welfare of the whole people. How far the preservation of health and life from all avoidable limitations thereto, enters into consideration, let those tell whose effective labor and usefulness has been abridged by the restraints of disease. Or let the epidemic record it, which is only more significant because it fully acquaints the people with what is constantly happening as an individual or family misfortune By the stagnation of business, the loss of property and the discouragement of life, it serves to make deep impres-

sion as to the extent to which we constantly need to be guarding the physical stamina, the hardy vigor and the industrial health of the people.

The general scope of this department and its possibilities of conserving general prosperity and happiness are far wider than most imagine. If to-day every household, every city, every hamlet of New Jersey could be put in the best sanitary condition it would be an achievement in the annals of peace as patriotic and as fruitful as any recorded in the triumphs of campaigns.

Even if we could reach the best status already attained by some of the most favored localities, we would be far in advance of our present record.

An outline of the great scope which the work includes is well presented in the following extract from Dr. John C. McVail, one of the best Scotch authorities:

"The means for disease prevention which lie at the disposal of the modern sanitarian are both numerous and varied, and the value itself of the whole object of preventive medicine is but seldom called in question. Broadly speaking, we may take it that there are three great lines of defence, three groups of measures belonging to preventive medicine. These are sanitation, inoculation and isolation. Sanitation is the first line. The word is often used to cover both inoculation and isolation, but I wish to apply it here in a more restricted sense. Assuming the theory to be correct that zymotic diseases are due to specific organisms, we may say that the object of sanitation in this narrowed meaning is to produce such conditions of air, soil and water as shall not be consonant with the existence of these organisms. Such environment as is most suited to a human being is least suited to his microscopic foes. The first line of defence, in fact, is simply cleanliness—cleanliness in breathing, eating and drinking; cleanliness, personal, domestic and national. It includes many measures. It means that the soil on which we construct streets and houses shall be unpolluted, that the houses themselves shall be roomy and well ventilated, and that the air which ventilation provides shall itself be pure. It means that the water we drink shall contain no germs of cholera or enteric fever, and that our food shall be clean and wholesome. It means many legislative acts relating to pollution of rivers, to adulteration of food, to water supply, to bakehouses, to smoke abatement, to cattle diseases, to dairies and cowsheds, to factories and workshops, to open spaces, and to public health matters of many other kinds. This, then, is our first line of defence, and the question arises, Is it not in itself sufficient? Are all these laws and is all this cleanli-

ness not enough, in our own country at least, to exterminate zymotic diseases? Unfortunately experience answers No, for there are germs and germs. A few feet of pure air are enough to destroy the poison of typhus fever, while, if Dr. Hubert Airy be right, that of diptheria may retain its vitality for several miles. Typhus fever, enteric fever and cholera may be taken as the best examples of enemies which are unable to pass our first lines of defence. The question as to whether this line will ever be rendered capable of eradicating such a disease as small-pox is hardly a practical one. I do not say that cleanliness has no power over it. The germs of small-pox will thrive better in a dirty house than in a clean one. But in the case of a disease, whose living cause seems to retain its vitality through a mile or more of London air, it is clear that in this country, with its enormous population, such air space as can be given in the best of model dwellings will be of little avail against this scourge. Whether a man's head, or his heart, or his liver be his weak part, he is strengthened and benefited by those sanitary measures which constitute our first line of defence. And be it noted that, valuable as are the second and third lines of which I am about to speak, it cannot be said of them that they directly protect against attack by any other than those diseases in special view of which they are undertaken.

The second line I have named *inoculation*, and I have done so advisedly, as indicating a theory rather than an actuality. If we describe the group of measures classed under the first line as consisting of means for preventing disease germs spreading and multiplying, we may describe the second group as a protection against germs which have succeeded in breaking through the first line. The second line is even less complete than the first. We have no inoculation to protect against scarlatina, measles or whooping cough. Against hydrophobia the line is in active formation. Against cholera it was tried with very doubtful effect in Spain two or three years ago. In fact, it is against only one disease that in past years this method of protection has been found capable of being made efficient. Fortunately, the disease in question—small-pox—is one against which there is very special need for protection, for there is none over which the first group of measures has less power.

"The third and last line of defence is isolation, the separation of the sick from the healthy. It has been said that the use of the knife is the opprobrium of surgery. In the same way isolation is the opprobrium of preventive medicine. Our first aim, as we have seen, is to prevent the existence of disease germs. Our second aim, which assumes that the first has been unsuccessful, consists in efforts to make the human body proof against the germs, to provide a coat of mail against an enemy that has broken through our defences. Our third aim

assumes that the enemy has got some of us by the throat, that part of our forces is in his grasp. I say, therefore, that isolation is the opprobrium of preventive medicine, and in all our work it is necessary to keep this in mind, that our main object should be to make isolation unnecessary by *preventing* any section of the population from being seized by disease, just as the main object of the surgeon should be to make operation unnecessary by the use of other and better means. But while it is true that the knife is the opprobrium of surgery, it is also true, paradoxical as it may appear, that some of the greatest triumphs of surgery are due to the use of operative measures. So also with us, some of the greatest triumphs of preventive medicine are due to timely isolation, isolation, that is to say, of the disease poison. For it is to be remembered that the isolation of the patient is simply a means towards the isolation of the poison. All methods of disinfection belong to this third line of defence—the burning of bedding, the fumigation of rooms, and so on, have for their object the destruction of a living germ whose existence we have failed to prevent.

These, then, are the methods of preventive medicines. We come next to the aims of preventive medicine and the objections that have been urged against these aims. For with regard to our whole procedure, the question of '*cui bono?*' frequently arises. To what end, it is asked, are all our measures for disease prevention? Are we not fighting against the great law of the survival of the fittest? In olden times, it is said, the weakly went to the wall, and only the strong lived, and became the progenitors of a healthy race, while now the weakly are nursed and coddled and protected against every wind that blows. The life, too, that these feeble ones live, is it worth living? Is it not simply one prolonged sickness, without either pleasure or usefulness? Nor do the consequences end with the sufferers. They marry and bring forth a degenerate race, the members of which also marry, and so by degrees the whole life blood of the nation is being poisoned Thus it would appear that our title of health officers is a misnomer, and that our efforts after health only end in disease. In reply, it would be sufficient for the sanitarians to take up the high ground of the physician; to say that human life is a holy thing, and that it is his duty to preserve it wherever found. The physician may believe that the patient, whose life hangs in the balance, will, if he survive, be a curse to himself and to the world. Yet it is 'his not to reason why,' but to do his utmost to turn the trembling scale toward recovery. So it is not necessary for the sanitarian to discuss whether it is well or ill that the general environment of life be made such as to cause many a consumptive or scrofulous child to live that otherwise would die. It is his work to do all he can to make life easy of retention by the very weakest. If the question be asked, Where is the proof that our preventive measures—our sanitation, vaccination and isolation

—have had the results we speak of, the answer is at hand. It is given by the Registrar-General in the language of figures. He points out that, according to the newest English life table, the children born in England in any one year have now divided among them 'nearly two million years of life' more than would have been the case thirty five years ago. In England and Wales the annual mortality per 1,000,000 of population has been as follows: In 1861-5, 22,595; in 1866-70, 22,436; in 1871-5, 21,975; in 1876-80, 20,817; and in 1881-5, 19,310. Comparing the first period and the last, the difference is 3,285 per 1,000,000, and, taking the population at 30,000,000, the total annual saving is about 100,000 lives. And if for every death there are twenty cases of sickness, then we have 2,000,000 less cases of sickness than in the first period. Interesting calculations have been often made on this subject, and especially by that father of sanitation, Mr. Edwin Chadwick, who happily, is still with us, a witness of the greatness of the success that has attended his life's work. You can count the cost of each case of sickness, of lost work, of doctors' bills, and so on, and also the monetary value of each of the 100,000 lives saved. And you can put all this as income against the interest on the money spent in sanitary improvements—in water works, sewerage works, vaccination grants, officials' salaries, etc. And even on this lowest ground—on this merely commercial basis—we find that cleanliness, which is next to godliness, resembles godliness itself in being 'great gain.' But we can take a vastly higher standpoint We also are laborers in the great field of moral reform. In this field there are many groups employed, each pursuing its own line, and each—ay, even the sanitarian—possibly apt to attach too much importance to his own particular department. The teetotaller hold that if intemperance were driven out of the land, then would follow education, cleanliness and religion. And, doubtless he is right. The educationist holds that if man's intellect were duly trained it would lead him to avoid alcohol, to avoid dirt, and to avoid immorality! Doubtless he too is right. The religionist holds that if man can be taught his duty to his God, he will do it also to himself and to his fellow-man, and that education, cleanliness and temperance will be the fruits of his religion, Again I say, doubtless he is right. And the sanitarian holds that if a man is provided with pure air, good food, and healthy exercise, he will then be in a bodily condition, which will produce no craving for the stimulus of alcohol, which will open his intellect to all the influences of education, and which will make him better able to receive and to appreciate the truths of religion. For, throughout our life, all good things are woven together, and thus it comes that the prosaic and ofttimes unattractive work of the sanitarian has in it an abounding helpfulness that overflows into every corner of man's being, and makes for his intellectual and his moral as well as for his physical welfare."

The time has really come when the State should be more agressive in this work. This Board has maintained a conservatism which would have been culpable had it not seemed necessary until the people come nearer to an appreciation of the real needs. It has exercised an economy which would have been parsimonious were it not that it was attempting to lay firm and sure the foundations of a system rather than expecting to complete its details. During all the period, the appropriation has been about that provided to keep a single disease from among cattle and less than that to keep a single adulteration out of a dairy product. We take some of the blame to ourselves since the State has always responded when appropriation has been asked. But we invite our Legislature, and the people as well as ourselves, to consider whether the time has not come for a broader and more thorough health policy than has as yet been enforced

It is not all, or chiefly in the direction of State appropriation. Should the people of thickly settled towns and cities, having a good water supply, be allowed to use so called family wells? Should large tracts of land, admitted to be in need of thorough drainage, be left to debilitate the people until the owners regard it as profitable to drain it? Should tenement houses, school houses and factories, which have relation to the State as well as to the locality, be left to the possible chance of some local ordinance? There are certain broad lines in which the State should itself enjoin. Gross neglects by cities are not bounded in their results by city limits. While the enforcement of ordinances should be committed to Local Boards, neglects on their part should easily reach the review of the higher courts. The time has at last come when laws and Boards of Health and the more intelligent public opinion should be found fully alive to the wide scope and beneficent possibilities of effective sanitary administration.

Our State has pursued a wise and liberal policy in the study of Economic Geology with a view of discovering and developing the material resources of all the land within its territory. There is an Economic Sanitation which is equally wise, and which should be provided for with a policy equally liberal.

Human life is a material resource and a well sustained condition of average good health has in it the material for economic success for the State as well as for the individual. When the air we breathe,

the food we eat, the water we drink, are properly guarded against contamination, when the arrangements and training in every shool house are such as favor the best physical condition and development of the scholars, when our workshops are deprived of insanitary influences, when proper inspection and plumbing secure healthy homes, and when there are proper public provisions for the prompt and proper removal of all decayable matter, there will be an addition made to the comfort, prosperity and material wealth of our citizens greater than can be derived from any other source. Every step in this direction is material progress and has its record in less disease and longer lives.

DRAINAGE FOR HEALTH.

Whatever may be the different views as to the precise relation of wet lands filled with decayable matter to the causation of this or that particular disease, there can be no doubt that such localities are unfavorable to the maintenance of robust health. Students of races, who have compared the dwellers upon the highlands and lowlands, are not in doubt as to the effect of climate, soil and surroundings upon heredity. Besides the large results in organic diseases, such as those of the lungs and the liver, there is little doubt as to a specific relation to some forms of fever. We, therefore, can assert, that it is the common consent of authorities, that stagnant water in rich soils is unfriendly to population. As such localities are often valuable for agricultural purposes because of their fertility, or suited by locality for cities, it is vastly important that the principles of thorough under drainage be fully applied A high water level in the soil is one of the greatest disadvantages of any thickly settled locality. Many of our cities are to-day suffering as to the general health of the people far more from a water soaked soil than from any other cause. Thus the organic filth falling upon it is retained in a sodden, half decayed, or unnatural state until the summer suns dry away in part the water and sufficient heat and moisture combine to start the outspread compost heap into pernicious activity. Not sufficient vegetable growth being ready to appropriate the gases of decomposition and putrefaction, the human being must appropriate them, and thus many diseases arise and many deaths result.

It is in our power, both in city and country, to thwart this ill

arranged scheme of destruction by those simple methods which lower the water level and thus bring the air in constant contact with the material which it is thus fitted to utilize without injury to man. It is an axiom that stagnant water amid decayable vegetable matter is always hazardous. On the other hand circulating water always means circulating air, and the two remain the conservative elements by which life of all kinds is nurtured and sustained. In the various volumes of this Board and in its special circular on drainage facts and incidents have already been given to enforce these views. Although there are multitudes of localities needing this drainage, and although every house and every building site need to be studied in their drainage relations, it is gratifying to know progress is being made in this State. The large scheme for the drainage of the Pequest Valley has been so far and so long perfected as to leave no doubt as to its favorable influence upon the health of its inhabitants. This Board has for some time past devoted particular attention toward promoting drainage of the upper Passaic district, between Lower Chatham and Little Falls, which has been so long and so forcibly advocated by State Geologist Cook, by the State Water Commission and by various engineers. It so happened that three years since the co-operation of this Board was sought by several township committees of townships bordering on the Passaic river. By reason of many disasters to crops and to health, and especially of a recent summer freshet that had submerged and destroyed the growth upon thousands of acres of cultivated land, these committees met with the State Board of Health at Caldwell, and we were able to collect a large number of specific facts.

Although legal proceedings had long been pending to remove or lower the dam at Little Falls, which greatly contributed to the disasters, there seemed little hope of speedy relief in this way. After this conference the Secretary opened correspondence with the owner of the mills, who responded by sending his engineer and his legal advisor to have an interview with the Board. A plan of relief was proposed, as to which the Secretary requested a further conference with Prof. Cook, Engineer Howell and himself. The plan proposed was found open to serious objection, but it led to an agreement that Engineers Hilton and Howell should traverse the stream to settle certain disputed points, and that still further effort should be made to devise a plan for relief. To this Mr. Beattie, the owner

of the mills, responded with new effort and additional engineering aid. A large mass meeting of the people of the various townships held under the leadership of Hon. Augustus Cutler and others, was of much service as well as the continued action of the conference committee appointed at Caldwell. Without full detail, suffice it to say that the co-operating engineers finally agreed upon a plan which proved satisfactory to all parties. Under the direction of the legal advisors the scheme was perfected, the necessary money provided and the work begun at the close of the year 1888.

Messrs. Geo. W. Howell, C. E, C. M. Harrison and J. H. Blauvelt were appointed commissioners. We add a brief statement by Engineer Howell as to its progress thus far:

Commissioners to Drain Meadows on the Passaic River and its Tributaries.

GEO. W. HOWELL, Morristown, N. J.
C. M. HARRISON, Verona, N. J.
J. H. BLAUVELT, Paterson, N. J.
} *Commissioners.*

MORRISTOWN, N. J., NOV. 15, 1889.

Dr. E. M. Hunt, Secretary State Board of Health, Trenton, N. J:

MY DEAR SIR—Yours of 13th is received. The work of the Passaic drainage is in progress. The modified plan proposed by the commissioners was adopted. Satisfactory arrangements have been made with the Beattie Manufacturing Company whereby no award for damages is to be paid to them, and they at their own expense make all changes in their dam which are contemplated by the plan, including erecting and forever operating gates in said dam of capacity sufficient to carry a volume of water in times of flood twenty-five feet wide and sixteen feet deep.

The contract for the entire work to be done by the commissioners has been let to Alfred B. Nelson, of New Brunswick, who has given bonds and has begun his work, He is now running three steam drills, working both day and night shifts on the lower reef lying just above the dam. He puts down and charges successively with dynamite from twenty to forty holes, the water being two to four feet above the rock, and the holes some eight feet deep and reaching below the specified grade. He then removes the float from which the drills work, and after covering the spot with a floating mattress to prevent flying stone from injuring the Beattie mills, only 150 to 200 feet away, the whole is set off by a battery. The results of the blasts are very satisfactory, the trap rock being thoroughly broken up into small pieces easy for removal by scows to

the shore. After a blast the loose stone lies piled up above the surface of the water.

The work has not progressed sufficiently to make any abatement of back water as yet. We expect to push on through the winter, and hope to show some practical results next season. The full benefit cannot be expected till the whole work is done, and after that it must be supplemented by ditches leading into the lowered river and the cleaning out of old water courses, which must be done by the landowners themselves in order to receive the full benefit. The contractor is expected to complete his work within a year and a half from the present time.

The commissioners have issued bonds, the proceeds of which will be applied to the work. After completion, assessments will be made on the lands benefitted and the bonds will be retired. We have issued $130,000 of bonds, which we are allowed to sell down to ninety per cent. We shall put on the market only sufficient to do the work. Assuming the probable cost as $100,000, a fair estimate, the contractor takes $45,000 in bonds at par. We have sold for cash at par $40,000, thus leaving only $15,000 to sell. No bonds have been sold less than par.

Yours, very truly,

GEO. W. HOWELL.

The validity of the "Act to provide for the Drainage of Lands," March 6, 1871, and the supplements thereto has been approved in the Supreme Court of this State, in a decision reported in 6th Vroom's Reports, page 497, and in the Pequest case (a similar case under the same Act) in the Supreme Court, and in the Court of Errors and Appeals of this State, 10th Vroom, p. 433; 12th Vroom, page 175; 13th Vroom, page 553; 14th Vroom, page 456, and in the Supeme Court of the United States, 114 U. S. Reports, page 606.

These decisions are final and conclusive upon the validity of the Act.

There are other districts in the State which need similar relief.

But we especially desire to fix attention upon the needs of various homesteads and small villages in country localities, to the fearful neglects in cities, and especially in the extending of their area upon low and undrained lands, causing an amount of sickness or loss of vigor too apparent in pale countenances and shortened lives. It is a great mistake to provide sewers, to introduce water supplies without previous attention to the demands for drainage. A ground foundation capable of maintaining a water level not less than ten

feet below the surface is the first prerequisite to successful city life. Unfortunately our population as a State must be centred near tide water, and there are especial reasons for insisting upon artificial aids to natural drainage. It is to be remembered that every erection of houses and occupancy of streets interferes with natural drainage as aided by sunlight, evaporation, etc., and that we must by artificial methods compensate for this if we would preserve the salutary operation of natural laws.

We thus once more commend this subject to the attention of all sanitarians and all citizens.

HOUSE SEWAGE, OR HOW TO REMOVE IT.

No more important question addresses itself to all householders than that relating to the removal of all soiled liquids from dwellings or from near proximity thereto. Unfortunately at the beginning we are disturbed by the fact that in England and on the Continent this is known as house drainage, and so with us the term is sometimes confounded or not fully understood. Besides climate and other considerations make it not safe for us to follow all the rules laid down by foreign authors. But fortunately good use has been made of the studies and labors of foreign engineers and our own faithful practitioners of the engineering art have been able to add much that is valuable. Indeed, we are quite justified in speaking of American methods of removing and dealing with sewage. The first principle of all is that all of these fouled liquids must be gotten away from the building, and unless the grounds are of large extent, also away from the premises. This is easily done in the open country without any system of water carriage, but in city life and especially where a public water supply is freely introduced into houses, it seems almost indispensable to have these liquids conducted away by pipes.

The principles as to the kind and construction of these are plainly laid down.

The receiving pipes should be of cast iron and such as have been thoroughly tested under proper pressure. At one time tarred pipes were preferred, but it has been found that the coating was used to fill up minute holes or to conceal them after they had been filled up with soluble material. Confidence was also placed in the weight of the pipe until it was discovered not to be of equal thickness

throughout. So this test was not accurate. Fortunately the time has come when tested and warranted pipe can be had, although this is not generally put in by plumbers unless the contract specifies it. Improved methods are also in use for the complete joining of the pipes so that there is no risk of leakage at joints. It is now well understood that pipes should, as far as practicable, be visible, and especially that at the lower part or basement they should not be under the floors, but easily within reach. The Durhow system has carried the idea of separateness and exposure so far that it is constructed quite independent of any support from the house and would be left standing if the entire building were consumed.

It is now also agreed that wash basins or closets should not be in sleeping rooms, and that even in the bath rooms all fixtures should not too soon join in a common pipe. Not only must the traps be distinct, but so located that one will not affect the other.

It is a great fault that in the architects' specifications for buildings or alterations the pipe and fixture work is not shown in section or elevation like the rest, and so too much of detail is left to the plumber. The specifications and drawings should be in full and the drawings should be framed, so as to be preserved and thus be at hand whenever any repair work is to be done. There is such variety in basins, bath tubs, closets, etc., that every item needs to be specified so that the best modern appliances can be secured, and most of these have been furnished within the last ten or fifteen years. Next in importance is the securement of free circulation of air through the various pipes that convey the sewage. As to this there are two sets of opinions. Some claim that the only traps in the whole system should be those that are under fixtures and tha there should be no trap between the house system and the sewer. In fact the introduction of an intermediate trap came from American custom. It has so commended itself that many English engineers now favor it. It is the more approved method with us. Those who oppose it contend that the street sewers or the outside cesspool, if there is connection with it, should be kept so well aired as that its air may circulate with impunity through the house pipes. But this security is very difficult of attainment. There is also much comfort in knowing that yon are cut off from the foul air of other houses and from any that may be generated in an outside cesspool. It used to be asserted that the disconnecting trap will become a

place of deposit, but examination of traps through which there is a flowing stream shows that if there is proper fall and if the crown of the trap is five or six inches below the pipe this will not occur. We, therefore, favor a trap between the house system and the outside fall. But in all such cases not only should the system of house pipes be carried out above the roof, but from the lower main outlet pipe just inside of this intercepting trap, there should go up to the roof another pipe for ventilation. It is sometimes forgotten that in order to have circulation of air in pipes we need two openings. Else the opening made by carrying the main pipe to the roof is only a vent for pent up gases and not a ventilator in the sense of securing a current of air moving through the whole length of the pipes. We must give plenty of pure circulating air to the inside system. Then those low forms of vegetable life which are the chief agents in oxidation and matrification are kept at work amid the sewage and on the material that tends to collect on the inside of these pipes, and so prevent those other forms of life which flourish best without air and become hazardous to health by the abnormal decomposition which they occasion.

With the best of workmanship secured in construction, it is to be remembered, that like most sublunary things, fixtures and pipes will occasionally get out of order and that time and rust corode. So from year to year there should be some examination, which is greatly facilitated if the working plans were complete and have been carefully framed and preserved. While good work if placed so as not to settle will last for a long time, too great care cannot be taken to remedy in time any defect that may have occurred. Often the sinks or other fixtures need to be taken apart and carefully cleansed, where the main pipes have kept in good order. As to the proper ventilation of fixtures we may have occasion to speak at another time.

SANITARY CONTROL OF HOUSE CONSTRUCTION.

The time has fully arrived when the necessity of some control over buildings in process of construction or of extensive alteration must be insisted upon in the interests of those who are to live in them and for the general welfare of the public. When a house falls down such is the indignation and such the verdict of law, that

the contractor, if found guilty of negligence, goes for years behind prison bars. But where one is killed by such an occurrence, hundreds pine away and die from concealed evils. Besides specifications as to the strength of buildings there must, at least in all tenement houses, be conditions as to ventilation, as to light, as to halls and stairways, and fire escapes, and in every house some way of assuring the proper introduction and security of all pipes, and especially of those connected with the house drainage or sewerage.

Strange to say, even where full working plans are furnished by architects, it has not been common to show the pipes and their fixtures in section or elevation. The entire plant should be as much shown in detail as any part of the building, with all the relations to frame, timbers, floor and to steam and all other pipes. It is best to have an accurate drawing which can be framed for the bath room and kept as a working basis for all future repairs.

It is not enough to have the usual four-inch cast iron pipe of at least twelve pounds weight per running foot, but care must be taken to know that it is of uniform thickness. This and all the fixtures must be tested before use.

The plumbing law of this State is such as to give to Health Boards the authority to secure the most thorough construction. We think it will not be invidious to claim that Asbury Park has furnished us the best early examples of thorough method and thorough work. Dr. Henry Mitchell had resigned as health officer but felt it his duty to respond to an appeal from the Board that he should aid it in the execution of the law.

After having investigated the best methods, and having fortified himself by the views of Mr. J. C. Collins, Chief Plumbing Inspector for the New York Board of Health, and such plumbers as Mr. Edward Murphy and James Muir, of New York City, he secured efficient oversight of the work. At first every job was found defective, and it was claimed that he asked an impossibility. But to the credit of those concerned, be it said, that trial after trial showed the possibility and reasonableness of the demand. We have before us the account given by the local paper of the first success, when by means of an air pump the pressure of ten pounds per square inch as applied to all parts of the system inside of the house showed no leakage. The trial not only revealed the propriety of the conditions, but also showed that no pipe tarred or painted before test

could be trusted, and that apparently soil pipe condemned in New York got an extra coat and was sent to New Jersey. "I was convinced," says Dr. Mitchell, "that no house system of drainage is safe where no test for leakage has been applied during construction." An architect who had recently built a house of his own without this precaution has already been troubled by minute pipe leakage, and expresses his regret that the law was not sooner enacted.

Similar attention was given to the ventilation of the sewer system and even one put in by the Durham Company was found defective and remedied.

The following letter of Dr. Mitchell to the Board of Health of Asbury Park well presents the subject:

To the Board of Health:

GENTLEMEN:—By an act approved Feb. 24th, 1888, the Legislature extended to the citizens of New Jersey an opportunity to protect themselves against the dangers attending unsanitary houses. An ordinance was adopted July 20th, 1888, making some of the provisions of this act apply to Asbury Park.

The preparation of blank forms necessary for the convenient execution of the ordinance, delayed operations until Oct. 13th, 1888.

Since the latter date thirty-three plans and descriptions of house drainage have been filed in the office of the Board.

The difficulties to be encountered in executing the drainage and plumbing ordinance were comprehended and anticipated, and no satisfactory solution for the perplexity was found, but the advantages to this community to be derived from carrying into effect the salutary provisions of this ordinance, led this Board to make an effort to bestow its benefits. The task seemed quite beyond the resources of the Board With no officer who had had any experience in the construction of drainage works, and without funds to employ a suitable person, the outlook was not encouraging, for a responsibility rests upon the Board to give to house owners the best of advice or none. Securing all available aid, the Board has cautiously proceeded, and no serious mistakes in administration have thus far been discovered.

The value to Asbury Park of the protection against unhealthful houses, which will be afforded by the intelligent execution of the ordinance referred to, may be illustrated by the following incident: Mr. X. finished up a handsome residence last fall, just previous to the exercise of the Board's supervision over drainage construction. A few months after the house was occupied, offensive odors were

observed in the building, and investigation showed that the soil pipe joints were so imperfectly made that through one of the openings a finger could be thrust.

Not one job which has been performed under supervisors has been found to be gas tight upon the first trial of the air pump, and one of our most skillful and experienced plumbers has said that no such thing as a tight soil pipe is in existence, except where the defects have been detected by the pressure test. The time has passed when we should stop to consider the relations born by pervious house drains to health; nor should we assume that pervious pipes are harmless when the drain is disconnected from the sewer, and good ventilation of all portions of the drainage system is secured, for we know not all of the methods of diffusion through the atmosphere of which disease causes are capable, and nothing short of air-tight barriers will afford certain defense against the entrance of these subtle influences.

Experience elsewhere has shown that tar applied to cast iron drain pipes may cover a multitude of defects in the metal, and the effectiveness of tar as a plugging for cracks, crevices and sand holes has been found to be of short duration. Thereupon this Board has required that no such flimsy veil shall be depended upon to fortify poor pipes. Our effort is to promote health and save lives, and the additional cost to house owners involved in the use of substantial pipe which will stand calking, and which is gas tight, and which requires no support from a flim of coal tar, should not deter us from insisting upon this essential requirement. The claim recently made by several of our plumbers, that it was impossibleto comply with this requirement because the market will not supply the desired quality of pipe has been set at rest by the procu rement of pipe which is in every way up to the standard we have fixed.

The air test of ten pounds pressure has also been objected to, but it has been found very effectual in disclosing defective pipes and poorly constructed joints, and it is applied with less delay and annoyance than attends the use of water. No other means of testing new work need be referred to here, for there is none in use which compares in efficiency with those already referred to.

The experience of the past few months indicates that house drainage construction has been heretofore performed in a careless and dangerous manner. The principles involved in the work have usually been correct, but the material and labor have been poor. Under the present regulations if they are well executed there is little opportunity for deviation from established principles, or for the use of poor material, and the scrimping of the work.

Newark and Camden have made some progress in carrying out the law.

CITIES--THEIR NEEDS AND THEIR REGULATIONS FOR PROMOTING THE HEALTH OF THEIR INHABITANTS.

The advances made in recent years as to a knowledge of the conditions favorable to health are such as to enable us with considerable precision to outline the sanitary requisites for a healthy locality, as well as the administrative methods to be pursued. Actual knowledge is far ahead of actual practice. Hence there is occasion for presenting this knowledge and for specifying how its more perfect application can be secured.

Since the evils to be prevented or overcome are more serious in cities, we shall speak especially of these. The same principles apply more or less to the country according to locality and density of population.

DRAINAGE.

The first consideration is that of drainage, and yet it is the one most frequently overlooked. If a capitalist, intelligent as to sanitation, had to choose a site for a city he would very early turn his attention to the character of the geological structure; the soil, the heighth of the water level in the soil and the artificial means to be used to secure its dryness, which means its porousness. Upon the porosity of the ground depends its power to receive air and so to properly conduct those changes of decomposable organic matter which are essential to good health. If these changes are so interrupted as to suspend at one time and to take place in excess at another, or if made unnatural by forced conditions instead of the orderly decomposition of nature, we have putrefaction or other unnatural changes of organic matter. The power to receive air depends upon the power of the upper ground to circulate the water which falls upon it and not to retain it in a stagnant state. This means that the water level in the ground must not be near the sur-

face. Most cities, or parts of most cities, stand in need of deep drainage. By deep drainage we mean land tile or other material for drainage, placed from eight to fifteen feet beneath the surface, sufficiently near to secure this circulation and having such grade or descent as will secure flow. Even if the ground of a city is well located and with usual tillage and croppage would keep itself as a circulating medium, it is to be remembered that excavations in it, buildings upon and streets shutting out much of sunlight and wind and interfering with evaporation complicate the original conditions. Drainage is rendered necessary in order to compensate for these artificial disturbances. It is all the more important because in addition to its indispensable aid in disposing of the organic or decayable matter and the rains which will fall on the ground, there is no other way of securing such dryness of streets as is necessary to prepare them for pavement. If in the laying out of a city this has been neglected, it is all the more to be attended to before the city reaches out to the suburbs. Very much also can be done in the built up portion by thorough deep drainage up every street and alley, and often of the parts of yards adjacent to the cellars.

Many a city would practice a great economy, if, before turning its chief attention to water supply and sewerage, it would thus do this cheaper and valuable preparatory work of securing healthy foundation for all other salutary and health promoting efforts. Where there are canals or feeders running through a city these need special care, and generally deep drains should interpose between these and the built up portion.

Especial care must be taken as to natural or artificial ponds within the city limits. Many a natural pond becomes artificial when a city is built about it, since some of its usual springs are dried up, and besides receiving much decayable material which is thrown on or falls into it, it receives more or less of wash and of the fouled water of the upper soil. Equally bad are those artificial ponds or pools of water which are made by the piling or removal of earth. Some cellars built under houses are an evil, and the houses would be better if erected on pillars with double flooring with even ground beneath. Stagnant water here and there in the country may be compensated for by luxuriant foliage and by occasional ebb and flow, but in the city the stagnant pond or water stagnant in the upper ground or cellar, is the enemy of health. No moneys from the

city finances is better expended than that which provides efficient drainage.

WATER SUPPLIES.

A pure water supply is indispensable to city life. Impure water is a special conveyance of disease, since water is so readily absorbed in the system and as the great purveyor of the body distributes its contents to every part. This does not mean that all water containing foreign matter will cause apparent sickness, since it is only when conveying the particles of specific disease that it especially declares its evil results. Oftener it causes diarrhœa, dysentery, dyspepsia or general malaise. It is a tax upon natural vigor, and to neutralize its effects appropriates vital force, for which there is plenty of demand in other and more useful directions. True sanitary care not only seeks to keep us in life, but to keep and render available all of our resources for vigorous health and service as well as for life.

A water supply should always be selected by those who know the quality and quantity of its source and are able to reckon upon its continuance and its sufficiency and purity for the growing wants of the city. Then however wise may have been the selection and plant, there is need of constant skilled oversight if its reservoirs, its pipes, its house connections and all that relates to the preservation of the water and its modes of conveyance from contamination. This means far more of technical and frequent examination than is generally secured.

It also needs to be known just how many houses do not take it but depend upon city wells, which as a rule are always hazardous. We are constantly surprised to find from fifty to one hundred wells in cities where the general water supply is of unquestioned quality. In some cases not over one-fifth of the people use the public supply and yet the city is quoted as if all used the city water. The closing of city wells often becomes the imperative duty of city health boards.

SEWERAGE SYSTEMS.

It is now conceded that every city having a public water supply also needs a general sewer system. Fortunately we have come to a period when the ordinary bricklayer on the committee of council

no longer regard themselves as competent to devise a system for sewerage disposal. So radical and important is the whole scheme that the very best plans and the very best workmanship must be secured, which always means the plan and oversight of a competent engineer. Sewers are now constructed so much more cheaply and thoroughly than formerly, that there is great encouragement to cities to be provided with them. Many cities that have old systems and cannot yet afford entirely to supercede them, need to have a full examination made and man-holes and other modern improvements furnished. The old unventilated, sewage-retaining sewers are to many of our older cities a very great nuisance, and should be thoroughly improved or replaced. A filthy sewer retaining much material on its sides is but an elongated cesspool, and as such a long drain and persistent menace to the public health.

The matter of house connection with sewers is always one of the greatest importance, and should not be trusted to the general workman alone. Every connection should have inspection before it is covered up.

Every city should have its complete sanitary map showing all underground pipes of every kind, so that in any change to be made all the relations are kept in view and so that points for joining or repair can be reached without any guess-work excavation. Even where this has not been done at the start, all new work should be thus mapped.

The facilities for cleansing sewers without frequent openings are now numerous.

There should be such inspection as will secure them proper condition. It would be far better for most cities if the chief streets were tunneled so as to give ready access to all pipes and to afford a mode of disposal for water, sewage and debris of various kinds. With the electric light and proper arrangement of all pipes in the underground passage, such a system would be found economical in the end. (See article by Secretary on this subject).

REPORT OF A. P. H. ASSOCIATION.

It is always very important to secure such thorough *outfall* for sewers as that the mouth is never water sealed or clogged in any way. This means frequent inspection. We shall not discuss the

various means of disposal of sewage, which have so greatly multiplied, and often are so combined as to be very satisfactory. The mode of disposal is greatly modified by locality.

Where cesspools are still in use in several cities they should be thoroughly cleansed and then filled up. There may be rare exceptions in very porous soils where there is a public water supply. Experience, however, shows them to be hazardous, and especially since heating apparatus is generally put in basement and cellars, which tend, especially in winter, to draw the surrounding ground air into the heated cellar.

WATER, GAS AND OTHER PIPES.

The underground of our cities has become such a thoroughfare for various forms of pipes that we are to remember that all these need care. If the water pipes leak the ground is made too damp. If the sewer pipes leak, as they too often do, decomposing matter is deposited in the soil. If the gas pipes leak the soil is filled with gases which mingle with others and find their way to the air so as to contaminate it. We recently saw an examination of gas pipes in which nearly evey joint uncovered would take fire on the application of a match. Water gas is so cheap that it is cheaper to lose much than to dig for leakes. The localities of all pipes should be mapped, and the city authorities, as well as the companies, should have these regulations.

CARE OF STREETS.

The thorough care of streets is not only a comfort but much more concerns the health of cities than is generally supposed. First of all there is the matter of proper pavement. There are now to be had most excellent forms of impermeable pavement, easily cleansed and sufficiently smooth without being slippery. But it is in vain to put down good material for pavement unless there is deep street drainage, thorough preparation of the ground on which the pavement is to be laid, so as to reach below frost, and skilled workmanship in its adjustment. We have from personal view had opportunity to contest the method of paving the streets in London, and a part of the chief streets of our capitol city. The one will last with but little repair for half a century, the other is always out of repair.

Much of the surface cleansing of streets should be done at night, and even the sidewalks should not be swept in the faces of those

passing. Besides the discomfort, it is not appreciated what damage to health occurs from city dust. It is made up of dirty mud, of droppings of various kinds and of various forms of decayable matter. This in a finely triturated state mingles with the air and has to go into the lungs and stomachs of the people. A very dusty city is always more unhealthy.

Water sprinkling in hot days or when there is much dust, is much the choice of two evils, but if this has to be carried to the excess of causing undue moisture, it too, becomes an evil. We desire to emphasize the injuriousness of city dust and to claim its abatement as a nuisance which interferes with the health not less than the comfort of the people.

BUILDING INSPECTION.

Experience has proven that in all of our cities there should be authorized oversight of the construction of buildings. So common has become the use of improper material or slighting of the work of construction that the terms "jerry building" and "scamping" have come into common usage. But it is not only imperfect material and workmanship. Ventilation, especidlly in tenement houses, must be provided for; hence the laws of many cities now designate the area of windows or light space in proportion to size of rooms, the proper construction of entries for light and for fire escape and prohibit the erection of rear houses. Parts of our cities are already showing the overcrowding which is so common in New York City, and precautions must be exercised in time. In our State especial provision has been made as to the plumbing of buildings. The house is the sanitary unit. No city can have sanitary safety unless the house is made to accord with the conditions for health. Our present Plumbing Law instead of being applied in three or four of our cities, should be enforced in all of them.

HOUSE INSPECTION.

This refers to such examination of houses after they are constructed as will inform the health authorities as to any defects and as to the way in which they are occupied. Thus only can it be known whether they are kept in accord with the necessities of health. House to house inspection by a competent inspector is

indispensable in every city. While in many cases there may need to be brought in operation the requirements of law in more cases, great changes are secured by pointing out the evils and indicating or aiding in the modes of relief. While the more active, administrative result as the removal of nuisances found, almost as much is done by preventing others or by stopping them in the very start.

An error of most Health Boards is that inspectors are allowed to make verbal reports. A schedule of each house visited and particulars as to it should be kept on hand, in books similar to those issued by this Board. This re-inspection when required is simplified and the work of the inspector and his recommendation are open for the Inspector of the Board. Only thus can the results of inspection be secured. At the same time the inspector is more thoroughly educated to his work. We are aware that the pay of inspectors is meagre, but the best way of increasing it is by the excellent quality of the work done.

COLLECTION AND DISPOSAL OF GARBAGE, ASHES, ETC.

No city can dispense with ordinances fully regulating the collection and disposal of garbage. Under this head we include all the refuse of the household, independent of that which naturally goes through the sewer connection or into the outside privy. While we have before urged the importance of burning and so using up much of the material generally classed as garbage and the keeping separate of ashes, there will still remain much material that is disposed of with difficulty, not only in tenement houses but by the ordinary householder. However unsightly it may appear, health requires that houses and lots should be kept clean of all such refuse. Once when remarking to the Medical Officer of Health the amount of garbage thrown into the streets in certain portions of Edinburgh, his reply was: "We encourage all householders to bring refuse of all kinds to the street, for it is not then a hidden menace to health but is sure to be gathered up." Of course it is not meant that the throwing of garbage in the street is a desirable thing, although this is far better than careless concealment.

The only proper method is to put it in receptacles along the

street, from which it shall be taken at regular and well known intervals. The collectors should be fined if not punctual to the day or nearly to the hour. Boston and other cities have shown how possible is such a demonstration if only it is organized and enforced. Neither rain nor snow should interfere with its regularity. If garbage is found concealed on premises it should be a punishable offence.

If the health interests of the city are greatly concerned in the disposition to be made of the garbage, the ashes under regulation can be used for filling in. Parker & Sanderson showed that in the case of Liverpool ordinary ashes even mingled with some garbage, if all animal matter was excluded, would refresh or purify itself in two years without evil effect if evenly spread over a surface and not put over two feet in depth. For garbage in general, undoubtedly for cities, the best mode of disposal is by cremation in what are known as incinerating furnaces. The feasibility of their use has been demonstrated in many of our cities as well as abroad. For an outline of these see article on Disposal of Town Refuse.

Where one of these is not yet in use, the garbage grounds should be carefully chosen and should be watched by an inspector. We have known a wet dumping ground within city limits well adapted for the disposal of ashes and some garbage to become the promiscuous receptacle for the spoiled offal of the butcher, the decayed vegetables of the groceryman and the carcases of various small animals. This not only means discomfort for all passers by, but a pollution of city air.

NUISANCES.

So as to the removal of most nuisances. It is not enough that they be found out and prompt action ordered. There must be strict direction and oversight as to the mode of removal and the disposition to be made thereof. The mode and time of removal may even become a more exciting cause of disease than the temporary retention under the free use of disinfectants.

KEEPING OF ANIMALS IN CITIES.

In our cities we cannot, as does Venice, do without horses, and to this class of domestic animals must be largely provided for. It

is not a very simple problem. In the interests of owners, as well as of the animals themselves, they need in their stables to have air and cleanliness. Heaps of bedding, partly impregnated with secretions, are the source of much disease to horses and bad for those attending them. All stables need to come under the eye of the Sanitary Inspector. In the attempt to avoid heaps of manure we have seen the pits for its storage become very foul, and while fermentation is going on give rise to bad odors. It is a good provision when the used-up litter and the material mixed with it can be frequently removed to the country. Where its importance is urged this can generally be arranged.

It is right to insist that in cities stables should be kept in accord with the demands both of comfort and health. Car stables need especial care because of their size and of the frequency of diseases among the horses. There, too, is generally stored the salt hay or straw, still used in too many street cars as the wretched receptacle of dust, moisture and filth.

As to other animals, swine have no claims upon city privileges. Exeept in the most scattered localities they are always a nuisance. We have frequently known the owner to contend for the right to keep them, but never the next-door neighbor, unless he too had a similar investment. If allowed at all pens should be registered and frequent inspection had. Most cities should have an ordinance prohibiting their keeping, and if not whenever a pen is offensive it should be dealt with under the general ordinances as to nuisances.

The keeping of cows in cities must always be a matter of Health Board register and regulation. It is rarely that a cow yard is not a nuisance to neighbors. It could only be prevented by inspection for which the owner should pay a moderate sum. When the yard is found a nuisance that cannot be regulated by reason of locality or for other cause, it should be dealt with as a nuisance. As experience proves that most of the disease of cattle begin in cities or are fostered therely, the farming as well as local interests requires skilled inspection.

As to goats, winged fowl, etc., it is proper that there should be regulative ordinances, or that they should be dealt with when causing nuisance.

SLAUGHTER HOUSES.

These are so difficult to keep in proper order in cities that they

are generally consigned to the adjoining country. There an abattoir can be established and be under thorough supervision, many of the evils are prevented and the establishment can be tolerated. Even then the cattle should not need to be driven to it through the streets.

INSPECTION OF MARKETS.

This is becoming more and more important in our larger cities not only as to the sanitary keeping of the market itself but as to the inspection of meat, vegetables, fruits, etc. Many diseases arise from food which was not in a fit state for selling. The chief remedy is to have a skilled inspector under the direction of the Health Board. Some of our cities already have this plan and find it a valuable check upon the sale of unfit goods.

DUTIES OF HEALTH INSPECTORS.

We have already spoken of the duties of Health Inspectors as to the single item of house to house inspection.

Their first duty is to educate themselves in their work. Experience is one of our teachers but one's own personal experience is not enough. The reports of the Board and a few hand books give information as to the duties of inspectors, and impart such knowledge as will much aid them to inspect with skill. The inspector must have a thorough knowledge of his district. The need to have some one else inform him of nuisances will be the exception to the rule. He will either discover them when beginning to be as well as to be on the alert to prevent their occurrence.

He must keep himself well informed as to all methods of dealing with contagious diseases and secure isolation and such disinfection as is in accord with the best approved methods. While at the command of the Health Board he is still more their agent to apprise them of needed action. His reports should always be in writing and placed on file, although in many cases the written portion may be brief and comments and explanations be given verbally. No officer more needs to conform to strict executive and administrative methods. His salary should be in proportion to his knowledge, his skill and his diligence in his work. Let the ser-

vice be well paid for but never let the position be a sinecure or based upon that he has done or can be done for a party.

REPORT OF CONTAGIOUS DISEASES.

There has been a growing sentiment that prompt reports of certain special contagious diseases are essential to the proper sanitary government of a city. If any physician has been inclined to regard his relation to his patient a private matter, in no case involving a special duty to society, he is simply behind the ethics of his profession and thoughtless as to his personal relations to community. Our law carefully guards his report as not a public one and provides proper compensation for the service. The article of President Boyles, of the New York City Board of Health, as given in our twelfth report, so well outlines the duty, the mode and the action of a Board or an Inspector as to it as to leave little to be said. A prudent Inspector comes to be in such cases a great aid to the physician in attending to the sanitary condition. Where the physician is sure that nothing is needed from the Inspector it is proper so to state. Some of our cities are succeeding well in this oversight of disease and physicians are recognizing the necessity of this co-operation.

HOSPITALS AND ISOLATION OF CONTAGIOUS DISEASES.

While there are many cases not needing removal to a hospital there are others in which such separation or isolation is imperative. Frequently in tenement houses there is not only unavoidable exposure for others but the means of care and nursing can not be secured. It is also often the case in an epidemic that the locality seems to have become impregnated with the materials for the disease and so removal gives opportunity for the more thorough access of sunlight, wind and air, and for the use of artificinl disinfectants and the needed washing and scrubbing.

The determination as to removal must always be left to the health authorities.

Every large city should not only have its outside hospital for contagious diseases but should have before hand its well devised plans for contending with an epidemic, both in its inception and in its possible extension. It is as foolish to postpone preparation

until the disease is upon us as it would be to delay procuring fire apparatus until the smoke or the flame declared the need of prompt action.

As to preparation we can learn much from military methods. Even our smaller cities should have small houses already constructed which can be put together at very short notice. All the contents for a small hospital should be equally ready. Tents are very available, and if only constructed as hospital tents and put over a flooring they can even in this climate be made much more comfortable than is generally supposed. We give here a model of a hospital tent and which can be quickly and economically prepared. (See Ontario report). If vaccination is properly enforced and proper care taken as to separation and compartments the same grounds may be used for a hospital for various contagious diseases and cities should own some well chosen spot and not be left to secure one amid the objections and excitement which the sudden fear of a contagious disease causes.

DISINFECTION AND DISINFECTING APPARATUS.

So much information has been issued by the Board as to modes of disinfection and as to the materials to be used that it seems almost unnecessary to do more than call attention thereto. Yet a complete carrying out of the details of disinfection is among the rarest of sanitary arts. The sprinkling of some patented compound with little disinfecting power but much odor, the placing of a little saucer of chloride of lime under a bed and such like "dabs of sanitation" are too common. Airing, washing and the use of a right quality and quantity of disinfectants are of the greatest importance. In many diseases, the locality and the clothing do far more to spread the disease or to continue its transmissibility than the person. Disinfectants act only in proportion to the amount of material they give up to the water, etc. Thus the value of chloride of lime depends on the amount of chlorine it contains and liberates. Sulphurous acid and chlorine gas act very feebly in the absence of moisture. Let it be understood that thorough disinfection has very great value in checking and preventing disease, but as usually performed it is a delusion and a snare. The directions given in our circulars must be carefully followed, and it is better still if done by

an expert or by some one who has followed for a day the disinfecting corps of such a city as New York and seen the actual process when thoroughly carried out. There needs to be the same exactness when dealing with persons, with single rooms, as with clothing. As it is often desirable not to destroy all clothing some form of disinfecting apparatus should be in use in our cities. The Ransom stove has been most used, but now there are a great variety of furnaces. See for full description, Transactions of A. P. H. Association.

The clothing should be carried to them in an air-tight metallic van, which itself is also disinfected from time to time.

PUBLIC BATHS, PARKS, ETC.

Besides the items named there are various other sanitary provisions which either come under the care of local health authorities or should receive from them advocacy and encouragement.

Public baths are found greatly promotive of cleanliness and health, and are largely patronized. Parks and open spaces are of the greatest importance to the health of cities. Trees are often too frequent in cities which are too often more than enough shaded by narrow streets and tall buildings. The various laws as to adulteration of foods, sale of kerosene, etc., should receive attention where any special occasion seems to call for inquiry. Every case of alleged poisoning by food or of explosion of lamps should be inquired into and reported if need be for fuller investigation. Accidents that may have arisen from carelessness or imperfect construction, should often fall under the notice of those looking after the great interests of health and life.

VITAL STATISTICS.

These constitute the record of increase and loss which the State keeps as to its greatest material resource—its population. Authorities are agreed that these records are indispensable in the study of those momentous questions which have to do with the health, the productive power and the lives of the people. The collection of these items must necessarily be committed to local authorites, and should in some way be under the direct or collateral administration of the Local Boards of Health. Most of our cities make very

imperfect use of these statistics. While the State Board aggregates the figures and studies them in their broad relationships, the city must study them in their relation to seasons, and to their own localities. The Health Officers should know each day what deaths have occurred; in what ward, street and house, and if the disease is a contagious one, the locality should promptly be inquired into. If not a contagious disease, there is no such haste, but as the figures accumulate, these too, are to be studied, as to locality, etc., and different parts of the city compared. At the close of every year the city record should show in what house each death has occurred, and that record should be studied as an index of the causes and courses of disease. Still more valuable are the summaries as they give year after year—when a quinquennial or decennial summary is reached—the information imparted is still more valuable. Marks of cases on maps, and graphic lines or colors aid to impress the facts. In some of our cities the compensation received by the Register is at present enough to pay for all this, and where it is not it should be secured. The Medical Health Officer cannot administrate to his satisfaction or for the best welfare of the city without these data. The law is now sufficient, and cases before the courts have so sustained it that if these vital returns are not nearly complete not only Ministers and Physicians and Undertakers are to blame, but the Health authorities.

BOARDS OF HEALTH.

We have left the consideration of these to the last because the law itself and circulars already in circulation and various ordinances passed so clearly indicate their sphere, their duties and the modes of administration. Notwithstanding the law is so framed as to limit partisan consideration, we are aware that those Boards are sometimes embarrassed by political complications. The most partisan official politician with whom I ever had to deal, once said to me: "I know enough not to push politics into health administration." Would that all had knowledge and conscience enough to say that. But at any rate Boards of Health must also know how to do the very best they can amid all embarrassments. No service needs more expert knowledge, more patience, more zeal, more faithfulness. It must avail itself of all the conditions and appliances for the most exact and business-like administration. It must know

the scope of its work, be both persuasive and bold, understand the doctrine of justifiable expediency, as well as that of prompt enforcement of law. Its details of service need not here be again reiterated. But in it the faithful Health Officer and his aids are doing noble work for the city, the State, the people, and faithfulness and ability obtain recognition if not always adequate pecuniary reward.

Let this outline of health administration be suggestive of the great scope, duty and necessity of the work, and prompt all to new devotion in its oversight and accomplishment. It means nothing less than being a public benefactor in all that relates to health and life and to the best physical, intellectual and moral welfare of the whole population.

DISINFECTION.

The sanitary and disease experience of each emphasizes the importance of the most thorough methods for preventing the spread of disease, that these methods are in some regards very fully settled. We will continue to have theories as to the origin and cause of disease, but no one has yet been found to advocate foul air, impure water, bad food, filth and general absence of cleanliness as favorable to the prevention or limitation of disease. On the other hand every new discovery as to the specific character of some diseases and as to the necessity of the presence of a special microptype or germ has left undisputed the need of purity in all things, as promotive of health. While it is not contended that filth will originate certain of the specific diseases, yet it is admitted that they are all rendered more malignant and are more likely to extend amid filthy surroundings. There are also many also who believe that under laws of combination or evolution, many common diseases take on a specific as well as an aggravated character.

It is well understood that in our combat with disease, as well as for its prevention, the great law is to secure pure air, water and food and to remove all such organic matter as is likely to pass into decomposition, and especially that of the putrification type. There are natural decompositions which may go on in the presence of life, and for which nature has at hand competent or compensating provisions. There are others so special in locality and circumstances, or so excessive in abundance that there is always hazard to

health in their presence. There are also forced, anomalous and artificial decompositions. Just as by certain methods of smothering we get charcoal, instead of the usual mode of consuming of wood and may stored up gases capable of destroying life, so we sometimes wholly change the natural order of decomposition and beget products full of special risk. The knowledge or theories of the past dozen years as to the omnipresence of low forms of vegetable life related to specific diseases, has not increased the probability that we shall be able to remove from human dwelling places all the germs or particles of communicable or other diseases. But it has put us on the alert to dilute or dissipate these by fresh air, by washing, and by the addition of certain articles known as disinfectants and by isolation to protect persons from those known to be actually suffering from contagious disease.

We have from time to time noticed the secondary but yet important place which disinfectants occupy, and in our reports and by circulars have set forth the facts as to the preferences to be given to various articles and the modes of their use.

While the last year has furnished no special discovery in this line, it has emphasized the value of corrosive sublimate, and has shown how important it was to rid sick rooms of useless furniture and after the disease has abated to cleanse the walls and all free surfaces. The rubbing for instance of walls with dry bread has shown that in this way more of the minute particles of specific diseases are removed than in any other way. We have even heard of men offering their services in such as bread rubbers as a part of service for hospital and sick room cleansing. It has also been shown, especially by Dr. Squibb, of Brooklyn, and Dr. Prudden, of New York City, that sulphur fumes are not as effective as they have been claimed to be, especially unless given off in the presence of moisture. Dr. E. R. Squibb speaks of it thus:

It seems to be absolutely proven that the one element necessary to the activity of all virus is moisture. Desiccated virus is inactive and impassive; and when desiccation is complete or perfect, as by a sufficient degree of heating for a sufficient length of time, the change is such that the re-supplying of moisture does not reproduce the contagion.

But moisture is an element of varying degree. Too much by dilution may weaken active virus to absolute inactivity, as too little may weaken it to practical destruction.

Contagious matter or virus which is only sufficiently dry to be thus rendered inactive and impassive, becomes active by contact with moist surfaces, and thus moisture becomes the essential element in its contagiousness by supplying the conditions under which its molecules can resume the function of propagation or generation. This same element moisture, which is necessary to enable them to propagate contagion, is equally necessary for any reaction with agents which have the power to so change their molecular structure as to destroy their capacity for contagion.

Hence all disinfectants require the presence of moisture, and require it in a degree sufficient to enable all the molecules of contagious matter to commingle and react with the molecules of the disinfectant. If the moisture be sufficient in amount it matters little whether it be held by the virus or by the disinfectant, but the reaction will be much more sure and more prompt if each of the reacting substances be fully saturated with moisture. If either agent be dry or nearly dry, the reaction will be proportionately slow and imperfect.

The condition of the contagious material of an infected apartment, although not absolutely dry, has only the moisture of the common atmosphere, and if there was any such thing in the living animal as a dry surface there could be no infection from such air-dry contagious material.

An air dry disinfectant or antiseptic is equally inactive and impassive, and for the same reasons; namely, the absence of the physical and chemical conditions for reaction.

When sulphur is burned in air a dioxide of sulphur is formed. One atom unites with two atoms of the oxygen of the air to form an anhydrous, or perfectly dry gas which occupies practically the same space as did the oxygen combined. This sulphur dioxide is therefore a heavy gas, and as it cools after being formed by the combustion, it falls, so that any inclosure in which it is formed will fill up from the bottom as it would with water, and but for the laws of diffusion of gases, an enclosure might have the pure gas at the bottom and none at the top. The laws of diffusion, and the currents of air and gas caused by the heat of combustion, do, however, carry the gas to all parts of an enclosure and yet the gas is in greatest proportion near the floor, and any leakage there, as under the doors for example, will waste much more gas than the same openings higher up. * * * * * * * *

Sulphur dioxide, resulting from burning sulphur in the air, is not a disinfectant, but requires the presence of moisture either with the sulphur dioxide, or with the infected matter, or with both. And, farther, that in proportion to the amount of moisture up to what would be a very large dilution, the more there is present the more perfect are the conditions for thorough disinfection; and the less

moisture there is present the more imperfect the disinfection.

Now, if the practice of Boards of Health and other authorities be examined, it seems to be very defective indeed, unless they use an abundance of watery vapor without thinking it worth while to mention it in their directions and practice.

The common usage seems to be to close up the infected apartments as thoroughly as practicable and to burn sulphur in them in the proportion of four pounds of sulphur to each 1,000 cubic feet of space. * * * * * * * * *

The conditions for a much better application of this agent are very easily supplied. To fumigate with the active sulphurous acid, instead of the inactive dioxide of sulphur, it is only necessary to evaporate water to the extent of three or four times the weight of the sulphur burned, or to wet the surfaces to be disinfected, or both, so that plenty of moisture may be present during the burning of the sulphur. A shallow pan of water upon a kerosene stove well started in advance of lighting the sulphur, and the floor, ceiling and walls well sprinkled with water by means of an ordinary dust-brush, is perhaps as good a practice as any.

There is abundant evidence on record that sulphurous acid in small amount is destructive to all the lower orders of animal and vegetable life, to all fermentations both vital and chemical; and, all that the more recent elaborate investigations seem to have shown, is, that the spores or germs of certain microscopic organisms were not destroyed by it as applied to them, even in the presence of abundant moisture in some of the trials. Many of the late investigations have been made with very great care and labor and by modern accurate methods. Some of the best results are, however, confusing, if not contradictory, and, therefore, are inconclusive, even in regard to the resistance of spores.

Chiefly from the above-mentioned considerations the writer reaches the conclusion that burning sulphur for disinfection should by no means be abandoned, but should be more thoroughly and more carefully applied.

Not only in diphtheria, but in all infectious diseases some such disinfectant is greatly needed in preventing the spread of disease, and diminishing the risks of susceptible persons, and no other method has yet been proposed that is more effective, more simple or of easier application.

In the less convenient and more costly method of disinfecting by gaseous chlorine the same principles apply, and the same conditions are necessary. Dry chlorine gas is as inactive as sulphur dioxide, and from deficient supply of moisture the one will fail as often as the other.

When chlorine is generated from common salt by means of dioxide of maganese and sulphuric acid, the salt and maganese are commonly mixed into a thin paste with water before the acid is

added. Then on adding the acid much heat is developed, and a proportionate amount of water is evaporated and disengaged with the chlorine. But this amount of water is far too small for the full effect of all the chlorine, and unless all the surfaces be well wetted, and steam be supplied, the disinfection will be defective.

If the walls and ceilings of apartments be kalsomined, or be covered with any other preparation of glue or paste, these should be scrubbed off clean with hot water before the disinfection, because disinfection does not destroy the tendency to putrescence in gelatine, glue, paste, etc.

Recently the value of lime and of whitewash has been more fully reasserted. We quote from a recent article as follows:

Lime, simple unslaked lime or freshly slaked, has long been used in various empirical ways as a disinfectant, and some recent exact studies in regard to its value, show, that for certain purposes, it is one of the most trustworthy of disinfectants.

In the early part of the year 1887, Dr. Liborius, of Kronstadt, Russia, communicated to the *Zeitschrift für Hygiene*, a paper on "Investigations into the Disinfecting Power of Lime." In summing up the results of his experiments he says: "An aqueous solution of caustic lime, of the strength of 0.0074 per cent. of the lime, suffices, in a few hours to permanently destroy the typhoid bacillus, and 0.0246 per cent. suffices for the destruction of the cholera bacillus.

Cholera bouillon cultures containing an abundance of fragments of coagulated albumen, which offer as unfavorable conditions for the action of the lime as natural cholera dejections would, were likewise completely disinfected by the action of 0.4 per cent. of pure caustic lime in fragments.

Under these unfavorable conditions, the most effective form of the lime was pulverized pure caustic lime, or as a 20 per cent solution (Kalkmilch).

In the latter part of last year, in the same journal, Dr. Kitasato, of Tokio, Japan, gave the results of rather a wide range of experimental work to determine the action of acids and other alkalis upon typhoid and cholera bacilli. As regards the action of lime upon the typhoid bacillus, he found that the addition of 0.18 per cent. sufficed to destroy typhoid bacilli in neutral bouillon culture, and he concludes that "caustic lime, is a very suitable disinfectant for typhoid and cholera bacilli, for the reasons that it is very effective and very cheap, and is to be found everywhere.

In the early part of the present year in the same journal, Dr. Pfuhl, of Berlin, accepting the work of Liborius and Kitasato as showing conclusively that very small quantities of lime will destroy the germs of typhoid fever and of cholera, undertook to determine in what form it is preferable to use the lime in the disinfection

of typhoid and cholera stools. His experiments with lime in lumps proved that, in this form, its action is too slow. He then made use of the milk of lime, prepared by slaking one part of pure, freshly burned lime, in four parts of water. This gave a 20 per cent. mixture. This milk of lime, when added in the proportion of 2 per cent. to typhoid dejections containing the typhoid bacilli, or to diarrhoeal dejections sown with the cholera bacilla, disinfected them completely. As, however, commercial lime is often impure, he recommends that a large enough quantity of the milk of lime, shall be added to the dejections to be disinfected, to render the mixture distinctly acid when tested with litmus paper.

In the *Revue D'Hygiene* for this year, Drs. Richard and Chantemesse repeat the experimental work which was done by Dr. Pfuhl, and virtually confirm his results, they also favor the use of lime in the form of the watery solution, and found that 2 per cent. of the 20 per cent. solution was sufficient to disinfect the stools of typhoid fever, cholera or dysentry. For the disinfection of a vault which has been infected with typhoid stools, they advise pouring in the watery solution and stirring to liberate the ammonia which is evolved until the whole contents are distinctly and permanently alkaline as tested with red litmus paper.

It would appear then, from the foregoing experiments, that caustic lime is a valuable disinfectant for typhoid fever stools, and the most trustworthy known, for Richard and Chantemesse in comparing its action with that of corrosive sublimate and chloride of lime, found it much more effective than the former, and more so than even the latter. As a disinfectant, unslaked lime must be used in preparing the milk of lime, and this must be freshly prepared or, if kept in a closed vessel, it may be two or three days old. The carbonate of lime, or lime which has long been exposed to the air, is worthless.

Recently the one thing needing to be emphasized as to all disinfection is, that unless applied with all the details prescribed it too often amounts to but little more than a "quieting charm" with which to allay fear rather than control disease. Yet if used as we have often directed, and in accord with the views of chemists and sanitarians it is a great aid to the limitation of disease.

DISINFECTING PLANTS OR APPARATUS.

No city in England is considered as having a competent disinfecting service unless there is a place to which all soiled clothing, not admitting of washing, can be carried in tight boxes and be there subjected to such heat or steaming as will destroy all animal or veg-

table life, or all the particles related to disease. The Ransom stove, among the first of these contrivances, is still in use, but since it a multitude of other forms of apparatus have been devised, some of which are now available in the United States. A very elaborate description of these can be found in the twelfth volume of the American Public Health Association (1886, pp., 198-228).

Recently the Board of Health of New York City (301 Mott street, N. Y). has had an apparatus constructed for this purpose, which is claimed to be very effective and which is well worthy of examination by the health officers of our cities. We desire especially to urge this matter upon the attention of all of our larger towns as we regard it essential to good sanitary provision against the spread of contagious and epidemic diseases.

COTTAGES AND HOSPITALS FOR CONTAGIOUS DISEASES.

Every city stands in need of some form of Hospital, as one of the appliances for preventing the spread of communicable diseases. The single case or the first few cases of such diseases are to be dealt with promptly and effectually if we would prevent an epidemic. While perfect protection and isolation can often be had in private homes, in boarding-houses, hotels and tenement houses, it is often impossible to separate the sick, except by Hospital provisions. Even smaller towns such as Mount Holly and Asbury Park have found signal advantage in having in readiness a place to which such cases could be quickly and safely transferred.

Each city should own a small piece of ground not closely surrounded by dwellings and easy of access on which two or three Cottage Hospitals can be kept or placed, as circumstances may require. While there should be at least one small administrative building as a permanent structure, it is not now difficult rapidly to add detached pavilions if only the plans and the appliances have been well thought out in advance. In the third report of the Ontario Board of Health is a model of the Canton Hospital at Geneva, Switzerzand. Its plan is that of a long, well-covered shed, with ridge ventilation, so provided with side canvas and with apparatus for heating and ventilation as to make it comfortable.

The system of Portable Houses and the many improvements that have been made in Hospital furnishing, and regulation of tempera-

ture render it quite easy to secure, rapidly, additional structures for various diseases if only the land has been secured in advance, some small central building erected and the plan of operation arranged in the minds of the Health Board or by its Inspector.

We call the attention of all of our Health Boards to the importance of timely provision for the separation of contagious diseases, and of being in readiness for prompt action as occasion may require.

VACCINATION.

It is still necessary to urge upon School Trustees, Boards of Health and each family the importance of securing this protection from small pox. The laws as to compulsory vaccination in England serve to bring out an opposition thereto from those that claim it is an infringement of the private rights of the citizen to compel an operation, even of so small a character. Leicester is often quoted as relying alone upon sanitary measurers, but it has been recently shown that its system of notification of disease and issolation is rigidly enforced, and that those waiting upon cases of small pox avail themselves of protection the same as others.

"In the German Empire during the year 1886, the death rate from small pox per million, living, was 3 5; in cities of the Austrian Empire it was sixty-five times greater; in Hungarian cities it was four hundred and eighty-six times greater. Of the 155 deaths in Germany, 45 occurred in the interior of the Empire where the community is better protected by vaccination, and 110 in the border lands and sea coast towns where exposure to countries not so well guarded is more direct."

"In Paris, where the law requiring vaccination is fully enforced, the mortality from small pox ranges from 136 to 10.1 to the 100,000 inhabitants, while in the principal German cities, where the vaccination laws are rigidly enforced, the death rate is but 1.44 to the 100,000 inhabitants. London, under compulsory vaccination, has a death rate from small pox of but .6 to the 100,000 inhabitants. On the other hand, in the Canton of Zurich, in Switzerland, since the compulsory vaccination law was repealed, in 1883, the death rate from small pox has steadily *risen* from 8 to 85 to the 100,000 inhabitants.

"A report lately published by Mr. Ritchie, President of the British Local Government Board, with reference to the recent epidemic

of small pox in Sheffield, shows that of the children under ten years of age, 95,000 were vaccinated and 5,000 were not. Among the vaccinated there were 189 cases of small pox with 2 deaths. Among the unvaccinated there were 170 cases and 70 deaths. Keeping these proportions, if all the children in Sheffield had been vaccinated there would have been 200 cases of small pox among them and a fraction more than 2 deaths; if none of the children had been vaccinated there would have been 3,337 cases and 1,330 deaths, 600 times the mortality with universal vaccination."

From every consideration of humanity and citizenship we must continue to urge the necessity of this protection. Physicians are especially referred to the articles contained in our fifth report and to the remarks on re-vaccination in the twelfth report.

RAILROAD TRANSPORTATION AND SANITATION.

The Board has from time to time directed attention to the need of oversight on the part of Local Boards of the conveniences of railroad stations, their water supply and the cleanliness of surroundings. There should at least be yearly inspection. One of our leading railroad companies has issued orders as to the weekly cleansing and disinfecting of cars. More attention is being given to water supply, heating and ventilation, but there is still much room for improvement. Side windows are used far too much for ventilation, to the pleasure of some and the great risk and discomfort of others. There is no reason why other forms of ventilation should not be sufficient.

TRANSPORTATION OF COMPOST.

Many complaints have come to the Board by reason of the transportation in summer of a mixture of various compounds called stable manure, but really a very noxious compost. When left to be carted to farms from the sidings in cities it has proved a great nuisance. The past summer the matter was again more fully brought to the attention of the P. R. R. Company, and much relief afforded by a suspension of the traffic during the summer months.

SANITARY SURVEY.

Many of the States are now conducting sanitary surveys at large expense, because a knowledge of soil, its contour and typography

and its water deposits, etc., is of such great importance, both on agricultural and sanitary bearings. It is the great boon of this State that its admirable maps and surveys give a complete basis for all such inquiries on the part of local authorities.

Prof. George H. Cook, whose loss the Board together with the whole State so much lament, was fully informed as to the great sanitary interests involved and in this and many other ways aided in laying the foundation for effective sanitary administration for the future.

It is now wise that in addition each city should have sanitary maps showing the underground location of all pipes, tubes, sewers, etc. We believe the time will come when many of our cities will construct underground conducts or tramways in which all water, gas and sewer pipes, and electric wires will be accessible, and through which garbage, etc., can be delivered. The possibilities of cleanliness are such as to require the very best constructive methods.

HEALTH INSPECTORS.

Besides the duties which naturally fall to the charge of Health Inspectors, they should be possessed of some special knowledge on the following subjects:

I. They should have copies of, and be quite familiar with the laws of the State as to health; as to vital statistics; as to the sale of meat and vegetables, of kerosene, and as to the more hazardous adulteration of foods.

II. They should have some knowledge of the principles of heating and ventilation, and be able to measure the cubic space of rooms and buildings.

III. A knowledge of the characteristics of good drinking water; the various ways in which it is polluted and how to prevent it; also of various methods of water supply, as by wells, driven wells, reservoirs, pipes, etc.

IV. A knowledge of the laws of drainage and of sewerage.

V. A knowledge of sanitary appliances as used in houses, and of what is good or poor plumbing.

VI. A knowledge of what constitutes a nuisance from any trade or business.

VII. A knowledge of best methods of scavenging and disposing of refuse.

VIII. A knowledge of methods to be used to prevent the spread of communicable diseases.

IX. A knowledge of proper house cleaning and disinfection.

LECTURES ON SANITARY SUBJECTS

While the sources of information as to sanitary matters have greatly multiplied since the Board began its work, the time has not yet arrived when we can trust entirely to general literature or the press for the needed information. There must still be on the part of the State and of Local Boards efforts to educate the people. The facts are with us and must to some extent be with the people in order to secure that legislation and that administration which to a fair degree will be sustained by public opinion. We often have to move against personal interests because it is right so to do. We need to have a constituency with sufficient information to see the need of laws and of their execution, and so to defend action, for this much can be done by popular lectures. There are physicians who have sufficient knowledge and access to sufficient authorities to enable them to be of great use in this regard to the communities in which they are located. After a teacher, an architect or an engineer can do similar services. For the sake of guiding such we here give outlines of a few courses of lectures which have been suggested or delivered.

An outline of a course suggested to the New Jersey Sanitary Association by Dr. W. K. Newton will be found in this last report.

With these as suggestive models, we trust that some good service will be done in this direction in various localities.

SYLLABUS OF LECTURES ON SANITARY SCIENCE.

BY PROF. WILLIAM H. BREWER.

Sheffield Scientific School of Yale College.

"*I. Sanitary Science.*—Objects and aims of Sanitary Science. Methods of investigation. Relation to the other sciences. Relations to personal hygiene. Three elements determine the health of the individual—(*a*) Constitution, (heredity); (*b*) Personal habits and vocation; (*c*) Surroundings. This equally true of a community. Classification of causes of death. Preventible diseases. Special dangers incident to modern civilization. Achievements of modern sanitary science.

"*II. Pestilences, Plagues and Epidemics.*—The part they have played in history. How they travel and spread. Relations to social and religious life. Relations to commerce. Relations to material prosperity.

"*III. The Germ Theory of Disease.*—Fermentation, general features; the chemical changes involved; the physical conditions required; putrefaction and associated phenomena; the nature of ferments. Zymotic diseases, general character; infections and contagions; animal plagues. Analogies and theories; microbia. Disinfectants and Antiseptics. Present status of the "Germ" theory. Parasitic diseases.

"*IV. Water.*—The properties of Water. Requirements of good drinking-water. Mineral ingredients of natural waters. Organic ingredients of natural waters. Gaseous ingredients of natural waters. General relations of each to health. Special infections. Quantities required per person. Methods of purifying.

"*V. Decay and its Relations to Health.*—"Filth diseases." Gases of decay. Oxidation and Ventilation. Malaria.

VI. Disposal of Filth.—Nature of the filth of civilization. Its general relations to health. Disposal of excreta and slops; sewer-

age, aims and methods; other methods of disposal. Garbage and its disposal. Street cleaning.

VII. Sanitary Aspects of Soil and Air.—Oxygen and its function. Relations of health to the dryness of the air. Relations of health to the dryness of the soil. Relations of health to topographical features. Relations of health to geological feaues. To heat and light. To climatic conditions.

VIII. Vocations and Industries.—Relation of longevity to vocation. Specially unwholesome vocations. "Poisonous trades." Offensive industries. Effluvium nuisances. Various nuisances incidental to manufactures. Abattoirs.

IX. Food.—Sanitary relations as to kind and abundance. Unwholesome foods. Food adulterations. Special dangers incident to the household preparation of food. Special dangers incident to manufactured food preparations. Diseases of domestic animals in their relations to human food. Milk supply of cities. Cookery in its sanitary aspects.

X. Education and Social Customs.—School hygiene. Sanitary aspects of certain social facts; of fashions in dress; of materials used about our persons or houses. Of the use of alcoholic drinks. Of narcotics. Medical customs. Of divers other social customs and facts. Disposal of the dead.

XI. Healthy Houses.—External requirements. Internal dangers to be avoided. Buildings for industrial or commercial uses. Public buildings. Neighbors, their rights and duties.

XII. Sanitary Administration.—Official sanitation. Boards of health. Quarantine. Unofficial sanitary societies and organizations. Sanitary engineering. Professional sanitarians.

XIII. Conclusion.—Present status of Sanitary Science. Effects on the production of wealth. Effects on life insurance and expectations of life. Its relations to modern sentiments. The growth of Sanitary Literature. Modern civilization and the three scourges, War, Pestilence and Famine.

LECTURE ON HYGIENE.

E. M. Hunt, M. D.

INTRODUCTORY OUTLINE OF THE SUBJECT.

I. Hygiene: Its Relation to Cognate Sciences and Arts; the Scope of the Study, and the reasons for teaching it.

THE EARTH AS RELATED TO HUMAN HEALTH.

II. Its Constituents; Animals; Vegetables; Minerals; Soil; Air; Water; Heat; their Relations and their Effects on Health.

WATER AND ITS RELATIONS TO HEALTH.

III. Its Sources without and within the Body; Air and Gases in Water; Animal, Vegetable and Mineral Matters; Organic Impurities; Sewage; Parasites in Water; Relation to Disease; Rain-water for Drinking Purposes; Cisterns; Surface Water; Springs; Shallow Wells; Deep Wells; Bored or Tube Wells; Reservoirs; Tests of the Purity of Water; How to sink Wells; Lead-pipe; Filters and Filtering; Hardness of Water; Aerated Waters; Ice-water.

AIR, LIGHT, SUN-HEAT, AND CLIMATE, AS RELATED TO HEALTH.

IV. Oxygen, Nitrogen, and Carbonic Acid; Aqueous Vapor; Purity of Air; Amount Needed; Air without Draught; Moisture of Air; Light and Sun-rays; Sun-baths; Electricity; Temperature; Climate and Health; Houses and Clothing as adjustments to surroundings.

THE ANATOMY OF THE HUMAN BODY, AND ITS HYGIENIC CARE.

V. The Bones and their Uses; their Proper Nutriment; Protec-

tion from Distortion and Accident; Effects of Posture and Pressure; the Chest; the Foot; the Effect of Habits; Deformities.

THE MUSCLES.—BODILY EXERCISE.—CALISTHENICS.

VI. Athletics; Gymnastics; Calisthenics; Tendons and Ligaments; Exercise; Body-building; Work; Walking; Bathing; Modes and Apparatus of Exercise.

THE SKIN, ITS FUNCTIONS AND ITS CARE.

VII. The Skin: Its Functions and Care; its Vessels; its Nerves; its Glands; its Structure. Perspiration; Water; Other Excretions; Oil-glands and Hair-follicles; Papillæ of the skin; its Nerve Distribution; the Nails; the Care of the Skin; Bathing; Soaping; Rubbing; the various Baths; Special function.

CLOTHING AND HABITATIONS AS BODILY PROTECTIONS.

VIII. Our relations to Heat and Temperature; Design of Clothing; Effect of Density; Fineness of Thread, Color, etc; Elasticity of Fiber; Head Coverings; Body Coverings; Feet Coverings; Waterproof Clothing; Bed Clothing.

Habitations: To be valued as Clothing. How made so as to adjust to our surroundings; as to Air; Temperature; Dampness; Dust; Protection from Chilling Draught.

THE BLOOD AND ITS CIRCULATION.

IX. The Heart and its Tubes; its Mode of Action; Course of the Blood; Composition of the Blood; Effects of Alcohol upon it; the Capillary Circulation; the Lymphatics as related to the Blood; Circulation; the Spleen; Air, and Gases in the Blood; How it is Replenished; Effects of Pressure on the Vessels; Hygiene of the Blood as to Food, Exercise, and Right Living; Faintness; Nose-Bleed; Care of Wounds or of Sudden Bleeding.

THE LUNGS AND THEIR RELATION TO HEALTH.

X. Their Capacity; their Bronchi and Air-cells; Formation of Carbonic Acid; Effect of Oxygen; Power of Blood to contain Oxygen; Impure Air; Air as a Food; the Act of Respiration;

Clothing as Fitted to the Chest; Posture in Study; How to Breathe; the Voice and its Health; its Apparatus; How to Care for it; Conditions of Vocal Success.

THE PROCESS OF DIGESTION.

XI. The Relations of the Mouth and Teeth; the Juices of Digestion; Mastication; Air in Food; the Order of Teeth; Sixth Year Molars; the Care of the Teeth; Chyme and Chyle; the Successive Changes in the Digestive Process; Peristaltic Movement; the Liver and Pancreas; Effect of Stimulants on the Digestive Tract; Deceptive Toleration.

OUR FOODS AND THEIR USES.

XII. Their Relation to the Constituency of the Body; Nitrogenous Foods; Carbonaceous Foods; Mineral Foods; Requirements of the Body as to each; Contents of Meats, Vegetables, and Fruits; Tables showing Proportions; Milk, Bread, Eggs, etc.; Cooking of Foods; Starches; Green Vegetables; Potatoes; Principles of Cooking as applied to various Foods; Modes of Preparing Bread; Hygiene of Digestion.

OUR DRINKS, AND EFFECTS OF STIMULANTS.

XIII. Water; Tea; Coffee and Cocoa; Oil in Cocoa; Chocolate; Alcoholic Beverages; Fermented and Distilled Liquors; Varieties of each; Intoxication denotes a toxic; Daily Rations of Soldiers and Sailors; Records of Registrar-General of England; Testimony of Scottish Amicable Life Assurance Society.

Effects on Particular Organs: The Teachings of Hygiene Explicit as to their evil effects; Condiments; Comparison of them; Tobacco and its Effects; the Cigarette.

MODES OF HEATING.

XIV. Radiation; Conduction; Convection; Heating of inside air by Fireplace, Stoves, Radiators, Pipes, etc.; Heating of outside air and introduction by registers; Heating by outside Radiators and Pipes, and Introduction of Air thus warmed; Illustrations of all these; Comparison of them; Consumption of Oxygen; Other Modes of preparing Air; Avoidance of Draught; of Dust; Chimneys; Cowls.

VENTILATION OF HOUSES.

XV. Constituency of Air; Fire and Lights in Rooms; Living Beings; Minute Particles; Dryness of Air; Draught; Windows; Air Space; Natural and Artificial Ventilation: Plenum and Vacuum Methods; Where shall Fresh Air be Introduced? Outline of Regulations; Ventilation by Flues; Modes of Lighting; Gas Lights; Electricity.

THE SCHOOL AND ITS APPOINTMENTS.

XVI. The Grounds; the Building; Drainage; Materials; Damp Course; Entries and Stairs; Doors and Celilings; Floor Space and Area; Window Space and Light; Blackboards; Desks; Height of Seats; Care of Floors and of Walls; Janitorship; Care of Children; of the Skin; the Breath; the Throat; the Eyes; of Contagious Diseases.

WHAT TO DO WITH REFUSE OR CAST-OFF MATERIAL.

XVII. Conditions of Life; Decomposition; Methods of Disposal; Cremation; Use of Water Evils of Filfth-storage; Absence of Light and Air and Conditions favorable to Disease; Effect of Varying Ground Water or Decomposable Matter; Person Cleanliness and Perfect Housekeeping; How to Prevent Foul Accumulations; How to Deal with Decomposing Matter; various Disinfectants and Modes of Use.

THE NERVOUS SYSTEM.

XVIII. The Cerebro-Spinal System; the Sympathetic System; the Relations of each; Description of the Brain and Spinal Cord, and of the Nerves as Distributed though the System; Reflex Action; the Nervous System; Education; How we Educate ourselves into Reflex Actions properly or improperly; How we make acts habitual or automatic, and so are trained; Nervous Diseases; Alcohol in its Effects on the Nervous System; Effects of Narcotics; Recreation and Rest; how to Invigorate; Twitching, sobbing; Spasm to be Heeded; Discipline in the Training of the Nervous System; Body as well as Mind need Education; Wholeness of Being to be developed.

THE SENSES.

XIX. Sensations; the Muscular Sense; how the Senses are Re-

lated; Cultivation of the Senses; Sense of Touch; varieties in it; Comparative as to Localities; Training of the Touch; Handiwork a part of Education; the taste; how Touch and Smell modify it; how it can be blunted; Perverted Tastes; the Sense of Smell; its Close Relation to the Brain; the Olfactory Distribution; Effect of Foul Air in Sleep; the Apparatus for Hearing; the External, the Middle, and the Internal Ear; how we may affect Hearing; the Throat; Hygiene of the Ear; Injuries and how to guard against them.

THE SENSE OF VISION.

XX. The Protections to the Eye; its Secretions; how we may Disturb them; Affections of the Lids and Glands; the Structure of the Eye; its Relations to Light; its Chief Affections; Myopia; Hypermetropia; Astigmatism; their Causes; Rules to their Avoidance; Specimens of Type; Artificial Lights; how the Eye is Injured; General Directions as to its Care; Color Blindness.

LECTURES ON SANITARY SCIENCE.

DR. V. C. VAUGHAN, ANN ARBOR, MICH.

1. *Chemical Biology.*—(*a*) The formation of organic compounds in the plant, or food for plants and tissue changes in plants. (*b*) Digestion, Assimilation, and tissue change in the animal. (*c*) Physilogical growth and decay of the individual.

2. *Foods.*—(*a*) Varieties and the special adaptability of each. (*b*) The supply of muscular force and animal heat. (*c*) Adulterations of Foods; means of detection and methods for the suppression of.

3. *Water and Air Supply.*—(*a*) Detection of impure water. (*b*) Methods of purifying. (*c*) Water supply for farm houses, villages and cities. (*d*) Baths and bathing. (*e*) Air supply and ventilation. (*f*) Laws preventing the polution of water and air.

4. *Supply of Fuel and Light.*—(*a*) Varieties of Fuel and Special use. (*b*) Method of heating. (*c*) Methods of lighting.

5. *Ferments and Germs.*—(*a*) Physiological ferments and fermentation. (*b*) Disease Germs. (*c*) Filth diseases. (*d*) Antiseptics and disinfectants and their use. (*e*) Quarantine, vaccination, etc.

6. *The disposal of decomposing Matter.*—(*a*) Vaults, cesspools dry-earth closets, etc. (*b*) Sewerage. (*c*) Disposal of the dead.

7. Public Nuisances.

8. Influences of occupation upon health.

9. The relations of Meteorological conditions to health and disease.

10. Vital Statistics.

11. Duties of boards of health and health officers.

12. General health laws.

SCHOOL HYGIENE.

A SCHEMATIC VIEW OF TOPICS.

Prof. T. P. Wilson.

A. — GENERAL TOPICS.

1. School Houses; 2. Scholars; 3. Teachers; 4. Curricula; 5. Parents. Trustees.

B.—SPECIAL TOPICS.

1. School Houses. 1. Location; 2. Construction; 3. Management.
   1. Location. 1. Soil; 2. Street; 3. Grounds; 4. Neighborhood.
   2. Construction. 1. Material; 2. Form; 3. Furnishing; 4. Water Closets.
   3. Management. 1. Warming; 2. Ventilation; 3. Light.
2. Scholars. 1. Age of Admission; 2. Years in School; 3. Manners and Hours of Study; 4. Physical Condition.
3. Teachers. 1. Age; 2. Qualifications; 3. Duties.
4. Curricula. 1. Subjects; 2. Time; 3. Mode of Teaching.
   1. Subjects. 1. Literature; 2. Art; 3. Science.
   2. Time. 1. Literature, one-fourth; 2. Art, one-fourth; 3. Science, two-fourths.
   Mode of Teaching. 1. Text Books; 2. Lectures.
5. Parents. 1. Home; 2. School. Trustees.

Ann Arbor, December 13, 1883.

U. S. NAVAL DEPARTMENT AND LITERARY CLASSIFICATION AND ARRANGEMENT.

A.—DEPARTMENT OF PUBLIC HEALTH AND COMFORT

Class 1.—Local Hygiene.

Sub-class 1.—SOIL:

a. Geological and physical character of localities.
b. Thermometry.
c. Permeability by gases and water.
d. Micro-organisms.

Sub-class 2.—ATMOSPHERE:

a. Chemical composition.
b. Abnormal constituents—chemical, microscopical. How supplied.
c. Physical properties—humidity, heat, electricity, winds, weight.

Sub-class 3.—ARCHITECTURE:

a. Dwellings.
b. Hospitals, medical establishments, infirmaries, asylums, homes, alms-houses.
c. Buildings for educational purposes, refuges, reformatories.
d. Schools of all degrees, and their equipment.
e. Factories, laboratories, (chemical, powder, fire-works), metallurgic works, work-shops.
f. Vaults, morgues, mortuaries, burial of the dead, and creation.
g. Movable dwellings, tents, shelters.
h. Materials of construction, devices.
i. Walls, prevention of the rise of damp through foundations and walls.
k Cellars, surface drainage.

l. Wood floors for use without carpets.
m. Fire-proof construction.
n. Ventilation.
o. Heating; grates, stoves, furnaces, steam, hot water.
p. Fixtures and fittings connected with water-supply.
q. Drainage; disposal of refuse and excreta.
r. Defective and ill-constructed traps, pipes and sanitary apparatus of various kinds.
s. Materials and appliances for obtaining artificial light.
t. Laundry arrangements.
u. Floor, wall, and ceiling coverings; tiles.
v. Household furniture, showing sanitary advantages and defects.
w. Fabrics suited to avoid the harboring of dust, zymotic effluvia, or vermin.
x. Culinary utensils and other household requisites from a hygenic stand-point.

Sub-class 4.—TOWNS AND CITIES:

a. Streets, roads, parks, etc.; paving.
b. Drainage and sewerage.
c. Application of sewage to agriculture.
d. Water-supply, public baths and laundries; drinking fountains.
e. Public lighting.
f. Food-supply, markets, dairies, slaughter-houses, hotels, restaurants.
g. Steam, electric and horse railroads.
h. Water transportation.

Sub-class 5.—SHIPS—WAR, MERCHANT, YACHTS:

a. Heating and ventilating.
b. Living accommodation.
c. Quarters for the sick.

Class II.—Personal Hygiene.

Sub-class 6.—CLOTHING: To include materials, processes and fabrics.

a. Specimens of fabrics used for clothing, with statements of their relative power of resistance to the absorption or

transmission of heat, their relative flexibility, durability, fast or fugitive color, etc.

b. Body garments providing against cold, rain, dry or damp heat, dust, and attacks of insects.

c. India-rubber, gutta-percha, and other water-proofs.

d. Head and foot coverings.

e. Military, naval and industrial costumes.

Sub-class 7.—FOOD: Rather kinds of food. N. and C.

a. Food supplied by the animal kingdom.

b. Food supplied by the vegetable kingdom.

c. Secreted and extracted products.

d. Condiments.

e. Narcotics and masticatories.

f. Beverages and drinks.

g. Microscopic preparations illustrative of genuine and adulterated food articles.

h. Culinary science and dietaries. Cookery.

i. Military and naval rations.

k. Personal regimen—exercise.

l. Special hygiene of professional occupations.

B.—DEPARTMENT OF LIFE-SAVING AND PRESERVING.

Sub-class 8.—PUBLIC HYGIENE:

a. Life-saving from fire.

b. Protection against lightning.

c. Protection against inundations.

d. Protection against explosions.

e. Protection against accidents in submarine works.

f. Protection against accidents in mines.

g. Safety appliances in traveling on land.

h. Safety appliances in traveling on water.

i. Prevention of the accidents, injuries, and diseases incident to industrial employment.

k. Prevention of contagious diseases.

l. Attendance to persons wounded in war—ambulance, cots, litters, and other apparatus.

m. Attendance to persons accidentally injured in peaceful pursuits.

n. Fragments of exploded boilers, heaters, tubes, etc., damaged by pressure, frost, acids, scales, and other deposits, injury by bursting.

GENERAL CIRCULAR.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
WASHINGTON, January 10, 1882.

The Surgeon General of the Navy has established a Museum of Hygiene connected with this Bureau, which the American Public Health Association has made its permanent central repository.

It is intended that it shall exhibit the present state and future progress of the nation in all departments of hygiene, and to carry out this important scheme, the co-operation of physicians, engineers, architects, builders, manufacturers, inventors, and others interested in sanitary matters is not only desirable but indispensable.

Contributions of articles, appliances, models, drawings, etc., illustrating improvements in food, water-supply, bedding, clothing, marine architecture, house and hospital construction and furniture; apparatus for heating, illuminating, ventilation, and removal of excreta and refuge; culinary, laundry, and bath facilities; appliances for physical culture and exercise; and whatever else tends to the preservation of health and the prevention of disease, are therefore solicited.

Contributions of materials and books should be sent to the address of the Surgeon General of the Navy. Donors and depositors will, in every case be duly credited on the descriptive labels of their exhibits.

Respectfully,
PHILIP S. WALES,
Surgeon General U. S. Navy.

CIRCULAR TO NAVAL OFFICERS.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
WASHINGTON, January 15, 1882.

The Medical Officers of the Navy are informed that, in the application of a fund appropriated by Congress for sanitary investigations, the Surgeon General has instituted a Museum of Hygiene connected with the Bureau, which is intended to exhibit the present state and future progress of hygiene. In this undertaking the active interest and co-operation of the members of the Medical Corps of the Navy are expected, and it is desired that they will avail themselves of every opportunity to procure, both at home and abroad, contributions for exhibition of such articles as may have a bearing upon the preservation of health, the prevention of disease, and the comfort of the sick. There are many subjects

which admit of a vast range of illustration, among which may be mentioned: models, drawings, and appliances suggesting improvement in house, hospital, and marine architecture; apparatus for heating, ventilating, and illuminating; collection and disposal of excreta and refuse; food and water supply; clothing; appliances for exercise and physical culture, etc., etc.

Respectfully,

PHILIP S. WALES,

Surgeon General U. S. Navy.

INSPECTION WORK OF THE BOARD.

During the past year the inspection work of the Board has been pursued with renewed diligence and increasing satisfaction. It is evident that from time to time various local boards need to be visited in order that they may be instructed as to ordinances as to modes of procedure and as to the evils which need to be remedied. The State Board is often appealed to in difficulties arising out of attempts to remove nuisance, and not unfrequently is able to secure the desired result without litigation. Where litigation occurs the testimony of the State Inspectors is often of much value. Eternal vigilance is the condition of success in combating the causes of disease, and if pecuniary provision permitted it would be practicable to extend this work considerably. Some special inspection has been made of some of our principal places for summer resort, and of the condition of the hotels and boarding houses open for the reception of guests. So many defects have been revealed that the Board has thought proper to order a special examination and report for the ensuing year. While our resorts will, in their sanitary condition, favorably compare with those of other States, we desire to be able to say more than this.

Our experience with at least one of the seaside resorts has shown the possibility and feasibility of a record which shall tell to strangers the sanitary condition of each house, and so enable them to have a reasonable assurance as to its fitness or unfitness for occupation. The result is a confidence which far more than balances the evil of exposures. More than this, it is a duty we owe to society, and oftener than we think the demands of sanitary law and its enforcement is in the direct line of pecuniary advantage and of steady and prosperous growth.

The sewer systems of the State have been examined during the

year. It is the constant effort of the Board thus to co-operate with all the local boards and thus aid them in their work. Much also is accomplished by the correspondence of the secretary and by information in various ways furnished to local boards. The circulars of the Board, which are always at command, are found very serviceable and are especially called for in times of epidemic.

Under the heading of Circulars and Laws will be found a list of all circulars at present issued and kept on hand for distribution.

CHILD TRAINING AS TO HYGIENE.

There is no more essential and precious guardianship than that which needs to be exercised over child-life. We now speak of it only from the physical side of life. Life and health are the foundation capital and the foundation hope for worldly happiness and prosperity. Wise is that State which early turns its attention to the care of childhood in the home and in the school.

As to the home, the sphere of State influence and control may seem somewhat restricted. But even here, without meddlesome interference, there can be wise supervision and assistance. The State has a right to place limitations upon the degree to which people may be packed in houses or to say that no family of children shall be compelled to be brought up in one room. It has a right to prescribe rules as to admission of air and light, as to space for ingress and egress and for the prevention of accidents.

It must more and more be recognized as a part of governmental admistration to regulate the construction of dwellings to the extent required for health. Laws for the prevention of cruelty to children are now well recognized as having their place in codes and statutes, and there is no reason for overlooking those smaller impositions which are disregarded because of their smallness or insidiousness, but which become most serious by reason of their quantity and their continuance.

There is ever need of care that the child be protected as far as the domain of law can reach from all those conditions which tend to interfere with the development of the physical life. For the stamina of the man and the woman are being determined in these growing years, and this means the vigor and welfare of the State as well.

PHYSICAL LIFE IN THE SCHOOL.

Still more time is it that the control of the State has to do with the physical life in the school. Here the State itself takes the child in charge. As its ward, and by the offer of free education, recognizes the essential relation which exists between the two. Society, by the force of events, has been brought to recognize that this education must mean the training of the physical as well as the moral and intellectual natures. Hence the training of the body in all that habit, posture, exercise, development mean, comes largely into the calculation. We are to study the laws of health and to teach them and see them practiced with the same exact assiduity with which we train mind or soul. Hence, the sanitary conditions of all school buildings must be sedulously secured Sanitary methods must be in operation in lighting, heating and ventilating, in the arrangement of studies, in the admixture of work and play and in all the details of education. It has come to be recognized as an axiom that what we would have appear in the Nation's life we must have appear in its schools. This is especially true in a country like ours where the popular voice and the popular vote, not only make public opinion, but are the real powers of government.

Our public school system, especially, is based upon the fact that education is essential to the prosperity and perpetuity of the State. Lest it should be neglected, the State makes of it a gratuity, and, as far as seems practicable, compels the training and education of the children. Well may this be so when we remember that even every year brings to the ballot-box multitudes of new voters, who if good voters, will express the results of training in the home and in the schools.

How much then depends upon the character of the education imparted? So much over-prominence has been given to mere mental education, that it is necessary to urge the still greater importance of moral and physical instruction. Dr. Lord, in his Roman history, notes the fact that the first signs of the decadence of a nation are to be found in physical changes of the people, and in less tendency to and ability for sustaining occupations. Those who have studied with closest scrutiny the nearly two hundred years of American population, and have taken into consideration the influx

from immigration, are quite in agreement that there has been gradual loss of physical vigor, and that it is high time for us to seek to counteract this tendency by a reconstruction as to our methods of and subjects for education. It is probably the inherent recognition of this want that has led to so great an extension of athletic sports and gymnastic exercises, and has helped to give to instruction and practice in manual labor the prominence of consideration which it is now receiving.

This Board early took occasion to issue circulars upon the subject, and four years since, in conjunction with the Superintendent of Public Institutions, made an extended inquiry into the sanitary conditions of the school buildings of the State. This awakened the attention of teachers and trustees and led to many improvements in the appointments of school buildings. But the subject of which we now speak is one of still greater importance. It concerns that kind of training which the pupil is to receive during his school life, and those methods which shall secure its practical application to his own physical habits. In all our higher and larger schools there is need of definite instruction in hygiene instead of mere advice. Only so much of anatomy and physiology should be taught as are subservient to the teaching and practice of hygiene. Teachers should be examined as to their knowledge of this as of other branches, and should themselves be able to give practice in calisthenics and to direct as to other exercises. Where, as in the ordinary country schools, it is not practicable to have a text book of hygiene, the teacher should be so well versed in the subject as to be able to give short lectures on the various topics which it includes. We know of some instances in our own State where this has been done with great success. Often, too, the physician of the neighborhood may be found available for occasional instruction in this direction. If only the rising generation of children could be educated in what is now known of the principles and practice of hygiene, it would secure a race of improved vigor, increase the working period of life and diminish the number of untimely deaths. The fact that one-half of our children die before six years of age is serious enough. But it is still more serious that this indicates a want of vigor in parentage and in a large proportion of those that remain. If we wish radically to reduce the sickness rate we must secure such manly and womanly vigor as will be more resistful of

disease, or be better able to grapple with it when it invades. We refer our teachers, physicians and people in general to the many articles on this subject in our former reports, and add some in this report, from experienced and accomplished teachers of our State. These will be found to contain many facts and thoughts which should lead to more thorough attention to the subject.

CHARITABLE AND PENAL INSTITUTIONS.

The Board has continued, during the year, an examination into the sanitary condition of institutions. The full report made last year seemed to arouse public attention, and to make many of the officers more watchful as to prevalent conditions. Local boards are also recognizing this as a part of their duty and make occasional examinations. Valuable additional circumspection is given by members of the State Charities Aid Association and its local branches. While its attention is especially directed to personal needs and social questions, it also incidentally aids much in securing cleanliness of persons and surroundings. There remains much to be done in rendering all these various institutions as effective as possible for the purposes for which they are intended. It is the effort of the Board to have as many as possible visited each year, including the township almshouses, which, because of their smallness, often fall into gross neglect.

HEALTH LAWS.

The various laws relating to the public health receive the careful oversight of the Board. Those relating to the adulteration of foods and drugs and to the contagious diseases of animals are now also reached by the service of the dairy commissionar and of the U. S. Bureau of Animal Industry. We still give careful attention to adulterations injurious to health, to complaints as to the sale of poor quantities of kerosene, and as to the disease of horses known as glanders, which is communicable to man.

We had occasion the past year in connection with the serious freshets to call attention to the laws as to drainage. For years some of the mill dams, situated so as seriously to interrupt drainage in inhabited localities are being removed.

Our two principal health laws as found in Circular LX (chap. LXVIII, Laws of 1887), and Circular LXVI, (chap. XXXIX, Laws

of 1888). Attached to Circular LX is a list of various health laws passed from time to time by the Legislature. As a whole our system of sanitary legislation is ahead of its effective administration and forms the basis for excellent sanitary progress.

THE THERMOMETRY OF HYGIENE.

Annual Address of the President of the New Jersey Sanitary Association, held at Trenton, November 22 and 23, 1889.

BY D. BENJAMIN, M. D., CAMDEN, N. J.

[NOTE BY THE SECRETARY.—The address of Dr. Benjamin was without manuscript and was illustrated by various maps and diagrams, so that it can only be reproduced here by abstract. It has been a study with him for a long time. His object has been by actual tests in the sick room to find the varied temperatures at the same time in different parts of the room and at different heights. Results show some surprising variations between the center and sides of the room and between the vicinity of windows and the more remote corners. As currents of air are made by variations in temperature, the bearing of all this on ventilation is easily seen. We believe the paper will be of service in drawing special attention to the subject.]

It gives me much pleasure this evening to address such an audience as this and upon such a subject as Sanitary Science. Surely this is one of the first consideration, and yet there is perhaps no subject to which the masses of the people seem so indifferent. The Thermometry of Hygiene has not been studied, and I could find no literature upon it. Years ago its importance pressed itself upon my attention. The frequency of colds and the tendency of civilization to increase our susceptibility to colds, show that the progress of civilization is towards rendering the human race more feeble, and it is only to the development of human science that we can look to combat these tendencies. Every nation, as it becomes more civilized and enlightened, seems to degenerate until it reaches its declining stage and is marked with decay. Such has been the history of the world, and it is hardly fair to affirm that this age is

an exception to the history of the past. Rome and Greece followed the same course, leading to effiminacy, decay and ruin.

Perhaps there is no class of diseases more common than those of the respiratory organs. Now, what is a cold? appears to be the first consideration. This has never been clearly defined. But we may say it is a congestion and an inflammation. This is mostly produced by some exposure to changes of temperature. The effect is very greatly increased by moisture. A uniform temperature of 70 degree F. is about what a human being can remain in and continue in a normal condition. This in ordinary circumstances, but if we have been overheated and then sit quietly in this temperature, we may take cold. Loss of heat, with dampness and wet feet, results in the leaving of the blood from some portion of the body, and consequently there is an accumulation of it in some other place. This other part is then in a state of congestion. This is the first stage. If reaction can be brought about, the cold may be prevented in many cases. But the majority of colds, croup, etc., are due to the changes of temperature in the dwellings and rooms at home. This has been known, but no satiafactory knowledge has been obtained. Most of the cases are in the house, and persons in the habit of going out will not take cold. They keep in motion and the temper ture of the body is even. But in the house the circulation is interfered with.

One physical law is that heated air is lighter than cold air and it will ascend. Therefore the hot air will accumulate at the ceiling, and the floor will remain cold. The second law is that the circulation of air goes on if there are any means within to warm the air or disturb the temperature. That is, if there is a human body in the room or a stove, a constant current air of will be induced. Of course, we cannot live in rooms unless there is an influx of pure air and an egress of impure. It is necessary that currents of air be thrown into the room. Most rooms have no provision for the ingress of air. They depend upon crevices of windows and doors. The cold air works its way in and floods the floor, and the little children on the floor are sitting in cold air, while their parents above them feel a higher temperature. This is mostly due to stoves. A stove requires a constant and larger supply of air, and the air must come in with great rapidity. Some of it is almost as low in temperature as the external air.

In order to ascertain the exact difference in temperature, I procured a number of ordinary thermometers and hung them in different parts of the room. I found that where there are heaters used a different state of affairs exists. The air from the heater as it poured into the room is warmed before it enters, and there is a warm current going out. In heating by steam there is not the ventilation obtained when a stove is used. There is no draft in the room at all. The air in the room is merely heated. Where there is steam heating there must be some system of supplying fresh air in the room, and some exit for the foul air.

(Diagrams were exhibited, showing clearly the action of the currents of air, and how hard it is for children to escape without colds and croup).

No. 1 shows plan of room. The outside air is 24 degrees, while inside at the window it is 40 degrees and ranges up to 80 and 90 degrees at the stove, while in the upper part of the room it is 78 degrees.

No. 2 shows temperature of cellar under the floor as 22 degr es with 50 degrees at the floor, and ranging to 85 degrees at the ceiling.

No, 3 shows 24 degrees outside and 30 degrees at the window inside, with a cold current flowing into the room from the window making 59 degrees at the floor while 71 degrees is marked in other portions of the room. A child standing at the window is in a temperature nearly as low as that outside.

No. 4 shows temperature in different parts of a house. Cellar 42 degrees; first floor room heated by a stove, ranges from 48 to 78 at the floor, 32 to 90 half way up, and 80 to 90 at the ceiling. Second floor room heated by a stove, 65 to 68 at floor, 65 to 73 in the middle and 70 to 77 at top. Third floor not artificially heated, 45 to 52 at the floor and 66 higher up.

No ventilation should be allowed to come from open windows No stream of cold air should be allowed to come in. The opening of church or car windows is a serious source of danger and death that should be prohibited. There should be fresh air, but it should be heated, and not allowed to enter in cold streaks. With steam pipes there should be an ingress of air. It should not come in in solid volumes, but in small streams, and strike the heater.

Sanitary science has a field in which to work, in the State House

Here it is crippled by political complications. This is specially so in school-rooms.

The ventilation should not be in the top of the rooms. It is a mistake to have the foul air register in the ceiling. The foul air being heavier than pure it should be allowed to pass out near the floor. It will then be forced out by the heated air filling the upper portions of the room, and the whole room will be warmed. (Illustrated by diagram showing true and false methods).

There is no association in this State so potent for good that has done so much to enlighten the people as this Sanitary Association. It is good, of course, to heal diseases, even though sometimes the physician may be paid. But it is a far greater thing to prevent these diseases. The suffering is prevented, the danger avoided and the life prolonged.

No doubt there are thousands now living and millions yet to come who will profit by the labors of this association, though they may not know the source of these benefits. As sanitary science is appreciated these beneficial results must grow. The greatest blessings come to us without a knowledge of their sources. The influences of the sun and the rain, and all the glorious blessings of our lives seem to come in the course of nature, so the blessings of Sanitary Science do not seem to be appreciated by those who are most benefited by them. The indifference of the people is a source of alarm. We have daily evidence of the deadly influences of typhoid fever. Science raises her voice and declares that 99 per cent. of all the cases of typhoid fever come from the drinking water. This is the verdict of the greatest scientists of Europe. In view of the incontestable evidence, if the water supply is pure it may be asserted that you will not have one case of typhoid fever where now you have a hundred. But look at the indifference of the people. Not only is it true of typhoid fever, it is almost equally true of all the other cases of preventable disease.

I urge you to go forward in this good work. Your efforts have already been far reaching, and promise hereafter greater results.

THE EAST ORANGE SEWAGE DISPOSAL WORKS AS COMPARED WITH OTHER METHODS.

Abstract of Paper read before New Jersey Sanitary Association, Trenton, November 22, 1889.

BY C. PHILLIPS BASSETT, M. AM. SOC. C. E.

When the township of East Orange began discussion of available systems of sewage removal, in 1883, they came face to face with a problem altogether new in municipal development in this country. Serious obstacles to a collection of the sewage, due to topographical peculiarities existed, but these problems were almost forgotten in a search for a satisfactory outfall for the collected domestic and manufacturing wastes.

Bordered by Newark, Orange, South Orange and Bloomfield; supplied with excellent water, and provided with many miles of substantial Telford pavements, East Orange was enjoying an area of most prosperous growth and development. But every rise in the wave of municipal prosperity made more urgent the removal of voided and discarded wastes.

How was this to be accomplished? Where were they to be discharged? These were the questions propounded before many a public meeting, and many times to committees in power during the winters from '83 to '86. *(a)* The sewers of Newark on the east offered possible outlet to the Passaic river. *(b)* Pumping over the high ridge to the south, and thence to the Newark bay between Newark and Elizabeth was suggested; *(c)* and schemes for local purification of the sewage were presented. To the first project Newark, through a Common Council committee, said emphatically, No! The sewage of Newark was of itself giving sufficient trouble

in the water supply without accepting contributions from beyond its limits, even for a liberal subsidy. Pumping to Newark Bay involved eight or nine miles of conduit outside of the township across several municipalities, beside the heavy current expenses of pumping and maintenance. Rights of way and legal complications added objections to this plan. Argument, discussion and investigation seemed equally to favor some method of local disposal of the sewage.

I do not understand that the title of the paper allotted to me has been intentionally worded to secure a comparison of the operation of the purification works which have been constructed with results possible by any of the projects originally suggested in East Orange involving a crude discharge of sewage into tidal waters. I interpret the intention to have been to compare the results of the purification process here adopted with other purification processes.

Nor is this an easy task. For it may be stated with perfect assurance that no system of sewage purification has been constructed in this country, up to the present time, which is competent to do the work, under similar local conditions, which the East Orange plant was designed to accomplish. Small available area of land in the midst of a dense suburban population, and a high class of chemical purity in the effluent from the works which flows into a small stream entering the Passaic river close to the water supply intakes of Jersey City and Newark. These were the conditions which the works were designed to meet.

The aim of this paper will be to give in outline an accurate account of the success and shortcomings of the works as constructed and operated, and then outline the conditions under which the principles involved may be introduced with advantage into new work.

A brief explanation of the system will be of service. (For further description and plans, see "Engineering and Building Record" and "Engineering News" for January, 1889.)

The sewage enters the works in a 2 x 3 feet new form, egg-shape, brick sewer, terminating in a conduit of rectangular section having lateral projections, extending nearly to its centre on alternate sides, at intervals of three feet along the axis.

In this conduit, chemicals from the building unite with the sewage, the lateral projections of the carrier give a whirling motion to

the sewage, which causes a complete mixture of chemicals with it. The carrier now leads the sewage to the precipitation tanks. The tanks are constructed in duplicate, one set being cleaned or lying idle while the other is in use. A brick wall, located ten feet in front of the inlet to the tanks, checks the velocity of entrance flow. A board floating on edge in vertical guides intercepts the lighter floating matter and insures their saturation before passing it, at a depth from the surface of 30 feet. The cross-walls in each tank divide it into three compartments; over these the flow passes with a depth of about 2 feet, the heavier matters settling and being intercepted; with a continuous flow of low velocity in the tanks the surface water is being constantly skimmed off into the carrier, leading to the irrigation ground. Drums float a swivel-arm in each compartment which connects with a low-service pipe in the bottom of the tanks and discharges on the surface of the ground at a low level. These arms draw water only from the surface, but the drums falling with the water enable any arm to empty the compartment in which it is located to within eighteen inches of the bottom into the low service carrier leading to the surface of the ground.

The effluent from the precipitation tanks, after entering the carriers, is distributed over the surface of the filtration ground and descends to the under-drains which are from three to five feet deep and twenty feet apart over the entire 14.7 acres in the works.

The sewage effluent is applied to the land on the principle of intermittent downward filtration, the flow being applied successively to different areas. Part of the land is laid off in beds four feet wide, separated by shallow furrows in which the water flows, soaking laterally into the beds. The remainder of the land is divided into flat beds, 100 feet long by 50 to 100 in width, over the whole of which water flows. This latter method is preferable where the coarser matters are removed from the sewage before it passes onto the land.

Italian rye-grass has given the best results on the land, and is now grown almost exclusively. Farmers from the neighborhood cut the grass and remove it as necessary, but up to the present time the town authorities have not been able to secure a satisfactory return from its sale.

Returning now to precipitated matter or sludge in the tanks; after the supernatant water is drawn off through the swivel-arm, a

valve-gate is opened and the sludge drawn into the deeper sludge-well within the building. By forming a vacuum in a cast-iron receiver which is connected by an iron pipe with the sludge-well, the sludge is drawn up in the receiver; milk of lime being drawn in at the same time by a small pipe from a mixing tank in the chemical room. This lime prepares the sludge for pressing, cutting it so that the water separates more readily from the solids.

A pressure of 100 pounds per square inch is secured in one of the other receivers, and, being connected with the receiver containing the sludge by an air transfer-main and the proper valves opened, the sludge is forced into a Johnson filter-press and pressed into moist, hard, portable cakes.

The machinery used in manipulating the sludge was constructed by S. H. Johnson & Co., of Stratford, England, who have erected numerous plants in England. Their machinery is the subject of several patents and no similar devices are manufactured in this country. Water for dissolving the chemicals enters by a pipe from the town water mains. Air from a compressor is blown in at the bottom of the tank and the active agitation rapidly dissolves the chemicals. The outflow of chemicals to the sewage is regulated by gate-valve. At present about 2.5 grains of lime and 1.0 grain of sulphate of alumina are added per gallon of sewage treated. The sewage is highly diluted with a large flow of ground-water taken into the twenty-six miles of sewers in the town—more than twelve miles of which are constructed in a saturated subsoil.

The filter-press consists of thirty-six cast iron cells, supported on a simple frame, with a central feed-passage into which the sludge is forced from the receivers. The cells are separated by canvas bags, and in the intercellular spaces the sludge remains while the water is strained out through the canvas into a trough on the rear of the press and returns to the tanks. On the end of the press is a capstan screw connected with a thrust-block which presses the thirty-six cells of the press into close contact. It is the air pressure which separates the water from the sludge.

There is nothing offensive about these cakes when pressed dry; and, if protected from water after being taken from the press, may be kept in bulk for weeks without nuisance. But, in the presence of heat and moisture, they become more or less objectionable.

At present between six thousand and eight thousand people are

contributing to the sewage, and about ten tons of sludge-cake are taken out each week. Some of the sludge cake has been sold at fifty cents per load, but more has been given away in the hope of creating a demand for it among neighboring farmers, while a large amount has been carted away by the authorities when no other removal offered.

It seems here desirable to introduce a summary of the processes of purification which are operating on the sewage as it passes through the works.

As the sewage enters the tanks, matters in suspension by their own gravity tend to deposit; this tendency is fostered by the arrangement noted of the cross walls and floating interceptors. The coagulated film formed by the chemicals entangles finer suspended particles and enticing other matters from solution, settles or is precipitated in the tanks.

The effluent water from the tanks is spread out over the surface of the ground in their streams. Coming in contact with vegetation, some of the water is absorbed through the large bulbed roots of the grasses, and more or less aeration of the water; resulting in the combustion of nitrogenous matter; occurs in its flow through the carriers and over the land.

The soil acts on the effluent water first as a mechanical filter, straining out finer matters in suspension; it next performs the work of dividing up the water into minute particles and prosecuting an increased surface to the oxygen contained in the pores of the soil, oxidation or combustion of organic matter here takes place.

Until recent years the processes at work on the sewage water were traced no further than this point, but the enunciation of th e germ theory of disease and the careful study by biologists and microscopists of this subject have made clear another agent, more powerful under favorable conditions perhaps than all others combined.

Microscopic life, scavenger bacteria, is found at work in the soil near the surface devouring and destroying with wonderful rapidity under favorable conditions nitrogeous matters entering the soil. The results produced by these agents is called "nitrification," and is, perhaps, the safeguard of the land treatment of sewage. All these agents, comprising all that is practically applied in sewage purification works, are at work in the East Orange plant. Rough

sedimentation, coagulation and preceptation, oxidation and intrification are each allotted duties in the proper operation of the plant. Better results could be obtained by calling out more nearly the full efficiency of each than is obtained at present. But the works have accomplished an important service. They demonstrated the practical operation of the processes of purification to an unbelieving public; they have made a sewerage system possible in an important residence district of the State, and they have pointed out difficulties which could hardly have been forseen and fortunately indicated the methods of their solution. All this they have accomplished with abilities of the work never called out by vigorous maintenance.

The expense of maintaining the works is about fifty cents per head of contributing population; this amount may be somewhat reduced when a larger part of the population of the township is connected with the sewers.

Mention has been made of the unusually large percentage of the sewers throughout the township which are under water pressure. The intricate topography of the town made several heavy cuts—in some cases over 30 feet—necessary. In all these deep cuttings the water level is now far above the sewers; a head pressure of over 20 feet occuring in several places. In addition all the mains located in the valley lines were constructed in a quicksand or running sand formation. Under these circumstances, despite the greatest care and much expense, a considerable volume of ground water finds its way into the sewer pipes. When it is remembered that there are over 2,600 joints per mile, some of them over six feet in circumference, the practical impossibility of making actually impervious sewers under the conditions named with vitrified pipe and cement becomes apparent. But this flow from the 25 miles of pipe sewers was limited to a very small volume, probably about 2.5 gallons per second.

It was necessary however to build the outfall sewer with a size beyond the maxium vitrified pipe and a brick sewer was therefore constructed for 2,000 feet through a difficult formation, a timber cradle being used under the sewer.

In another section of the town a tunnel, at a depth varying from 25 to 35 feet, was driven for about 2,500 feet to avoid the interference with surface travel incident to so tedious a work in open

cut. The great difficulty experienced in controlling the large volume of water encountered at this depth practically prevented the construction of an impervious sewer in this place, where the tunnel was lined with brick.

From these two pieces of brick sewer less than a mile in length about five gallons per second enters the sewers—twice the quantity, it will be noted, entering the remaining 25 miles of pipe sewers.

This aggregate flow of 7.5 gallons per sec. (650,000 gallons per day), mingles with the house sewage (about an equal amount), becomes sewage and must undergo the purification processes.

To relieve the filtration grounds, which have rather a retentive soil, from the heavy tax of passing this million and a quarter gallons per day, several artificial filter beds of coke and gravel were constructed and have been of material service, performing the work excellently. Obviously the more labor of purification performed in the tanks the less remains to be accomplished on the land.

On account of the small quantity of chemicals which are being added to the sewage, the coagulation and precipitation is much less effective than could be secured (at an added cost) and the land is called upon to do rather more than its equitable share of the purification.

I have nothing to do at present with the management of the works—they having been turned over to the authorities last spring—but I understand that the Committee having the works in charge are satisfied with the present results obtained with the small amount of chemicals mentioned. It should, however, be understood that much more efficient precipitation may be secured when it is deemed desirable.

No well-founded complaint has been raised against the works since they were placed in practical operation, although they are closely surrounded by several dwellings.

Naturally, however, objection exists in the minds of some to the "suggestiveness" of the works, and for this reason considerable pains were taken to make them attractive to the eye. They were, and I believe are, pleasantly referred to by the residents as "Franklin Park." Experience in the operation of these works suggests several conclusions.

The purification of sewage is a burden to the tax payers. Under almost no conditions can it be done at a profit; there are, however,

almost no conditions under which it cannot be accomplished without nuisance and at a justifiable cost if no satisfactory crude disposal is available. The maintenance expense under trying conditions is here established. In most of the towns of the State it would be much less.

Sewage purification *is* a burden. Sewage is an evil to be gotten rid of in the best manner possible. But what are the conditions under which purification is desirable? That is the question that might have driven the Sphinx into silence; but it demands a reply. Inland towns in this State and throughout the country are waiting the answer.

The question does not interest alone the town seeking a sewage outlet, it involves the public weal.

The human nature of a municipality if left to itself may be relied upon to shift the evil of sewage discharge from its own door to the threshold of its neighbor. Illustrations where the sewage of one town becomes the drinking water of another, are but the evolution of the earlier relation to the well and the neighboring cesspool. Nothing but the power of the law can prevent this "touch of nature."

This anomolous mixture of sewage and potable water is apparent everywhere, and yet it has produced but a small effort to prevent it.

As a nation we have been prodigal of our inheritance. We have neglected the lessons of older people.

It will not do to argue that because sewers pollute streams therefor we must go back to, or perhaps cling to, the cesspool and leaching vault. Some communities are thus arguing with dogged persistence. But the value of the modern sewerage system is demonstrated, it remains to secure relief from the pollution of streams which it threatens.

But who is to decide upon the needs of purification or the merits of a crude discharge of sewage in the different cases that arise. It would seem that these questions could not be safely left for decision to the populations directly interested. Some competent authorities should be vested in them these powers.

In England the Local Government Board is judge, while in Massachusetts the State Board of Health controls. The latter method if competent and unprejudiced supervision is secured,

promises the best results and is here suggested as desirable in our own State.

Dilution, subsidence and oxidation are looked upon as the three chief causes of transformation in the organic wastes entering rivers. From one hundred and forty to one hundred and eighty cubic feet per minute is generally considered to be sufficient flow in a stream receiving the sewage from one thousand people to render it inoffensive to populations living along the stream within a few miles of the pollution where it is not used as a potable supply.

The rapid subsidence in streams of slow velocity enables them to free themselves from a large percentage of the matters in suspension within a few miles (the distance being dependent on the specific gravity of the matters in suspension and the velocity of the stream) of the pollution.

The improvement in rivers immediately after fouling, due to these two causes, appears in some cases to have been overestimated. Drs. Letherby, Odling and others in England, have asserted that if the dilution is at least twenty times the volume of the sewage the organic matter will be rapidly oxidized and will be entirely destroyed in a dozen miles or so. Belief in this theory has resulted in serious consequences. The English River Pollution Commission, however, stated in 1878 that there was no river in England long enough to completely destroy sewage matter discharged into it. Some considerable "personal equation" must be allowed in these results; and a middle ground is more defensible than either extreme.

Every gallon of filth taken out of a stream makes its purification by natural means so much easier, and streams receiving only purified sewage effluents in place of crude sewage would have far less difficulty in digesting and eradicating the dangerous elements now threatening.

Along streams used as public water supplies and at the same time as outlets for sewage, requirements of purity in the sewage effluents should be established in accord with the results of available processes, and where necessary, populations required to subject their water supply, taken from such a stream, to a process of artificial purification.

Potable streams should be defined and classified; and, when a complete examination of any water-shed indicates that a stream or

any part of a stream should for any reason be finally abandoned as a potable supply, provision for a proper supply for the populations using such a source should be made and ample notice given that they may effect the needed changes.

If such a policy were inaugurated, radical improvements in present methods of sewage and water purification to meet the added needs would certainly follow. The extra expenses incident to the plan would be amply justified in a saving of life and an increase of efficient and vigorous health. And in this particular it may be stated that the sanitarian never fears a fair comparison of the cost of removing unsanitary conditions with the cost of retaining them.

A review of the legal decisions against river pollution even under present imperfect laws, shows that the courts are very emphatic in protecting a public water supply. And, although comparatively few actions have been taken considering the very general practice of stream pollution, it seems probably that in the near future the subject will receive more of the attention which it merits.

THE SEWER SYSTEMS OF NEW JERSEY.

BY A. CLARK HUNT, M. D., SANITARY INSPECTOR.

Year by year the importance of definite plans for the removal of sewage is becoming more and more recognized. It will be remembered that last year, under the direction of the Board, examination was made of the public water supplies of the State with a view of ascertaining their source, their general character, the condition of reservoirs and conduits, and the extent to which the supply was used in its particular locality. During the past year, as far as other duties would permit, a similar investigation has been made into sewer systems. This was felt to be important because of the variety of systems employed in the State (see report page—), because of the needs of some of our cities and the active discussions of methods, and also because in the examination of water supplies, it was found that in so many instances householders still depended on former methods. It is useless to attempt to make cities healthy by a good public water supply and by good sewer systems if half of the citizens will still drink the water from wells located in filth-sodden ground or fill their rear yards with cesspools, instead of connecting with the sewers.

In the process of investigating the sewer systems the following questions have been used as a guide.

1. Name of city or town.
2. Population.
3. When built, who designed.
4. By whom owned.

5. Is stream water separated.
6. System of disposal, describe outlets.
7. Sizes of intercepting sewer, of laterals of branches of house connections.
8. Length of system, miles of pipe.
9. Material and shape of construction.
10. Maximum and minimum grades.
11. How flushed, any other method of cleaning.
12. Average depth below street.
13. How is subsoil water dealt with.
14. How is roof water dealt with.
15. Number of connections.
16. Dry weather flow of outlet sewer.
17. Have you printed reports.
18. Frequency of manholes, how many.
19. Is there any other ventilation by shafts, etc.
20. Are sewers deep enough to drain cellars. Are they laid straight from manhole to manhole.
21. Are intersections on a level with mains.
22. Does ground water enter the sewers.

The following is the list of towns reported:

Asbury Park,	Atlantic City,
Camden,	Cape May,
Elizabeth,	East Orange,
Englewood,	Gloucester City,
Hackensack,	Jersey City,
Long Branch,	Mount Holly,
New Brunswick,	Newark,
Ocean Grove,	Passaic,
Paterson,	Princeton,
Perth Amboy,	Rahway,

Trenton.

NOTE.—Salem is introducing a system. Riverton has decided upon a sewer to be introduced in the spring. Plainfield and Orange have the subject under consideration.

ASBURY PARK.

The winter population is 3,000. During the summer the average for three weeks is 40,000. Upon certain days when excursions

come in the number of people in the city is as high as 80,000. The sewer system was constructed in 1879. Mr. Barmore planned the work. The system is owned by Mr. Bradley.

Storm water is excluded. The sewage is emptied into the ocean The intercepting sewer empties into a receptacle or pit, which is 60 feet long by 22 feet in width, and 6½ feet in height. From this two vents of 26 inch pipe rise to a height of 75 feet. The pit is connected with the ocean by a twelve inch pipe, which is protected with a gate for emptying at set times. From the ocean side of the gate a pipe leads back to the pit, and this, with each wave impulse, the air is driven over the sewage and up through the vent shafts. In this manner efficient ventilation is secured. The outlet is 400 feet from the pit and the sewage is disposed of without any trouble. As the system is made up of small pipe it is necessary to provide each connection with a catch basin having a grating, so as to intercept all floating material and secure the more perfect breaking up of matters in suspension.

These gratings are cleaned from time to time as necessity requires.

The intercepting sewer is 12 inches in diameter.

The branches are 4, 10 and 12 inches, and the house connections are 4 and 6 inch.

The length of the system is 15 miles.

The pipes are terra cotta.

The average grade is 3 feet to the 100.

The minimum grade is ½ inch in 100 feet.

This grade is carried over a distance of 3,400 feet and the pipes are very carefully laid.

The system is flushed by household use; formerly it was artificially flushed, but this is at present unnecessary.

There is no other method of cleaning.

The depth of the sewers is from 15 to 18 inches. Both subsoil and roof water are excluded from the system.

The flow has not been computed but the pit when full can be emptied in 38 minutes. There are no printed reports of the system. In addition to the large stacks for ventilating the pit air shafts are in use in many localities.

The house catch basins are also ventilated. Cellars are not drained by the sewers, except in a few instances. The pipes are

laid straight from manhole to manhole. Branch pipes enter with their upper borders on a level with the upper border of the intercepting sewer.

All connections are made under supervision, and a permit is required. There are 750 connections.

ATLANTIC CITY.

The permanent population is 12,000. The sewer system was built in 1880 by Messrs. Robinson & Wallace, and is at present owned by a stock company. It is the separate system, surface water being excluded. From the various portions of the city the sewage flows into a well at the pumping station, which is located at the foot of North Carolina avenue. The well is twenty feet in diameter; from it the sewage is pumped to a filtering bed which is located well out on the meadows. After passing through the filter the effluent is carried by under-drains into a stream called the "Beach Thoroughfare." The main is twenty-four inches in diameter. This was formerly built with terra-cotta pipes, but as there has been trouble from breakage whenever it is necessary to repair portions of the pipe iron pipes are substituted. The laterals and house connections run from 12 to 6 inches in diameter. There are about 15 miles of pipe. The system is flushed by the liquids entering it and no artificial flushing is used. The greatest depth of the sewer below the street is 16 feet. The sewer, in some places, is within 12 inches of the surface, but as frost does not give any trouble, it is permanent and in no danger of breakage. Roof-water goes upon the streets and does not enter the sewers. There are a few manholes on Pacific avenue wherever there has been trouble from clogging. Only a few cellars are drained by the sewers. The pipes are laid straight and with even grades. A new filter bed is being built 1800 feet out in the meadows. The effluent is not clear, but the beds remove the larger suspended matters. There are 1125 connections and the people are rapidly learning the value of the system and availing themselves of it. It seems to answer every purpose and it is hoped that in time all those using cesspools will connect with the sewers.

CAMDEN.

Has a population of 75,000.

The Federal street sewer was built in 1860.

The city owns the system.

Both storm water and household waste are received.

The outlets are into Cooper's Creek and the Delaware River.

The largest sewer is 6 feet in diameter.

The egg-shaped are 3 feet 4 inches by 5 feet 6.

The smallest built sewers are 12 inches in diameter.

The majority are 2 feet in diameter.

The smaller pipes run from 12 inches to 4 inches.

There are 33 miles of pipe.

Eighteen feet is the greatest available height above outlet. Some 1,000 feet along the river front is almost level. The average fall is 1 foot in 100 feet.

There are but few terra cotta sewers.

The sewers are flushed by storm water.

The older sewers need frequent cleaning on account of lack of pavement in some of the streets.

The depth of the sewers is from 5 to 9 feet.

The old sewers were laid with loose bottom for drainage. The new ones are tight.

A printed report is published. The number of connections is not computed. Man-holes are located from 150 to 200 feet apart. Perforated covers are used. All branches are carried to the tops of the houses. Sewers are laid straight with even grades. Intersections are always 56 inches above the flow. 1,000 connections have been added each year recently. Permits are issued, but there is no supervision of the way connection is made. Connections are now compulsory. The greatest difficulty met with is the slight elevation, which makes it almost impossible to drain some of the cellars in the lowest part of the city. These sometimes contain water, especially after heavy rains and during high tides.

CAPE MAY.

The sewers have been constructed about 20 years.

There are no maps of the system existing.

The sewers were not, at first, well laid, but extensions and repairs have been carried on with more care.

All the sewers are of terra cotta pipe.

There are two miles of pipe, the largest being 14 inches in diameter, the smallest 8 inches. House connections are of 6 inch pipe.

Connections are made by individuals, and the number is said to be 350. Manholes are not frequent or at bends.

The city engineer is in charge of the system.

The discharge is by two openings into tidal creeks. One of these has recently been dredged and straightened, and thus the outfall flow has been increased.

Storm water is received into the sewers.

The grades are slight but seem to be sufficient.

ELIZABETH.

Population is estimated at 35,000.

The sewers were built in 1866, and are owned by the city.

They were designed by Ernest L. Myer.

Both storm water and household waste are carried. The outlets are into Staten Island sound at different points.

Some of the outlets empty into the Elizabeth River. The largest sewer is 7 feet in diameter and is circular. The smallest pipe sewer used is 15 inches in diameter. There are 33 miles of sewers. The larger sewers are built of brick and are all egg shaped with the exception of the main circular sewer. The sewers are flushed by storm water and hydrants. The large sewers are cleaned by entry through the manholes. The depth of the sewers below the street averages 11 feet. There is no especial provision for subsoil water. Both roof and surface water is allowed to enter. Nearly all houses on the line of sewers are connected. The Board of Health requires this. There is no printed report. The manholes are every hundred feet apart. Ventilation is secured by the manhole openings.

Cellars are well drained.

The sewers are laid in straight lines from man-hole to man-hole with even grades.

All connections are made at an angle where possible, and under the supervision of a licensed sewer inspector, who gives a bond of $500 to carefully make all openings into sewers and drains with due regard to sanitary regulations. The average grade is two feet to the hundred, and in small pipe, from six inches to a foot per 100 feet.

EAST ORANGE.

A full report upon the system at present in use will be found in the preceding article.

ENGLEWOOD

Has a population of between 4,000 and 5,000.

The sewer system was constructed in 1887.

A company known as the Englewood Sewage Company own the plant.

The separate system is used.

Mr. Bassett planned the system and superintended the construction. The outlet of the sewer is half-way between Englewood and Nordorf into a tidal creek.

The pipes are from 12 to 4 inches in diameter.

The pipe used is the vitrified pipe.

The minimum grade is 1 in 300, the maximum is 50 in 100

Eighteen flush tanks holding 350 gallons each flush the pipes at regular intervals.

The greatest depth of the pipes is 14 feet. No roof or rain water enter the sewers. There are 179 connections. Manholes are every 300 feet. Reports are printed each year. Perforated manhole covers serve as ventilators. The pipes are all laid straight. Laterals enter above the flow in the large pipes. A citizens' sewer company has a 12-inch pipe running down Palisade avenue to the creek. It was intended originally for cellar drainage and it is hazardous to use it for other purposes, as the joints are all open and no provision is made for ventilation or flushing.

GLOUCESTER CITY.

Population, 8,000. Sewers introduced in 1889.

The system was planned by Fowler & Loomis, of Philadelphia. The combined system is used. The outlets are into the Delaware river at high water mark. There are three outlets. The main sewers are 4 feet in diameter—299 shaped and laid with dry courses at the bottom. These run through Hudson, Mercer and Market streets. There is also a 12 inch outlet in Monmouth street. The laterals run from 12 to 24 inches in diameter, and are of cement pipe. There are 5 miles of pipes. The sewers are flushed by storm

and waste water. Some of the grades are very slight, the lines being almost on a level for short distances.

The sewers are six feet below the street surface. Manholes are 100 feet apart. Cellars are drained into the sewers. There are but few connections as the system is just nearing completion. It will be a great improvement to the city and should result in increased healthfulness.

HACKENSACK.

The sewers were introduced in 1871. Mr. Bacot planned them. The outlet is into the Hackensack River at low water mark.

The sewers are through Bridge and Anderson streets. The Bergen street sewer is two blocks long. The Anderson street is three blocks long. The sewers are 6 feet in diameter, made of brick. They are made of this size on account of the larger quantities of surface water they are compelled to carry. The laterals are 3 feet brick sewers, through Main and State streets. The pipe laterals in Union and Park streets are all 18 inch pipe. House connection are of 6 inch pipe. There are at least 200 connections. The average grade is 3 feet in 100. Manholes are 50 feet apart. The sewers are dry laid at the bottom. They are cleaned by manual labor. Permits are given for connection and the street superintendent has charge of the services. The lower part of the city is sewered for its entire width. The Hackensack creek has 119 sewage connections. This should be changed and all such connections be made with a sewer so that the creek may not be a menace to the health of the inhabitants.

JERSEY CITY.

Has a population of 175,000.
The sewers are owned by the city.
Both storm water and sewage are received into the sewers.
The outlets are from 1 to 2.5 feet below mean low tides.
The main sewers are from 42 to 54 inches in diameter.
The branches are from 12 to 30 inches in diameter.
The house connections are from 6 to 12 inches in diameter.
The system is about 57 miles long.
The spurs are both circular and oval in form.
The grades are from 8 feet per 100 to 1 inch per 100.

The sewers are cleaned by manual labor.

The depth below the street varies from 8 to 12 feet.

The bottom of the sewers is laid dry, and thus much subsoil water enters.

Roof water is discharged into the sewers.

There are 17,800 connections.

There are printed reports. Manholes are located every 100 feet. Cellars are drained by the sewers.

The sewers are laid in straight lines with even grades.

Connections are made about half way between the top and bottom of the sewers.

LONG BRANCH.

The population is estimated at 7,000 in winter and 30,000 in summer.

The sewer system was introduced in 1885, and is owned by the Long Branch Sewer Company.

It was designed by C. P. Bassett, of Newark, N. J.

The system is the separate one, excluding surface drainage.

The outlet is by an iron pipe, secured to a jetty in the sea, and is carried out 200 feet.

The intercepting sewers are of pipe running from 24 inches to 15 inches in diameter.

The laterals are from 8 to 12 inches in diameter and the house connections are 6 inches.

There are 12 miles of pipe.

The pipe used are of iron and vitrified terra-cotta.

The pipes are flushed by water from hydrants through the manholes.

The average depth below the streets is eight feet.

Roof-water enters the sewers at the heads of the lines.

There are at present 370 connections.

In summer 500,000 gallons flow from the sewer in 24 hours, in winter 200,000 gallons. There are manholes about every 300 feet, with lampholes at various points for examinations. The manholes are fitted with ventilated covers, which have under them a catch basin to intercept sand and dirt.

The sewers are laid deep enough to drain cellars and have even grades.

The system also includes treatment works, where the sewage is filtered through coke, after being treated with chemicals.

The sludge is forced into a receiver, and thence into a Johnson's Filter-Press, which presses the solid material into cakes for removal.

An arrangement is made by which the treatment works may be avoided, and when the filters are not in use in the building the sewage flows through by gravity to the tidal chamber. The system gives satisfaction and the outlet is not a source of complaint, although it opens near the pier and at a point where surf bathing is indulged in.

MOUNT HOLLY.

The population is estimated at 6,000.

The sewers were constructed under the supervision of Mr. Gaskill. The plans were submitted to Mr. Waring and approved of by him.

They were completed in 1888.

The township owns the system.

The system employed is the so-called separate system.

The outlet is into the Rancocas Creek at high water mark.

The main is 2,000 feet in length on Mill street and is 10 inches in diameter.

The laterals are 6 and 8 inches in diameter.

The house connections are 5 and 6 inch pipe.

Permits for connection with the sewers are issued by the township committee.

All connections are made under supervision.

A Y is placed at every house and vacant lot with a stopper where it is not needed.

The system is 3¼ miles in length.

The pipes are of terra cotta with both open and cement joints. The grades runs from 1 in 50 to 1 in 350.

The Fields flow tank, with Col. Waring's improvement is used at the heads of the laterals. There are 12 of these used. They are set to flush twice in every twenty-four hours. Each of them discharges 150 gallons at each flush. For the purpose of inspection and determining stoppage branches are put in every 200 feet. A standing Y is inserted and ahead of it a T, with the stand pipe coming to the top of the ground.

The average depth of the sewers is 5 feet, in laterals, in some places it is but 2 feet, but this is where streets are to be filled in to a fixed grade, and in these places the pipes are concreted for protection against breakage.

Some fifty houses have roof water pipes connected with the sewer. Surface water, rain, water, etc., is led by drain tile into Buttonwood run.

There are 160 house connections.

The flow is not determined. No ventilation is provided. Most of the cellars drain into the sewers in the line.

The sewers are laid straight with even grades. Laterals enter the main at an angle of 45 degrees.

The lateral is always the height of the pipe above the main sewer.

The system seems to be working nicely, and will certainly be a source of greatly increased safety and convenience to the residents. There are many still unconnected with the sewers, but applications for permits are steadily increasing.

NEW BRUNSWICK.

The system was introduced in 1881. At least, the commission was then appointed. Sewer District No. 1 was completed in 1874.

A plan was prepared for District No. 2, but it has never been carried out.

District No. 1 includes Hiram, Bayard, Burnett, Nelson, French, Prospect, Somerset, Hardenburgh, Hamilton and Canal streets. The system is owned by the city and was designed by Mr. Ryan. It is the combined system, receiving both storm and waste water.

The outlets are into the canal; there are two of them. The main outlet is at the foot of Albany street. The main sewer is 60 inches in diameter. The large size is due to the greatly increased flow down the hill during large storms. The laterals are from 12 inches to 24 inches in diameter. The main is an oval brick sewer and the laterals are pipe.

The grades are not exactly known.

The sewers are flushed by rain water.

They are from 5 to 8 feet below the surface of the street. There is no provision made for dealing with subsoil water. The number

of connections is not known, but nearly all private residences on the lines of sewers make use of them.

There is no printed report.

The manholes are upon an average 100 feet apart.

The only method by which the sewers are ventilated is through the manholes.

The sewers drain cellars along the route, but during times of freshet the cellars on the lower streets are not drained on account of the backing up of the water and the large amount of water coming from the higher portion of the city completely filling the sewers.

All pipes are, where possible, laid on straight lines with even grades.

The laterals enter the main sewer on a level with the average flow.

System needs some changes and the sewering of district No. 2.

The emptying of the sewers into the sluggish water of the canal is not satisfactory, and a plan has been proposed of carrying it under the canal by means of a syphon and emptying it directly into the Raritan river. The river, although not a deep one, would probably take care of all the sewage if it were emptied into the channel, as it is a tidal river and also subject to large freshets.

NEWARK.

Has a population of 180,000.

The sewers were commenced in 1854 and there have been continuous extensions to date.

The city surveyors have had the matter in charge.

The sewers are owned by the city.

The combined system is used.

The outlet are into tide water, and into the Passaic river.

Some of the sewage is conveyed by open ditches into Newark Bay, and the remaining portion emptied into the Passaic river.

The intercepting sewers is 6½ feet.

The laterals and branches are of terra cotta pipe, from 10 to 18 inches in diameter.

The house connections are of 6 inch pipe.

There were to January, 1889, 47½ miles of brick sewers, which, together with 30 miles of pipe, makes 77½ miles in all.

There are 1600 basins and 17 flush tanks.

The sewers are egg shaped and oval.

They are all flushed by storm water and tanks.

The average depth below the street is 10 feet.

There is no provision for the disposal of subsoil water.

A yearly report is made of work. Manholes are located about every 150 feet, and the more recent ones furnished with perforated covers. Cellars are drained by the sewers. The new sewers are laid straight with even grades.

Intersections are on a level with the flow. Ground water enters by leakage and absorptions. The system is sufficient but is to be wondered at that so few comparatively avail themselves of it. There should be some method devised by which all those in the lines of sewers should make connection.

OCEAN GROVE.

The sewers were built in 1885, and were planned by Mr. D. H. Brown.

The system is owned by the Ocean Grove Association. Storm water is separated. The sewage is discharged into the sea.

The intercepting sewers are 12 inches in diameter.

Laterals and house connections are 6 inches in diameter.

There are 12 miles of pipe.

The material of the pipes is circular tile.

The grades are from 4 to 18 inches in 100 feet.

The sewers are flushed from the public water supply. The depth below the street varies from 4 to 9 feet.

Roof water flows upon the surface.

There are 764 connections. There are no printed reports. The flow from the outlet sewer is not known. There are manholes at every crossing. Cellars are not drained by the sewers. Intersections are on a level with the mains. The outlet is a 12-inch wrought iron pipe, supported on piles extending out about 200 feet. There is no method adopted to prevent the tides from backing up the sewer, and as the outlet is below low water, at high water the sewer water fills the pipes for about one-quarter of a mile. This is obviously wrong and should receive immediate attention.

PASSAIC.

As the question of the right to sewer into the Passaic River is still before the Court of Errors and Appeals, the full plans for sewering the city have not been as yet carried out. The city is now engaged in constructing a small section of the River street system, (Col. Waring's small pipe system being used), and also a large brick sewer 3 feet 3 inches by 4 feet 10½ inches for carrying off the storm water and for draining cellars and the subsoil. The length of the pipe sewers under construction is 4400 lineal feet and of brick sewer 2350 feet. The latter was designed by Messrs. Wise and Watson, who are in charge of all the construction.

The large sewer will probably be extended ½ mile. The population of Passaic is now not far from 12,000. The sewers are put in by the city. The average depth below the street is 7 feet for pipe sewer and 13 for the brick sewer, so that it was not originally intended for Col. Waring's system to drain the cellars. House connections are 4 inches in drainage, but will in future be 6 inches, and connections are placed opposite each 25 foot lot. Manholes will be located not further than 200 feet apart and lamp-holes will be located between each manhole. The flush tanks, which are now being put in, are the "Van Vrankin Tank." This or some other may be adopted for permanent use. The pipes are laid in straight lines. The intersections of the small lateral sewers are above the grade line of the mains. It is to be hoped that the system planned will be in the future fully carried out.

PATERSON.

Has a population of 80,000.

The sewers were commenced in 1868 and have been under the direction of the various city engineers.

They are owned by the city. The combined system is used. The sewers are circular and egg-shape.

The sewage is emptied into the Passaic river. The larger sewers are 72 inches in diameter and the smallest are 12 inches.

The house connections are 8 inch. There are 24 miles of pipe. The large sewers are built of brick; the smaller are of vitrified pipe.

The grades are from 2 inches in 100 feet to 8 feet in 100.

The sewers are cleaned through manholes and at catch basins.

The average depth below the street is 10 feet. The subsoil water is carried off by stone wall aud cement inverts.

Roof water is received into the sewers. Nearly all houses on the lines of sewers are connected.

There is a yearly report made but only of new work.

Sewers are ventilated through manholes and basins.

Cellars are drained into the sewers.

The sewers are laid straight with even grades.

Intersections are always in the direction of the main sewer flow.

PRINCETON.

The sewerage system of Princeton College was instituted in 1880 under a commission appointed by the trustees, consisting of Dr. Janeway and Dr. Hunt, Secretary State Board of Health, who selected the late E. S. Philbrick, C. E, of Boston, to design and superintend the carrying out of the system.

It provides for the sewering of all the buildings then existing on the campus, except the School of Science, which is otherwise provided for, and admits of being extended to the new buildings now in process of erection. It consists of about 4,600 feet of very choice six inch Akron pipe (salt glazed) leading from the different buildings to the sewage field. Originally intended to be a separate system in the strictest sense of the term, it was provided at the upper ends of the branches with flush tanks, into which the sewage was received, and from which it was syphoned periodically into the sewer by the aid of tumbling buckets. Latterly, however, the water from the roof of the new chapel has been admitted into the system, not from any necessity, however, but merely as a convenient means of disposing of the roof water. The cleansing of the sewers still continues substantially by the operation of the flush tanks. But once a year, just before the opening of college in the autumn, the lines are thoroughly flushed with clean water. It is hard to estimate the number of persons served by the system, owing to the fact that so many students lodge in the town, but from 600 to 700 would probably be a fair estimate.

The flow of the sewers varies at present from 7,000 to 10,000 gallons per diem. But in order to account for so slight a discharge, it is necessary to add that only four private houses are connected

with the system; that all kitchen and laundry work for students is carried on outside of the college premises; that chamber slops from the dormitories are carried by hand to hoppers outside of the college buildings, which form the upper terminals of the sewer branches, and that all fixtures for supplying students with water for drinking and washing are portable. The result is that, although there is a very liberal use of water in the baths, water closets, etc., the absence of supply and waste piping throughout the dormitories leads to a very great economy of water.

The sewer pipes are of plain pattern, *i. e.*, laid with sleeves. They were selected with extraordinary care; even the pipes remaining after the completion of the work, and which, therefore, include many rejected lengths, have only in rare cases as great a difference as one-eighth inch in the diameters.

Each pipe was bedded for about two-thirds of its length on a narrow bed of cement mortar (about three trowels full) and the joints were made in the usual way with split collars and mortar. The care with which all materials were selected and the sewer pipe laid is shown by the fact that no surboil water has ever been observed in the sewers.

The different lines are laid straight, with even grades varying from 1½ per cent. to 7 per cent., and all deviations have been made in the manholes, which also serve as ventilators of the system. The distance between manholes, owing to the configuration of the grounds, varies from 150 feet to 300 feet. For the same reason the depth of the sewer below the surface is very variable (from 3 to 10 feet), the average being about 5⅔ feet.

The storm water from the roofs and from the larger part of the roads is carried off to a neighboring brook through an independent system of pipes (~~designed by yours truly~~).

The sewage field proper occupies about four acres of a sloping field on the southerly slope of the college grounds. The soil consists of about six inches of black soil resting upon a homogeneous clay subsoil. The entire area is underdrained to a depth of four and a half feet with two-inch drain tiles laid thirty feet apart. Ordinarily, only a little more than one acre is occupied by the sewage, which is applied from a line of troughs at the upper margin of the area. Intermittency of application is secured by throwing out of line one trough, or section of the carrier, every day.

During the past two years it has not been found necessary to move the line of troughs to a new place. During that time, therefore, the area occupied has been receiving and disposing of sewage at the rate of about 7,000 gallons per acre per day. The operation has been in all particulars satisfactory.

PERTH AMBOY.

The population is given as 6,331. The sewers were first built in 1859 through Smith and State streets to the river. The city owns the system. Storm water and household waste are both received.

The main sewer through Washington street, and from the Central Railroad to the sound is egg shaped, and is 4½ feet in diameter. The small sewers are pipe, and mostly put in by private enterprises. A second sewer drains Gorden and High streets, and empties into the sound. The Fayette street sewer is large and is finally intended to drain the tenement house district. The Jefferson street sewer is too large for the drainage area.

The Commerce street sewer is 3 feet in diameter and runs from State street to the sound, and drains 40 acres.

The Buckingham avenue sewer is a 3 feet 6 inch sewer, and 2 feet 4 inches for 700 feet, thence 2x3 feet for 1900 feet. The two are connected by 658 feet of 12 inch pipe sewer. The only small pipe connections controlled by the city are those coming from the school house.

A new sewer is being constructed running through State street, Railroad avenue and Hall avenue, which will drain about 80 acres. House connections are not supervised. There are 4½ miles of sewers. The city engineers from time to time have planned and supervised the work. Running north and south the minimum grade is 3-10 to 50, and the maximum 8-10 to 50.

The sewers are flushed by storm water.

The streets running to the sound fall 40 feet to 1600. Some of the sewers are 12 feet deep. Subsoil water flows into the sewers without any special provision. Roof water flows into gutters and cisterns. Nearly all houses on the line of flow are connected. The flow from the outlet sewers has not been completed. There is no printed report. The manholes in the old sewers are far apart. In

the new they average 150 feet and have perforated manhole covers. There is no effort toward ventilation. Cellars in the line of sewers are drained.

The sewers are laid in straight lines and near bends the manholes are only 100 feet apart. The grades even. Laterals enter below the crown of the upper arch.

RAHWAY.

Has a population of 8,000.

The sewers were constructed from 1867 to 1874, including the various extensions.

The city engineer at that time supervised the work. The system is the combined system, in which both rain water and waste water is received.

The outlets, seven in number, empty into the Rahway river.

The sewers can empty freely except in cases of heavy freshet or very high tides.

The main sewers are 5 feet 6 inches in diameter.

None of the city pipe sewers are less that 12 inches in diameter. Nearly all the sewers are made of brick.

The house connections are of 6 and 8 inch pipe. The length of the system is 9 miles.

The main sewers are oval, but some of the smaller ones are egg-shaped. The flow is always uninterrupted. The sewers are flushed by rain water. The catch basins are regularly cleaned. The depth of the sewer varies from 5 to 23 feet.

Subsoil drainage is provided for by laying the bottom of the main sewers dry.

The number of connections is not known, but nearly all on the lines of the sewers avail themselves of the privilege of using them.

No reports are printed. The manholes are from 100 to 300 feet apart. Ventilation is secured by manholes only. All sewers drain cellars. The sewers are laid straight with the curves at corners as gradual as posssible. All house connections enter the middle of the sewers.

Permits are issued allowing parties to tap the sewers. There are some portions of the city needing sewers, such as through Bond street to a low point north of Grand street, and also through the

Main street ditch, but taking it altogether, the system is quite complete and satisfactory.

TRENTON.

A system of sewers is at present being introduced and will in time be extended so as to include the larger portion of the city It is being constructed upon the separate plan with outlets into the Delaware river. The work has been necessarily slow on account of the underlying rock. At some future time a full report will be made, when the plans have been more fully carried out.

It will be seen that many of our cities are thus provided with systems of various kinds for dealing with sewage and we may draw the following conclusions:

I. It is more and more evident that water carriage for sewage *i. e.*, some system of sewer connection and discharge is the means to be adopted in all growing cities.

II. The variety of methods and the increasing cheapness of material makes it feasible even for smaller cities early to adopt some method for dealing with sewage.

III. The choice of method depends on locality, contour and so many other details that experienced engineers should be called upon to decide as to choice of system and to supervise construction.

IV. In some instances land disposal is necessary, in others the use of chemicals or a combination of the two. Occasionally the best use to which a river or stream can be put is as a conduit for sewage. In other cases these streams must be carefully protected for water supply.

V. In all cases sewers need frequent examination and the use of mechanical or other methods for cleaning, and great care should be used in the methods by which house connections are made.

Under the new plumbing law it is possible to see to it that such connections are made properly, and it would be well if each city Board of Health should have reports made from time to time as to the condition of the sewers in their cities.

In many of our cities although sewers are provided, very few avail themselves of them. Compulsory connection with sewers in streets where they are laid should be obtained, and an ordinance by the local Health Board to that effect would make a vast improvement in many localities.

TUBERCULOSIS.

BY S. G. DIXON, M. D.

Professor of Hygiene, University of Pennsylvania.

In speaking of this disease I do not intend to discuss the question as to whether or not it is an affection essentially general and constitutional, an alteration of the humors and a disease of the blood, nor whether the tubercles that form in the lungs are secondary or whether or not the Koch bacillus causes the primary lesion. We do know that tuberculosis is constantly associated with the presence of this micro-organism, which either by its own initiative powers or by means of the product of its activity, causes the formation of the bodies called tubercles within the texture of the body. We know that it makes its entrance from without and that as a rule when injected into the lymphatic system, it travels infectively through it. From the fact, then, that the tubercle bacillus is so closely associated with phthisis it behoves us as sanitarians to study the source of this micro-organism and the channel through which it enters the animal system.

As early as 1846 Klencke insisted upon raw milk from tuberculous cows being a source of phthisis. Koch claims that the bacillus in man is identical with that of the bovine tubercle bacillus. On the other hand, Klein will not acknowledge the identity of the respective tubercle bacilli, claiming that the morphological characters and distribution are quite different. My experience bears out Klein in his claim that the bovine tubercle bacilli average larger

than the tubercle bacilli found in man. This, however, I attach little or no importance to, as my recent result shows conclusively that the bovine bacillus when grown under certain conditions changes its morphology. The more marked granularity of the bovine tubercle bacillus is accounted for by the different temperatures under which it is grown. Even should the respective bacilli taken from the cow and from man be identical in their morphological characters, we have no direct proof that tuberculosis is transmitted from the cow to man. To decide this Prof. Crookshank is now running a line of experiments which tend to show that tuberculosis is communicable from man to cattle. Last summer he obtained sputum containing numerous bacilli from man in an advanced stage of phthisis, which he shook up with a sterilized salt solution and injected it into the peritineal cavity of the calf. In a few weeks the animal showed marked signs of illness, loooked dull, did not feel well, had a slight cough, and showed less inclination to move than usual. These symptoms gradually increased, and death occurred 42 days after inoculation. Extensive lesions were discovered at the post-mortem examination. The mesentary was adherent to the abdominal wall at the seat of the inoculation and to the rumen; the liver was adherent to the diaphragm. There was extensive tubercular deposit at the seat of inoculation, and an abscess the size of a walnut. Extending over the mesentery from this point there were hundreds of wart-like, fleshy, new growths, some quite irregular in form, others spherical or button-shaped. There were similar deposits on the under side of the liver, on the spleen, in the gastro-splenic omentum and on the peritoneal surface of the diaphragm. The spleen was adherent to the rumen, and on dissecting away the adhesions another abscess was opened. On the under surface of the liver was a third abscess, about the size of one's fist, which burrowed into the depth of the liver substance. The kidneys were very firm on section. The lungs were congested and the pleuræ thickened. On microscopical examination extremely minute tubercles were found disseminated throughout the lungs and liver. Long beaded tubercle bacilli were found in these organs and in the peritoneal deposits. The pus from the liver abcess contained streptococci. The calf died from pyæmia, a result to be anticipated if sputum be employed for inoculation, but sufficient time had elapsed for pronounced local infection leading to acute miliary

tuberculosis. Prof. Crookshank also obtained milk containing bovine tubercle bacilli, mixed it with bran and fed it to a rabbit. In four weeks there was commencing emaciation; later diarrhœa set in, and death occurred exactly 58 days after administration of the milk. At the post-mortem examination the mesenteric glands were found to be much enlarged and caseous. A cover-glass preparation from a crushed gland revealed numerous tubercle bacilli. On opening the intestines there was a patch of ulceration showing the point of access of the bacilli. From these results we must greatly suspect the power of bovine tubercle bacilli to infect man with tuberculosis. Yet my experience goes to convince me that cow's milk is not responsible for quite as much infection as the profession has been inclined to credit it.

First.—Fewer animals are affected with tuberculosis than are reported. Actinomycosis is often mistaken for tubercular phthisis. The reasons for which are obvious. A few days ago I held a post-mortem on a cow that had been condemned for tuberculosis. Her physical appearance was certainly that of a tuberculous animal. After I failed to find any tubercle bacilli, Prof. Huiedkoper, of the Veterinary Department of the University of Pennsylvania, sliced the lungs and found traumatic inflammation, caused by what I believe to be an osage orange twig about three inches long, which had evidently worked its way down through the bronchus and on down to the base of the lung.

Secondly.—I have never found tubercle bacilli in cow's milk unless the animal was suffering from tubercular mammitis, and even then the proportion was small. Drs. Woodhead and McFadgean, of Scotland, after carefully examining six hundred cows as found in the dairies supplying Edinburgh with milk, detected tubercular mammitis in thirty-seven animals. They only found a few tubercle bacilli in the milk of six animals. The milk of these six cows was mixed with the milk of five hundred and ninety-four others. Further, we know that milk kept at the temperature it is usual to submit it to, is not propitious for the propogation of tubercle bacilli.

Thirdly.—It is an undeniable fact that a large proportion of mankind can resist or overcome the injection of tubercle bacilli unless given in great numbers. Otherwise but few of us would escape this dreaded disease.

Fourthly.—If the ingestion of cow's milk was a frequent cause of

tuberculosis in adult man we would likely find the primary lesion in the digestive track. Clinical experience has not shown this to be the case.

Fifthly.—Clinical research does show frequent cases of tuberculosis in children where the abdominal glands appear to be the seat of the primary lesions.

Dr. Woodhead has been a careful observer in this regard. He states that he has often observed in children who died of other diseases tuberculosis of the abdominal glands when there were no traces of tubercular disease in other parts of the body. But notwithstanding all this, from the facts and observations mentioned, I must conclude that it is probable that udder tuberculosis can be communicated to man. And from the fact that primary lesions of this disease are often found in the digestive tracts of children, we should take every precaution possible to guard against this probable cause of phthisis. Dairies should be often inspected and all tuberculous animals condemned and killed.

Moreover, we as sanitarians should recommend the sterilization of all milk from public dairies immediately before use, whether it be from the cow, ass or goat.

From what I have said of primary tuberculous lesions not having often been noticed in the digestive track of man, I do not wish you to imply that I am satisfied in my own mind that such lesions do not frequently exist; for I do think that we will hereafter be able to demonstrate that many ulcerations of the oral cavity heretofore and at the present time diagnosed as carcinomatous are of a tubercular character; and if this should be satisfactorily demonstrated, we may then in all justice hold that milk is a medium responsible for many of these primary lesions. To be sure, milk will only deserve a small share of the censure. Underdone butcher's meat and poultry, the air, drinking water and even the tooth-brushes kept in a family tray come in for their share. Only a short time ago I reported a minor experiment which went to show how possible it is for a consumptive member of a family to inoculate his kindred. I took a new tooth-brush, sterilized it, and had a girl in an advanced stage of tubercular phthisis brush her teeth with it. Then I rubbed the bristles of the brush over a couple of cover-glasses and submitted them to carbol-fuchsine, nitric acid, etc., and mounted them on slides. When examined under the microscope I found a num-

ber of tubercle bacilli. Had this brush been placed in a family stand or tray with its bristles in contact with those of other brushes, one can easily picture another member of the family inoculating himself by brushing his poisoned brush over an abrasion or simple ulcer in the oral cavity, or even upon a carious tooth. Just here I may say that such local seats of invasion should yield to surgical interference. In fact, any superficial inoculation not entering the circulation system is, I believe, curable; for it must be remembered that the tubercle bacillus as we now know it is not motile. Further, it is quite possible that such inoculations lose their virulence before the reach the systemic ciculation. I have been able, as you may know, to cultivate under certain conditions tubercle bacilli morphologically different from those generally recognized as the bacilli of Koch. From the conditions under which I produced this changed form I have every reason to believe it is a degenerate one.

I have carried this change to a stage when the resisting power of Guinea-pig tissue will resist it for months, if not altogether. And most interesting to relate, these same same pigs will, after inoculation with this attenuated virus, resist virulent virus for months, to say the least.

Even should I fail to produce tolerance to the tubercle bacillus, we will have left one new fact that will hereafter assist us in searching for sources from which the tubercle bacillus may come or in which it may be playing an important part in destroying animal life. Not only must the form described by Koch be looked for, but also the forms as described in my article in the "Medical News" for October of this year. Again, from the fact that the newly discovered form has been produced from the Koch bacillus by time, a change of pabulum, variable temperatures and a dry medium, it should be a hint to us that it might be well to place our phthisical patients under such conditions as will not supply from without a constant supply of fresh germs, and to keep up the vitality of the general system and thereby enable it to outlive the bacilli already lodged therein, when possibly the granulating tissue will become connective tissue as it sometimes does in tuberculous joints, forming a practicul cure. Further, it might be well, if possible, to have the bacillus in pulmonary consumption brought in contact with a dry, cold and pure air.

Not wishing to lead myself into a clinical discussion, I will re-

frain from saying more upon this subject on the present occasion, but will take pleasure in showing a slide of the tubercle bacillus in its newly discovered morphology.

DISPOSAL OF TOWN REFUSE OF ALL KINDS.

BY E. M. HUNT, M. D., SEC.

It must ever be a question in all populous cities how best to dispose of the refuse, garbage and all the various decomposable matters incident to life, as it exists in crowded populations.

It is at once admitted that the natural process would be to return them to the soil and follow nature's methods of giving them up as foods for vegetable life. We are so conservative in this direction that we believe no feasible effort should be left untried to imitate and accomplish this order of nature. But the conditions of life in crowded cities is so artificial and the accumulation of all refuse or offalings from city life and all its concentrated industries is so enormous that the financial part of the problem can not but enter as one of controlling considerations in the question of practical disposal. Most of all, the question must arise and be answered how to handle as well as dispose of the material with the greatest regard to the interests of *health*. There are three *axioms*, none of which must be disregarded without the most apparent and defensible necessity.

The first is that all such materials amid close populations must be handled and disposed of before decomposition has been set up. Even voided secretions are, in their health aspects, totally different from those which have been retained so as to undergo decomposing or putrefactive charges. The same is true of all the accumulated debris incident to civilized, industrial and crowded life.

The second axiom is to keep it as dry and cool as possible, since moisture and heat are the only forces that hasten decomposable

matter through its various processes. Therefore we are not surprised that eminent authorities enter their protest against all systems of wetting and storing decayable matter, and that even the advocate of water carriage or sewers are compelled to justify the addition of water on the ground that it is the most speedy way of carrying out the first axiom, viz., the removal of the material while yet in its fresh state, to some distant place.

The third important axiom is never to mingle and accumulate various kinds of offalling or refuse when they can be kept separate. Both quantity of accumulation and variety of material greatly complicate the practical question of disposal. The householder who burns all house dust, refuse, dried peelings of vegetables and fruits in the kitchen stove, who keeps the ash heap free from all other refuse, and who pours the house slops about the vines or the flowers and removes at suitable intervals the dry contents of the outhouses has no very complicated problem on hand. But let all these be indiscriminately mingled, and not only bulk but the variety of the decomposing mass has much complicated the disposal. (See on this subject Circular LXI of this Board).

In some of the smaller cities and in a city situated like Newark, with low meadow dumping grounds near at hand it is possible to dispose of much of the refuse as a filling up of low ground. Even then there should be separation of the grosser and more decayable masses, and some attention to the reducing of the water level of the ground. Some careful experiments by Burton Sanderson and Dr. Parkes as to the changes in the dumping grounds of Liverpool, showed that the forces of nature were active in recovering such material. If only it was not dumped in deep heaps, but on dry ground and fully exposed to air and to the influences of the upper soil. From two to three years is the usual time that should elapse before a deeper covering than three feet is allowed. All agree that it must be removed outside of the city limits. Even with dumping grounds there will remain some material to be disposed of in a more radical way. Besides there are many cities so situated that there is no suitable surburban place of disposal within distances easily accessible.

It is not surprising that fire should be thought of as the most ready and efficient destructor, and as offering the most radical and

efficient method where the two great powers of earth and air are not adequately available in the interests of health.

Hence the most advanced of ancient cities had its Gehenna and its perpetual fire was a sanitary provision.

There have been various imita ions thereof on a smaller scale all through the ages. One South American city, Rio Janeiro, driven by the indications in times of pestilence, has for more than a score of years had its perpetual burning of refuse a few miles out of the city.

But it is the advance of science and art that has especially suggested and practicalized this method. So soon as the Siemens furnace was invented and its principles came to be applied in various forms for the cheap and rapid reduction of materials by concentrated heat, the question naturally arose whether the same mechanism could not be applied to the destruction of decayable matters.

It was not long before various inventors were in the market with varieties of furnaces adapted for this purpose.

It is a sufficient evidence of their success that some form of these incinerators or destructors is successfully in use in many of the chief towns of England, such as Bradford, Leeds, Nottingham, Newcastle-on-Tyne, Manchester, Warington, Derby, Birmingham, Southampton, Nelson near Burnley, and at several points in London, and more recently in our own country. They certainly furnish the most economical way for the disposal of refuse. In populous towns no other method of removal can be be adopted at so small an expenditure, and in time, no doubt, some way will be found even for the utilization of the heat evolved in the process. (See Sanitary Record, April 15, 1887, p., 567). In many cases, the garbage, etc., is passed through long chutes for assortment before passing into the furnace.

There are about 100 in all now in use in England. The first trial was at Manchester in 1873, but improvements since 1880 have multiplied them. Mr. C. Jones, of Ealing, England, has recently well discussed the subject before an association of municipal sanitary engineers, in a paper on "Refuse destructors in use in England." (See Sanitary Record, July and August, 1887, pp. 77, etc.) He contended as a result of his own experiments that every town supplies sufficient dust bin refuse to destroy its own sludge, including

sewage refuse, and that there is no difficulty in dealing with town refuse effectually and economically in this way.

The paper was fully discussed by various persons in different localities who had seen the operation of these furnaces. Fryer's Destructor (1876) was among the first used and most of recent inventors have profited by it. It was first used at Nottingham and afterwards at Birmingham, Leeds and Bradford. That of Young, at Glasgow, which I have examined, adopted the air-blowing system. The most recent in England is the Jones Destructor, at Ealing, a suburb of London. It is an improved Fryer's Destructor. It deals with the sludge of a population of 19,000, and the house refuse of 22,000. This is comparatively a new attempt so far as sludge or pressed material of sewage is concerned. Dr. Sicly has said that in his opinion the destructor had reached its highest perfection at Ealing where the sludge was mixed with the house refuse.

In other forms of destructors while there have been complete destruction within economical limits, there have been occasional complaints of odors from the chimney. In the Ealing destructor a "fume cremator" is attached so that increased heat and economy of heat are secured, with a thorough destruction of noxious gases. Vensholine also reports the plan thoroughly successful. The cost is stated at 9d. or 18 cents per ton, apart from the cost of carriage. (See Sanitary Record, August and September, 1887). The following outline gives the present status of the method in England:

It appears that the first attempt to burn house refuse in closed furnaces was made about the year 1870, but those constructed at that time did not prove a success, and were consequently soon afterwards pulled down; and it was not until the year 1877, after many experiments and failures, that furnaces were erected in a sufficiently perfect form to be capable of consuming the ordinary midden and ashpit refuse. The first of the kind were erected at Manchester, and were arranged in pairs back to back. They were each 8 feet 6 inches long, 4 feet 3 inches wide, and 6 feet 3 inches in height from the fire-bars to the crown of the arch. The bottom was formed with a hearth 3 feet in length and fire-bars 5 feet long, and it was made to slope downwards towards the furnace doors, the fire-bars being at the lower end.

At the back or higher end of the furnace an opening was formed, from which the smoke and vapors passed into the flue, which was connected to the main flue leading to the chimney. The top of the destructor was made flat, and is used as a platform on to which the refuse to be burnt is tipped, from whence it is fed into the

middle and hottest part of the fire through a hopper formed in the top of the furnace.

The refuse was satisfactorily disposed of in those furnaces, although no attempt is made at any previous drying of the material; the quantity consumed being at the rate of about 28½ tons per furnace per week.

About the same time—viz. 1877—Leeds took up the question, and erected one of "Fryer's Destructors," which consisted of six cells or furnaces arranged in a double row of three, back to back, in a similar manner to those at Manchester, but they differed in construction in some material points. The area was about the same, but the height of the furnace was reduced to 3 feet 6 inches, and the bottom was divided into three parts, the lower consisting of fire-bars 5 feet long, the intermediate being a drying hearth 4 feet long, and the upper part what may be termed a feeding hearth. The fire-bars and drying hearth have an inclination of 1 in 3, and the feeding hearth is somewhat steeper. The latter extends across half the width of the furnace only, and is situate immediately under the refuse feed-opening at the top of the furnace. In the other half is an opening in the back of the cell leading to the flue—a wall separating the opening provided for the admission of refuse from the one formed for the outlet of the products of combustion into the flue.

An inclined roadway leads up to a platform level with the top of the destructor, on to which the refuse is tipped and shovelled into the feed-openings, which are kept filled with the material to be burned. This slides forward upon the sloping hearths, and is partially dried by the heat given out by the burning material lower down the furnace. This form of furnace was a distinct advantage over any other furnace that had been erected up to that time, as of course, considerably more material could be consumed when partially dried than when in a wet condition. The quantity disposed of averaged about 34 tons per cell per week.

In addition to the ordinary feed-openings, a larger opening, with a cover, is provided over the middle of the furnace, through which infected bedding, unsound meat, &c, can be put direct into the hottest part of the fire, and at once consumed.

These furnaces were so successful in their operation that numerous other furnaces were soon invented, and amongst those which have been tried are "Healey's," erected at Bradford, the "Beehive," invented by Mr. Stafford, erected at Bumley, Leicester, Richmond, and one or two other towns, and the "Nelson Town Refuse Destroyer," the invention of Messrs. Richmond and Birtwistle, erected at Nelson.

I do not think any very useful purpose would be served by describing the construction of these furnaces, as neither "Healey's" or the one at Nelson appear to have got beyond the experimental

stage, whilst the "Beehive" has been abandoned at those towns where it has been tried, except at Bumley, where it is still in partial use for burning shop and market refuse at night time three times a week.

Since the destructor at Leeds was erected others of the same kind have been constructed in towns in various parts of the country, and the experience gained from the working of these under varying conditions revealed certain defects, which gave rise to complaints from those living in the neighborhood of the destructors. One of the principal grounds of complaint was the escape of dust and charred paper from the chimney, which afterwards settled in the immediate vicinity of the works. To remedy this defect the main flue under the cells has been enlarged, so as to form a chamber about 9 feet wide and 6 feet in height. Low walls of dry brickwork, about 2 feet high, are constructed across the chamber at intervals, which serve to prevent the passage of the dust into the chimney, and wire screens fixed across the flue have prevented the escape of charred paper.

The amount of dust collected in the chamber varies in different destructors according to the composition of the refuse burnt, but, as a rule, the chamber requires to be cleaned out at intervals ranging from one to two months.

Since these precautions have been taken no further complaints have been made, and there need be no reason for such complaints if ordinary care is taken to clean the chamber at proper intervals.

The only other material cause for complaint was the offensive smell which sometimes proceeded from the chimney. This smell, do doubt, arose from the vapors given off from the refuse whilst it had been drying, and before it had reached the fire. The wetter refuse being nearest the opening out of the furnace into the flue was, of course, in the most favorable position for the escape of the vapor at once into the flue in an unburnt condition, which gave rise to the complaint I have referred to.

To remedy this evil Mr. Charles Jones, Assoc. M. Inst. C. E., surveyor to the Ealing Local Board, has devised an additional furnace called a "fume cremator." This furnace is about 5 feet long by 4 feet wide, and is built into the main flue in such a manner that all the gases and vapors from the destructors must pass through the furnace on their way to the chimney.

The furnace is heated with selected material from the refuse or with coke at a cost of a few pence per day.

The fume cremator has now been in operation in connection with Fryer's Destructors for some time at Ealing, and no complaints of anything offensive have been made since it came into use, and the result of analysis of the gases passing from the chimney proved them to be perfectly innocuous, and it is now an accomplished fact that towns' refuse may be disposed of through the agency of the

destructor combined with the cremator in such a manner as to be absolutely free from any nuisance whatever. * * *

Recently Dr. MacLintock, the Health Officer of Bradford, England, (pp. 229–721), has reported on the successful use of Fryer's destructor, to which Jones' cremator and Horsfall's steam injectors have been added; the result of the use of the two latter being a great increase in the heat of the furnace and its more effectual consumption of the refuse without odor. (See Sanitary Record, Nov., 1889.)

A full and excellent account of all foregoing methods is also given in the sixth report of the Provisional Board of Ontario, 1887, pp. 14–26.

The city of Montreal, population 70,000, has a destructor or incinerator which has been in operation since July, 1885, and has given as the report of the medical officer says, complete satisfaction. It is known as the Mann Furnace or Incinerator. From July to December the amount of night soil removed and burned was 1184 loads of 60 cubic feet each. The night soil is removed by odorless apparatus. The furnace being in blast, the contents of the barrels is emptied into the two funnels. The matter in its fall comes on a grating where it is quickly dried, and passing through falls on arches where the reduction is completed. Refuse is dumped directly from the wagons. One of the furnaces in use easily consumes from 50 to 70 cubic yards per day of 12 hours. The cost is from $3,000 to $6,000 per furnace. One of this kind has since been built at Chicago by Mr. Mann, of Montreal, the inventor.

"Its length is 69 feet, width 18 feet 8 inches, height, 21 feet Large doors at the top receive the garbage; smaller doors beneath are for the distribution of the burning garbage by men with rakes and bars. The lower doors open into a box where the ashes of the burned garbage fall." In some respects this furnace is said not to have worked satisfactorily, but from the evidence furnished us by Dr. Laberge, the health officer in Montreal, (see Transactions of A. P. A. Association, Vol. XII) and from other sources, we believe the defects not to be due to the principle of the furnace but to some errors in construction and management, perhaps, also, to the pressure brought in favor of a rival furnace.

The chief other destructors that have come into especial notice in the United States, are as follows:

The Engle Furnace, of the Engle Sanitary and Cremation Company. Office, Des Moines, Iowa.

The Rider Garbage Furnace, Pittsburg, Pa.

The Vivartas Furnace of the Cremating and Refuse Company, Seymour & Smith, secretary, Plainfield, N. J.

The Vienna or Merz process, represented by "The Universal Extractor and Construction Company," Buffalo, N. Y. In this, the grease is removed by means of benzine, and the residue used as a fertilizer. Heat is used to remove moisture and to dry rather than to destroy. There are specimens of the Engle furnace in use in Minneapolis, Des Moines, Milwaukee and at Coney Island; and in New York, at the foot of East 16th street; of the Rider, at Pittsburgh; of the Merz, at Buffalo and Chicago.

Most of these deal with garbage, street sweepings, night soil, cesspool material, etc.

The old Dr. Marden furnace at Milwaukee, has been substituted by the Engel.

The various improvements on the Sieman's system of cremation, or the modification made by the Garini and Venini patterns of crematories have been utilized, while modes of caring for dust and for odorous gases have greatly improved. The device of Mr. Charles Jones, C. E., known as the Fume Cremator and attached to the furnace, seems equal to the prevention of all noxious vapors. See his small pamphlet on "Vapor Destructors," as published by the Association of Municipal and Sanitary Engineers and Surveyors, (England) 1887.

As to the cost of these destructors it varies with locality and the number of "cells" but they have been shown to be fully within the reach of most municipalities. Many companies will furnish upon a royalty and erect the works. The following is from an article by Dr. Kilmington.

"Among the questions likely to be asked under this topic, is that which relates to the primary cost of construction. Definite answers to this query cannot be given, for the reason that, with any of the furnaces we have described, cost must depend very largely upon location, availability of materials, command of skilled labor, and the size and capacity of the furnace which the circumstances and extent of the population demand. Equally important is the question of the cost of operation. This again is insusceptible of a definite reply. Location, available fuel-supply, econom-

ical management of the furnace fires, the class of garbage or refuse to be burned, and the proper disposition of fuel-forming materials —these are all considerations which largely affect the questions of working cost. The Mann furnace in Montreal is said to be operated at a cost of 25 cents per ton for miscellaneous refuse and of 75 cents per ton of night soil. It is claimed that the Rider furnace will do about the same thing.

OPERATING EXPENSES.

An estimate of the expenses of operating the Engle crematory in Minneapolis for a period of five days, during which the furnace was worked by three men entirely new to the task, two of whom were on duty by day and one by night, gives the following facts and figures:

CONSUMED IN FIVE DAYS.

Thirty-three horses, 59 dogs, 103 barrels of hotel and commission-house refuse, 12 loads of market offall, 70 loads manure, weighing in all over 200 tons.

Total cost of labor and fuel for this period $38.25 or $7.65 per day, the entire weight of refuse being destroyed at a cost of 19 cents per ton. The ash deposited in the course of the consumption of this material is exceedingly small in quantity, weighing less than 200 pounds per day.

This estimate, eminently satisfactory as it is, is not altogether a fair one. The men employed were wholly inexperienced. The furnace at the beginning of these five days was cold, and it required several hours to superheat it. The fuel used was simply lath edgings and coal screenings, or "breeze." The glut of horses was unusual and crowded out the ordinary supply of garbage. It is safe to say that upon an average run, over an extended period, 15 to 20 cents per ton of refuse would pay for the labor employed and the fuel consumed.

No doubt other improvements and reduction of expense will follow, but the time has already come when most of our cities of over 20,000 population should be inquiring into their needs for some such apparatus. Among the chief duties of City Boards of Health is the removal or destruction of all decayable prutrescible material that remains from the necessities of civilized life. Locality and quantity will determine whether it can have carriage to the country, but if not, or if the expense is to too great the ordeal of fire must deliver the people from the danger. We cannot too

strongly urge upon our cities that all such material is the enemy of health and so of property, and that cities as they grow in size must grow in enforced cleanliness. We shall be glad to aid any local board with further facts, or to give them facilities for fuller details as to the various forms of filth destructors and their results in actual operation.

The following from the *Metal Worker*, is a description of the disposal of garbage in London:

Somehow or other the rubbish both from the streets and the houses finds its way to the wharf. A considerable pile it makes. The 70 vans make on an average 3½ loads of about 2 yards each a day, and the year's total shows about 38,000 loads taken from premises and 27,000 loads of sweepings from the streets. Averaging, then, 65,000 loads at a ton apiece, we have 65,000 tons of rubbish from within the city boundaries to be dealt with in a year. How is it disposed of? Let us go to the wharf and see. The chief object is the destructor—a furnace, or rather a set of furnaces—in which the rubbish is cremated after everything worth picking out has been removed. It is a range of very dirty boiler fires, which are fed with fuel from the front and with rubbish from the top. The "cells" are back to back, over a dust-chamber 10 feet 4 inches wide and 6 feet high, the flue from which leads to a 30 horse power boiler and to a chimney shaft of 150 feet. Night and day the fire is kept up, from Sunday midnight to Saturday at half-past eight in the evening. During the year over 19,000 loads of refuse are shot into it, and these produce a residum of some 4,000 loads of ashes and cinders, more or less hard, not only valueless, but for the removal of which money has to be paid. The men work the destructor in three shifts of eight hours, there being three men on the top to feed the furnaces and three below firing and removing the clinkers and ashes.

We mount to the top of the furnaces with the superintendent, and stepping gingerly behind him on a very warm layer of odds and ends and carefully avoiding sundry small sloping gullies leading down to the fires, we stand in safety on an iron platform. Overhead runs a traveling crane, behind us is the engine house, in front of us is the space on which men loaded with big baskets are throwing down, one after another in constant succession, almost every variety of dry unsaleable refuse. As the heaps fall they are attacked by the three men with long pokers or peels and pushed down the sloping gullies into the fire. They are dealing with the refuse in retail; we are to see it treated in wholesale. A van drives into our right and takes up its position under the crane. Its contents are known—nothing worth troubling about in that lot. The claws of the crane sink threateningly on to it. There is a loosening of bolts

and springs in the body of the van. Down go the crane claws and clutch hold of it. The chains tighten. Slowly and resistlessly the body of the van is lifted up from the frame work and hung in the air. Higher, higher it comes, until it is above our heads. Then the vertical movement becomes a horizontal one. Slowly along the double rails the crane and its burden travel toward the gullies of the fire. It stops. There is a clanking of chains, a rattle, a jingle, and a roar, and the stuff is shot in an avalanche before the men and rammed out of sight to pass through the furnace. The empty van body slips back to its level, glides horizontally to the rail end, sinks on to the frame work, with a slide and a click the whole thing is a dust cart again, and away it drives for another load to bring to destruction in the same way.

Every morning there comes a van from a hospital into whose contents no man pries. It is brought under the crane and lifted aloft and run over the fire, but its doors fall open only as it touches the gully, and no one sees what it has brought to be destroyed. Often a less horrible cartload comes with diseased meat or other condemned food to be lifted by the crane and similarly converted into ashes or clinkers. The dividing of the body of the van from the frame work has many advantages. There is no advantage in any excessive stock of wheels. The frames do double duty. The van bodies are replaceable by water tanks. Slide off the body and slip on the tank, and there is a water cart complete—a capital arrangement, for when there is most need of dust vans there is no need for water carts. The load we have seen dealt with was one of hopeless rubbish. Let us inquire into the fate of a more mixed accumulation now entering the yard. Along the yard side is a row of heaps over each of which a gang of pickers are busy. In one place the center heap has disappeared, sorted out into smaller heaps or carried off to the destructor opposite. The van is backed into the vacant space and the contents deposited on the ground. A gang sets to work on it, consisting of three women and a man, for the women, though surely disappearing, have not yet died out even in the City Yard.

The "leading woman" is in charge; next to her is the man who is known as "the filler." The woman works by contract at so much a load, and the members of the gang earn from 12 shillings to 17 shillings a week apiece. The fuel is here their perquisite. They sort out the paper, the string, the bones, the tins, the oyster shells, and, speaking generally, their performances are more curious than pleasant, and one is not very sorrowful to hear that the profit on what they do is so near extinction that in a few years their trade will be unknown. Women smoking short pipes and wearing straw-board gaiters and torn bonnet boxes for pinafores are perhaps worth seeing by students of so-called "life," but the fewer we have of them the better. A strange notion this of hereditary pickers;

mother to daughter, mother to daughter, going on the heap generation after generation—a caste or class by themselves, a profession, indeed, quite exclusive and a special inheritance of the spindle side. The paper and pasteboard, bundled up into trusses about as large as a bolting of straw, are loaded into barges and sent to Germany to be made into such paper as no English manufacturer can make a profit out of. The string goes to the mat makers, the tins and cans and old buckets and rusty saucepans are taken—when some one can be beguiled into taking them—to be melted down for the sake of the solder, which is the most valuable thing they have about them. The oyster shells go to the three mortar mills worked from the destructor's boiler and are ground up into manure.

A report of a committee (of which Dr S. S. Kilvington, of Minneapolis was Chairman), made to the last meeting of the A. P. H. Association, gives many interesting details. At present, we think the Engle furnace has been introduced more than any other. The Engle fire closet, for consuming the refuse of private dwellings, hotels, etc., is also worthy of examination. While, as yet, not able to speak with entire confidence as to the preference to be given both, the great variation in their efficiency and the varying push and energy of the various companies, should put municipalities on their guard against preferences based either on ex-parte or interested testimony or upon the sole opinions of a visiting committee. It is safer to take the testimony of Boards of Health, which has given some system a thorough trial, and of those who are experts in this particular service. We feel sure, however, that our larger cities should not delay the thorough examination of this mode of dealing with all garbage and refuse.

PHYSICAL CULTURE IN ITS HYGIENIC RELATIONS.

BY J. M. GREEN,

Principal of State Normal School.

In announcing this topic, the question most likely to present itself first is, What of Physical Culture is not related to Hygiene?

There is a physical culture which aims simply at grace of movement and facility of physical expression, as in gesture. While it must be admitted that this kind of culture cannot be claimed for hygiene, yet even it must aid hygiene by turning attention to the importance of the consideration of the body as a factor in educational promotion. While it is not within the province of this theme to discuss the æsthetical side of physical culture, we would not have it thought that in leaving it that it is not important. All that in expression of thought can be claimed for the eye, the mouth, or the more general features, can be claimed more emphatically for the system as a whole. The motion of the hand, the shrug of the shoulder, the toss of the head, responsive to the impulse of the mind, have relationship to the body.

Then too the grace in movement may not be considered beneath our consideration. We of this nineteenth century are less complimentary to ourselves than were the citizens of Athens five hundred years before the Christian era. First attention was given to the cultivation of the human form. We are not so likely to give attention to the human form as to that of lower orders of animals. How great the importance attached to the gait or movement of a horse. What care and attention it receives that it may be developed not only in speed but grace. Our geographies note that such and such

counties and States are noted for their fine stock. Which of our counties and States are noted for their fine men? Is not grace in movement and symmetry in development as worthy of encouragement in men as in brute? Is not the human soul worthy a cultured tenement?

The fact that men will follow their ideals is abundantly demonstrated by history and observation. The Platonic or Stoic ideal was deeply impressed upon the educational conception of the human race.

Physical culture may be defined as such a symmetrical development of the various physical functions of the body as will enable the body, as a unit, to accomplish the best results possible to it.

If you will persist in having school teachers in your Sanitary Association, you must bear with us if we reason somewhat from an educational basis. Placing the soul as the central figure of all our systems, I prefer to view the physical first from the standpoint of the mental, that the former may always be considered secondary to the latter. If we may wait upon the physiological without detriment to the psychological, then we may turn to the task with unrestrained zeal.

Physiologists tell us that the brain is the centre of the nervous system, as it is also the organ of which mind is a function. As the centre of the nervous system it possesses its avenues of connection and communication with all parts of the body.

It is not questioned that the brain is developed by the development of certain of these avenues of connection or communication, the sensory nerves. If this point is admitted, may it not be admitted with equal safety that the symmetrical development of the brain depends upon the symmetrical use or development of these various sensory nerves or avenues of communication?

Admitting this point to be true, we next turn to mind as a function of the brain. While we do not admit that mind is in any any sense a part of brain, we do claim that it is a function of brain. Where there is no brain there is no mind. Now if mind is a function of brain its strength is in proportion to the development of that brain.

Put a tiny blood-clot on that brain and what becomes of the action of mind; may it not be claimed, with equal probability of correctness, that for a tiny contraction or lack of proportionate

development of that brain, there is a corresponding lack of development in mental power. If these points may be admitted, the conclusion necessarily follows that the symmetrically developed mind depends upon the symmetrically developed brain, and the symmetrically developed brain depends upon the symmetrically developed body.

While we admit that the above line of argument is not conclusively proven to be correct, and is based somewhat upon inference, we unhesitatingly claim that the man who undertakes to prove it to be false, has more of a task before him than the man who undertakes to prove it to be true.

The above are our grounds for feeeling that we have the educational sanction for the culture of the physical, but while these arguments are the more important in proportion as the mind is more important than the body, they are not the most direct.

The most direct arguments for physical culture are from the hygienic stand point. Be it understood that this claim for this culture is not only general but is for special attention to it in the schools. It has been claimed that men are governed by their idiols. That either this government, or ignorance of it, results in the neglect of important parts of the physical organization is apparent to the most casual observer. It is then the duty of the schools both to give light and set the new ideal. Let us glance at some of the results of this neglect.

We first notice it in the different development of the different races of men. Compare the Mongolian, the African, the Indian and the Caucasian, and note the varying physiological development.

How long has the sentimentalist pictured to us the sturdy flat-footed warrior of the West, but the investigations of the Indian bureau disclose quite another condition of things. This Bureau discloses that almost all this race are tainted with the diseases and weakness that are the resultants of the neglect of some portion of the system.

We may next notice these results in the different class of men as to occupation. Note the light and graceful movement of the dancing master, the feeble walk of the cobbler, the stooped shoulders and swaggering step of the miner, the long and heavy step and rounded shoulders of the farmer and cart-driver, the pale and slender form of the student, the slight and tapering form of the lady

devotee of fashion, and the better development of the lady devotee of comfort, beauty and judgment.

Of course, all these different degrees of development under the different occupations but demonstrate the result of sacrificing one physical function to the upbuilding of another. Now, it can be shown with equal force, that these peculiar neglects are attended by these special diseases. For the proofs it is but fair to call upon those present, learned in the medical profession.

A distinguished physician told me not long since that a very large proportion of the lung diseases developed in the apex of the lungs, and that the proportion was larger among ladies than gentlemen, and among clerks, book-keepers and other persons of sedentary habits, than among mechanics and persons of active pursuits. The reason he gave was that persons fell into the habit of stooping the shoulders and bearing the arms by the sides, and allowed the shoulder blades to rest upon the apex of the lungs, and did not lift them to afford a full inflation of the lungs and that a portion of the lungs lying dormant invited disease in response to nature's law of disposing of that which is not of use to her. A distinguished clergyman and orator told me that for some years he felt a weakness, but that he had thrown off the disposition to the disease and made of himself a strong and healthy man by simply practicing fully inflating the lungs and throwing the shoulders back a number of times each day.

It would not be difficult to instance diseases that are the direct result of improper regard for the digestive organs.

The evil results of a want of proper care for the physical organism is seen no where more than among students. The athlete in the great physical contests of the college sacrifices the nutriment that should go to the brain to the building up of muscle. The competitor for the intellectual prize sacrifices the exercise and nutriment necessary to the healthy action of the body, and even the nourishment of the brain itself that he may dwell on his books.

Many bright students graduate with diplomas that should only admit them to the hospitals.

Now neglect has its opposite care. Wherever a disease is the result of neglect, its prevention is possible by care or physical culture and intelligence.

How shall this knowledge or culture be disseminated? Not

alone by physicians. A distinguished physician said that he feared too many physicians felt that their prosperity depended upon their taking the opposite course. How, then, shall this intelligence be spread? The answer is by the common means, through the press and the schools, and by enlisting all the common agencies at hand. Perhaps no single one of these agencies is more powerful than the schools. Here the pupils are not simply within the reach of the knowledge on these points, but may be held to the practice.

How best shall we proceed to accomplish these ends?

I answer, first begin at the sources of preparation for teachers.

Over 400 persons in the State are directly preparing to teach. I would have in connection with every Normal or training school a gymnasium fitted up with such apparatus as is best adapted to the development of each of the various physical organs. I would have a teacher of such a class who is qualified to examine the student and prescribe the kind of exercise needed, and then watch and guard the student under such exercise to see to it that the very exercise was not abused. Such instruction as this has been abundantly tried to testify to its value. Measurements of the chest have been taken, both before and after the course of exercises, and the development accompanied by increased health and vigor noted. Locate such a department as this at our State Normal School, and the results upon the schools of the State cannot be foretold. The question will at once arise, what will the teachers do in schools where no apparatus is provided? I answer, that what is most needed is intelligence, accompanied by a desire for physical culture. The means will then certainly be provided, though in varying degrees. While a gymnasium may not be at hand, almost any school can provide means for lifting the arms and taking a long breath.

In almost any school where pupils are sacrificing the eyes and irritating the nervous system by facing the light they may be permitted to turn around and face the other way. There is rarely a school that may not have in one corner of the room a swinging pole upon which the pupils may be permitted to try their strength in raising themselves from the floor. A broom handle will serve for a gripping machine. Many of the best results have been secured without the aid of equipped gymnasiums or apparatus, if only the intelligence and desire was possessed. I would have well equipped departments at the sources of information, and send forth trained

persons with a desire to disseminate this valuable information and rely upon their ingenuity to provide in this as in many other branches the means. There are many other resources for the dissemination of information in this line, such as teachers' conventions, associations, institutes, press clubs, etc., all of which can and should be reached.

When Æneas in his famous journey from Troy to Italy visited Dido she conducted him to an eminence where he might look down upon the new Carthage and witness the busy scene of building houses, marking out places for new foundations, laying out streets, improving gardens, etc.

These are the occupations that have engaged our attention in this new country, but to the neglect of the bodies that were to reap the rewards of these labors.

Now that our work has progressed to a goodly degree, let us broaden our educational conceptions and practices to the promotion of this most important branch of training and education, physical culture.

THE NEEDS OF MEDICAL OFFICERS FOR SCHOOL DISTRICTS.

BY G. F. WILBUR, M. D., OF ASBURY PARK.

It will not be denied that the object of the training of children at school is the symmetrical development of *all* the faculties, physical as well as mental. In no other way can the real object of our Public School system—the attainment of an ideal citizenship—be accomplished. In order to bring about this great result the highest possible condition of physical health is indispensible. This can only be attained through a faithful observance of the laws of health. This must be mainly effected through a proper regulation of the occupations and opportunities that are afforded where so large a portion of the time is *spent* as at the school. The improvements and discoveries of sanitary science have come to cover so vast a field that the teachers themselves, however faithful and competent, cannot be expected to be very fully conversant with even their outlines. Trustees, of course, are in no better condition; and the higher school authorities are more than occupied with their arduous and exacting duties in other departments than those relating to health.

The hygienic supervision of the schools of a city is amply sufficient to furnish abundant work for the more industrious sanitarian to be found within it. The simple mention of the many subjects that would naturally come within the scope of his jurisdiction would, to one already occupied, be quite discouraging. It would be said that suffieient instruction on these points may be given in printed form for the hygienic management of schools. But conditions vary, and suggestions suitable for one locality may be quite

inappropriate for another. The examination of school grounds with reference to a proper sewerage and freedom from cesspools could not be conducted with too much particularity and strictness. The liability of pools and puddles to burrow for themselves communications with adjacent wells is no longer a matter of dispute. The escape of the contents of a barrel of petroleum that had been buried on the side of a hill was, not long ago, found to have tainted the water of a circuit of wells nine hundred feet distant, and to have so changed the taste that fifteen families were deprived of the use of it for many days. Had this soakage been sewage instead of petroleum, who can doubt that the result might have been wholesale water poisoning and a harvest of typhoid fever?

Another subject of the greatest importance, needing expert supervision, is the arrangement of light for particular rooms. Indeed, the scientific examination of the eyes of pupils, with the view of adapting the surroundings and arrangements for the admission of the proper amount and the direction of light forms in European schools a prominent subject for supervision. In truth, there is no good reason why this very regulation may not be adopted with advantage here. It is well known that many cases of near-sightedness are produced in children by studying in rooms poorly lighted, and that the fine prints of many text-books increase the evil. It is not too much to say that all such books, no matter how great their merit in other respects, should be at once banished from the school-room. Even where near-sightedness is not produced, the effort to see what is half invisible often produces, in children, an incurable squint. We all know that the lens and adjacent tissues of the eyes in children are exceedingly elastic, and that causes that would not operate at all on older persons are to them highly injurious. It is not proposed here to inquire into the exact way in which these changes are produced. It makes no difference in this connection, whether they are brought about by a slow congestion, causing the tissues of the eye-ball to become weakened, and so liable to give way posteriorly, which is supposed to be the lease vulnerable direction, and so become elongated; or, whether the mere pressure of the muscles on the sides of the eye-ball, in straining to read fine print causes it to give way in the direction mentioned, and so cause a gradual lengthening of the axis of the eye backward.

We know that this great affliction is brought on by studying under wrong conditions in childhood. In bad cases of this kind, the retina itself, not being able to follow the other tissues of the eye in their extension backward, becomes separated from them, causing partial blindness. Hence the unspeakable importance of watching over and protecting the children. The same exposure later in life might do no particular harm. We constantly see artisans, whose business requires constant looking at minute objects, retaining their sight unimpared all their lives. The real reason that makes a constant supervision indispensible is the fact that these changes in the vision of the child come on so insidously that the most intelligent of our teachers might not notice anything wrong until the mischief is beyond repair; the eyes of the child even looking brighter while sustaining the injury. A good general direction to give might be to recommend to teachers to suggest a frequent resting of the eyes by looking away from the book to distant objects.

We take it for granted that the time is past when teachers box the ears of the scholars for looking off the book. Another very important object to be accomplished through the kind of oversight we are insisting upon, is the thorough personal comfort of the children, as to position, proper support of the limbs, etc. Curvature of the spine is doubtless frequently brought on by scholars bending, year after year, over desks that are too low. The shame and pains of seeing little children perched on high benches with their feet dangling in the air, is now I trust, happily a thing of the past. Still far too many discomforts but little short of this enormity remain. The best results of school work can only be seen, or expected to be seen, where every possible attention is paid to physical comfort. Whenever a child appears tired, sluggish, inattentive, the imprisonment of the school-room is no place for him. The inexperienced teacher says he is lazy, that he needs discipline. The medical examiner says that he is sick, and needs air and exercise.

Another source not only of discomfort, but of the greatest danger is the dampness of many school buildings. Many of the country school houses in some of the counties should be condemned on purely hygienic grounds. The floors are damp, the buildings are on low grounds, the earth beneath the buildings is water-soaked. The children are exposed to rheumatism and diptheria. Their

feet are wet and they are in danger of consumption. Is there not great need of medical inspection here? And yet we must go slow or we shall encounter a prejudice that will retard matters rather than advance them. No school building should be allowed to be built on ground that has not been pronounced suitable by competent authority.

The question of the retention in the school of sickly children and the period of time when the children shall return to the school, after having suffered from contagious diseases—their period of quarantining so to speak—can, of course, only be decided by intelligent authority, such as we are here insisting upon. Nor is the amount and character of the study to be undertaken by little children, a less legitimate province for the judgment of the Hygienic instructor. Approving words for a moderate ambition in a child are all very well, but what shall be said of the hot-house stimulation and cramming that characterize some city schools? The multitude of studies, the far too short intermissions, the struggles for prizes and promotions, the high pressure and tension everywhere, are fraught with fearful dangers. I do not wish to be understood as blaming the teachers for all this. They are urged on to this over-pressure by foolish and ambitious parents. The teachers themselves need protection from overwork as well as the children. If our teachers could be allowed to have their way, the dangers we have described would be much diminished. It is for them as well as for the children, that the authority that we are contending for should be instituted.

The studies of a little child should never be a task. They should never be presented to him in the shape of a task. They should be a pleasure to him, or they should for the time being be discontinued. This should be a partial test, at least, of their fitness. When the child grows older a new test may be provided. Whenever a child shows persistent and continuous aversion to studies that are presented in an attractive and comprehensive manner by a competent teacher, we may well begin to look for some hidden underlying cause for such aversion in defective eyes, perhaps, or in some other and more serious pathological condition or process that may be going on in the child's body. It is plain that there is here a wide and exceedingly important field for expert medical investigation. Teachers could not be expected to be the proper judges in these

cases. Many a child has been sent to a premature grave by neglect at that period of life which deserves and should receive the most careful watchfulness. These necessities cannot be met except by direct and constant medical supervision of schools, and when the solemn importance of the matter is considered the marvel is that such offices do not now exist in every county, not only of this State but of every State in the Union. In some European cities, notably the city of Brussels, the most scrupulous care is taken of children in schools by medical men appointed for the purpose, and whose time is solely devoted to this one object. This care is exercised over the most minute details of the student's life, including periodic examinations of each child's eyes, and of special organs as well as of the general health. The time must come when we shall do as well in this country as they do abroad. The State stands to the child *in love parentis*, and it is the manifest duty of the State to throw around the child every safeguard to the child's health in its power.

The great subjects of heating and ventilation, as well as the directing and regulations of the exercise of students are of profound importance and can never be scientifically regulated except through the advice and supervision of competent medical authority. But I have refrained from dilating much upon these subjects, not only for the reason that each one of them embraces far too wide a field to be treated in a single paper with any degree of satisfaction, but also on account of the fact that they are so frequently touched upon by others. I deem our State most fortunate in having at the head of its Department of Instruction a gentleman whose zeal for education is only equalled by his interest in the health of the people; whose belief it is that the schools of the State are not meant to produce prodigies but citizens, and that whatever tends to promote this end is sure to be right. And so it must ever be. For after the school days are over and the scholors come to take their place in the ranks of the world's workers, the question that will be asked of them will be not so much, "What do you know?" as "What can you do;" but how well can you do it and how will your health hold out while you are doing it?

THE IMPROVEMENT OF SANITARY CONDITIONS IN THE HEALTH AND PLEASURE RESORTS OF NEW JERSEY.

BY HENRY MITCHELL, M. D.,

State Sanitary Inspector.

Towns and districts to which large numbers of transient residents are drawn in search of health and pleasure, have, in addition to the motives common to other communities, extraordinary commercial incentives to create and maintain good sanitary conditions.

Such resorts are dependent for prosperity upon their fame for salubrity and healthfulness, as manufacturing centres are dependent upon abundant labor and favoring transportation facilities, or as agricultural districts depend upon fertility of soil and easy access to markets.

Hygiene should be a part of their stock in trade—their "anchor to windward"—and, viewed merely from a business standpoint, health protection should there be studied and practiced with surpassing diligence.

It is not only the immediate vicinity in which these resorts are situated, which is financially concerned in the judicious employment there, of efforts to banish all causes of preventable disease, but the whole State participates in the profit or loss which attends the summer resort business, for its development in New Jersey has reached proportions which compare favorably in financial importance with the great industries of the Commonwealth.

We are thus led to the expectation that both individual and organized endeavor to promote health should be exceedingly energetic in these places, and that a widespread public interest should exist in their sanitary administration.

Local option in all matters relating to sanitation has been carefully provided by the legislature, and if the people of any district so will, they may dwell in squalor and die off in throngs. While to local boards is given ample power to protect the public health if they choose to, or if their constituents demand the execution of the laws, yet no authority exists outside of any health district to act for the local board in promoting health interests.

The members of this association are painfully conscious that the eminently successful efforts to provide adequate legislation to enable these, together with other communities throughout the State, to suppress unhealthful influences, have not yet been sufficiently appreciated by those persons whose business interests are most seriously damaged by uncleanliness, and you are aware that much remains to be done in some resorts before they will become the examples of sanitary perfection which they should be.

Indeed there are a number of these districts in the State, in which the local health authorities, and the property owners whom they represent, are pathetic concerning all subjects relating to health protection.

It is false pretense and fraud for municipalities which have no other business interests than those attending the entertainment of transient guests, to permit indiscriminate pollution of soil, water, and air; to ignore the relation of cesspools and drains to wells; to heedlessly store up typhoid poison in vaults and pits whence it may enter the soil and finally be pumped from wells to reproduce fatal effects; to passively disregard the spread of communicable diseases; to permit sewer air to have free access to dwellings, and to perform a hundred other crimes of omission against material laws affecting health. For the patrons from whom the annual revenue is derived presuppose, and there is an implied contract that artificial influences in health resorts will be kept healthful.

This association is the volunteer guardian of the State hygienic interests. Will it permit, without protest, confiding visitors who enter within our boundaries in search of rest and recreation, to be housed in death traps and exposed to the risks attending the use of water from polluted wells? Is it not incumbent upon us to attempt to impress upon negligent managers of health and pleasure resorts a sense of their responsibility to the public? Where, instead of leading in devising and executing sanitary precautions,

these resorts are trusting to good fortune to tide them over mishaps due to unhygienic conditions, and in their greed for fat bank accounts they are giving no heed to the danger to health consequent upon the soil and water pollution which their methods year after year create and augment, surely some monitor should touch their consciences or their pockets and guide them into better practices.

A large proportion of the hotels and boarding houses in many of these places were erected at a time when the outlook for prolonged patronage was problematical, and economy in the first outlay was a prevailing cautionary measure. Sanitary safety was scarcely given a passing thought. A well, a cesspool and a privy vault were hurriedly provided, and convenience was usually the only consideration in selecting the site for the location of these appendages to the house.

Silence and long suffering on the part of guests concerning offensive odors and tainted water have aided owners to cast aside troublesome doubts about the safety of their premises, and apparently warranted and sustained an indisposition to appropriate any portion of the income to rooting out and remodeling old drainage makeshafts or to supply better water. Past immunity from direct and calamitous results forms a powerful argument in favor of the presumption that no catastrophe will attend the future use of present devices.

But it is not only in houses and towns which have long been established that sanitation is ignored. One of the more recent of the many projected "sanitariums" has not yet a single inhabitant, but several very beautiful cottages have been erected there, and a hotel to cost one hundred thousand dollars is promised. Miles of streets have been graded and curbed, and much money has been expended in preparing the locality to become the site of a city. The buildings already constructed are plumbed and supplied with numerous drainage fixtures, but neither sewers nor a public water supply is announced, and cesspools and wells will probably be offered to the expected occupants of the handsome villas wherewith to commence the old operation of passing a fluid from a hole in the ground back into the soil so as to pollute all surroundings.

It may be confidently predicted that unless the projectors of this enterprise change their plans, New Jersey's death rate will be

increased when this locality shall be long enough inhabited.

The system recently inaugurated by the New York City Board of Health, of notification in cases of typhoid fever, informing local boards in rural districts whenever that tell-tale disease appears in persons who have returned to the city after having sojourned within their jurisdiction, should have a salutary influence, and the records of the New York health office, if they are correctly gathered, will in time help to indicate where it is unsafe to spend the summer.

What shall be the remedy for inactivity in health and pleasure resorts in promoting health and preventing disease?

1. Shall the State Board of Health ask Legislative authority to perform, under pressing circumstances, some of the duties of local boards?

2. Shall publication of local shortcomings be employed to arouse neglectful communities?

3. Shall the present system of local health administration be replaced by a different method?

4. Or shall improvement be awaited until an outbreak of disease in one or more of these resorts startles the country and compels attention to hygiene?

The first proposition involves the assumption of executive responsibility by the State Board of Health, and before advocating such a step for obtaining relief we should inquire into the equipment and facilities possessed by the State Board and learn whether they are prepared to deal with the detail of individual violation of laws and ordinances.

To publish reports of unhygienic conditions is an exceedingly severe mode of compelling improvement, but it would unquestionably prove to be wonderfully potent in the case of summer resorts.

To change the character of local health administration is probably premature. We may, however, expect radical alterations in the future in the system of official supervision over public health interests, for advances in hygieology, and the production of skilled practitioners of the art of hygiene, together with a growing public esteem for the beneficial results of sanitation will aid, extend and in time readjust the application of means for the promotion of health.

A conservative adoption of the first two of the foregoing propositions is apparently feasible.

In cases where a crying evil exists, threatening health and life, reproaching the whole State and bringing into contempt the public health supervision, the State board might interpose its good offices as heretofore, and if necessary it might even with its present meagre resources, prepare itself to invoke the power of the courts to secure improvement or abatement of objectionable conditions.

In other cases where the force of public opinion will effect improvement the publication of facts would prove an available motive by which to accomplish the removal of dangers to health.

In any endeavor to improve sanitary conditions in health and pleasure resorts which may be inaugurated by this Association or by the State Board of Health there will be hearty cooperation on the part of towns belonging to this class which have already taken the beams out of their own eyes. For the highest degree of prosperity for these places can only be reached when the whole group comes to be known as safe havens of retreat from preventable causes of disease.

So long as just reflections are cast upon any of these resorts because of their trifling with the health of visitors, so long will all of them suffer to some extent from a suspicion that if any are dangerous all may be.

Abstract From the Papers and Discussions of the New Jersey Sanitary Association.

Session of 1889.

BY D. C. ENGLISH, M. D., SECRETARY.

The fifteenth annual meeting of the New Jersey Sanitary Association was held in the new library room in the State House, Trenton, commencing Friday morning, November 22d, at eleven o'clock. In the temporary absence of the President, George P. Olcott, C. E., of Orange, occupied the chair. After a brief report by the Secretary Dr. H. G. Wetherill, of Trenton, Chairman of the Local Committee, in a short address, extended a welcome to the members to the city of Trenton, and spoke of the importance of the work of the association. Dr. A. C. Hunt called attention to the large number of reports from various boards of health and sanitary associations that had been placed on the tables by the State Board of Health, and which were at the disposal of the members present.

C. Philip Bassett, C. E., of Newark, was then introduced and read an interesting paper on "The East Orange sewage disposal works as compared with other methods." (See fuller account of this paper, page 73, of this report).

James Owen, C. E., of Montclair, was introduced to open the discussion of the paper. He congratulated Mr. Bassett on the success of the system which he believed answered the requirement of East Orange far better than any other system now in use. One thing he specially commended that these works were built by day's work, and so were well done. But it is not a perfect system; for instance,

of the one and a quarter million of gallons of the sewage which passes through these works each day, at least 600,000 gallons were ground water which should not be there. He did not believe in the use of earthen pipes; he would urge use of iron pipes only. As a matter of abstract principle be believed the Sewage Disposal Works should not exist. Sewage should be utilized as far as possible, and a main sewer built from East Orange to the Passaic river.

Dr. E. M. Hunt, Secretary of the State Board of Health, said that being somewhat familiar with the excellent work of Engineer Bassett he desired to submit these propositions:

1. The progress of knowledge as to sewerage methods in the last ten years have not shown anything equal to Intermittent Downward Filteration through suitable land. But for various reasons of locality and expense it cannot be always employed and is not necessary to satisfactory clarification.

2. Locality and circumstances must largely determine the choice of methods, of which subsidence by short detention in tanks and by mechanical and chemical methods are among the most practicable. Each year presents new methods, some of which have great merit.

3. We need constantly to be looking into these as also for improvements in mechanical devices for hastening clarification and for dealing with sludge. We point as specimens in our State to some of those of Engineer Bassett and to the modification of flush method devised by Prof. McMillan at Morris Plains.

4. One of the great advantages of the mechanical and chemical system is that it requires the use of much less land for purposes of filtration.

5. It is now certain that there are methods in the hands of our Sanitary Engineers sufficiently cheap and successful to leave no excuse for sewage in cities and villages stored in cesspools or polluting the surface of the ground. With these and with the new methods of garbage disposal by cremation it is not the fault of sanitarians if the people of municipalities continue to attempt to live and thrive amid forced and foul organic decompositions. Nor should our smaller cities and towns await greater growth by which comprehensive and efficient plans will be made more difficult of execution.

Mr. J. C. Pumpelly, of Morristown, and Dr. A. C.Hunt, of

Metuchen, also spoke in commendation of the paper and of the work done in East Orange.

AFTERNOON SESSION.

Called to order by President, Dowling Benjamin, M. D., of Camden. George W. Howell, C. E., of Morristown, was introduced and presented a paper on the "Passaic River Drainage," substantially as follows: Lying within thirty miles of New York city is a tract of country over twenty miles long and varying from two to four miles in width, which, during every time of flood, is submerged by freshets continuing from one to three weeks, and sometimes the whole season, thus causing a loss in crops often to the amount of $75,000 to $100,000 in a single year. This scope of flat land outlines the bottom of an old geologic lake which spread over all the country from Liberty Corner on the south to Wynockie on the north, a distance of forty miles, and from the foot hills of the Highland range on the west, to the great trap dike known as the "Watchung or Orange Mountains" on the east, about 10 miles at the widest. This immense lake of glaceal water was held in place by ice and drift. Extending across the valley about where the D. L. and W. Railroad crosses the Passaic River between Little Falls and Paterson. Its surface was about 375 feet above tide. The enclosing moraine was washed away and the surface was lowered some 200 feet until its further subsidence was stopped by a trap ridge running across the valley at Little Falls, where the river now descends about thirty feet. The depression behind this reef has been gradually filled up by the wash from the surrounding slopes, producing this large tract of almost level country covered with a rich, deep alluvium of great agricultural value, except for the frequent flooding of the entire tract.

Engineer Howell then calls attention in the paper to the efforts which have been made from the earliest settlement of the country to reclaim these lands, how the statute books of New Jersey show many laws passed in relation thereto, from long before the Revolution down to the present day. But owing to the magnitude of the work involved and the poverty of the land owners, no practical results were effected. He refers to some of the efforts made by the building of reefs and dams, and then states that as early as 1855

the annual reports of the State Geological Survey referred to the great benefit to be derived from reclaiming these lands, not only as a means of largely increasing the agricultural resources of the valley, but also for the improved sanitary conditions to be secured to this locality and to the surrounding slopes, this whole region being notoriously subject to malarial influences.

In 1867 Prof. G. H. Cook, our late State Geologist, then but recently appointed, began systematically to work in the interest of these and other drowned lands of the State, and from that year to the present time not a report was issued that did not contain reference to this important matter. Through the careful study and persistent efforts of Prof. Cook a general Drainage Law was passed in 1871, taking the place of all the partial and ineffective laws previously passed. This law provides tha on application of a certain number of land owners to the board of managers of the State Geological Survey the latter are authorized to examine any tract of land subject to overflow, to devise some plan for reclaiming the same, and to recommend said plan for the approval of the Supreme Court. If approved the court appoints commissioners to carry out the scheme as presented by the board of managers. These commissioners are given power to assess and collect the expenses of such work from the lands benefitted. In pursuance of this Act three commissioners were appointed early in 1873, one of whom is still connected with the commission.

From surveys made it was found that the river at Little Falls drains an area of 833 square miles, and in the course of 22 miles through this tract there is a fall of only six and three-tenths feet, or about three and one-half inches per mile, too little by far to carry readily the high-water flow, amounting at times to 7,000 cubic feet per second at the dam; and that an area of over 13,000 acres is liable to overflow. The plan, as then devised, provided for a fall of about 7½ inches per mile throughout the whole distance. This was to be effected chiefly by reducing the new stone dam at Little Falls seven feet, blasting out the rock-reef above the dam to the width of 200 feet, and removing a bank of earth and boulders at Two Bridges. With these, and some minor obstructions removed, it was expected that the scouring action of the river itself, induced by the increased velocity, would virtually complete the work.

Mr. Howell then refers to the financial depression of 1873, which

made it impossible to raise sufficient funds to make a beginning, and it was not till 1886 that the scheme was revived and two new commissioners, to fill vacancies, were appointed. Their first duty was to estimate the cost of the improvement with a view of placing upon the market a sufficient amount of bonds in anticipation of assessments. Then the question arose as to damages to the Beatty Manufacturing Company, at Little Falls, whose water power and extensive improvements were of very great value, the commissioners having under the law the power of condemnation. The amount of award was finally fixed at $55,000. While an appeal by the Compaay was pending, the Commissioners, after consulting with eminent hydraulic engineers, recommended to the Board of Managers a modification of the original plan, which was adopted and authorized by the Supreme Court. The principal change is at the dam. This is to be reduced 20 inches in height instead of seven feet, and gates are to be erected which will carry a body of water 25 feet wide and 16 feet deep. These gates are to be opened at the beginning of a rise of water, and kept open until the river returns to its normal condition. The expense of reducing the dam, and of constructing and operating the gates is to be borne by the Beatty Manufacturing Company, under a contract already made with them. No award of damages is to be paid to them. In addition, the Commissioners are to execute a channel 25 feet wide and 16 feet deep, to draw from the bed of the river above the reef, carrying this channel down through the dam into the stream below, and obstructions in the bed of the river below are to be removed by them to insure a rapid flow of the water from the gates to the main fall about 700 feet below. In fact, the main fall of about 20 feet will be obtained, and the bed of the river will be excavated on a regular grade from the gates to the foot of the fall below. The amount of work to be done is approximately,—

Twenty-two thousand yards trap rock excavation at Little Falls, 30,000 yards earth and boulders at Bwo Tridges, and 50,000 yards earth at Pine Brook. On Sep. 1, 1888, the Commissioners issued six per cent. bonds, interest payable semi-annually, to the amount of $130,000, but will place upon the market only enough to carry the work through. On July 16, 1889, the Commissioners awarded the contract for the entire work to A. B. Nelson, of New Brunswick, over six competing bidders, at prices for rock varying from

$1.87 to $4.80 per yard, according to locality; for earth and boulders at 46 cents, and earth at 31 cents. These prices at estimated quantities make the cost of the whole about $94,000. To this must be added expenses of surveys, supervision and assessments, and the interest on bonds. The contractor takes 45 per cent. of his pay in bonds at par. There have been sold at par for cash $40,000, leaving to be disposed of, on a basis of $100,000, only about $15,000.

Mr. Howell then gives an account of the work done since August 1, 1889, with some details of the method, and considerable promising data concerning the efficiency of the plan now being followed. He closes his valuable paper as follows:

As the law now stands the expense of work is to be assessed wholly on the flowed lands. In many cases this must be burdensome, though we are happy to state that most of the people are anxious for the completion of the work. Great benefits will result to adjoining lands not included in the assessment, and the taxable property of the counties will be largely increased in value. In addition the increased healthfulness of the entire region cannot be estimated in dollars. * * * Reference has already been made to the important part taken by Prof. Cook in the inception and carrying out of this scheme, and I cannot bring this paper to a close without attempting to pay just tribute to his memory. His was the brain that devised the original plan, that formulated the law and got it passed. Through discouragements and obstacles that would have staggered any ordinary man, his indomitable courage and patience, and his cheery hopefulness carried him along, and after the persistent efforts and weary waiting of twenty-five years, he had the satisfaction of seeing the fruits of his solicitude in the actual beginning of the work under the most auspicious circumstances. Only two days before his death, he saw the first monthly payment made to the contractor, and he could not sufficiently express his gratification at the crowning of his life work. In this Association we shall miss his knowledge and counsel, and who shall take his place in the State on the many lines of public interest to which his unselfish life was devoted? As the years go by the grandeur of his character and work will be more and more appreciated, and through the unostentatious exterior he will be recognized as what he was—a great man.

The paper was then discussed by Civil Engineers Bassett and Owen, both of whom availed themselves of the opportunity given by the writer to question him as to the plans or the work already done, etc. Both spoke of the great importance of the work to the State and especially to the sections most affected by it.

The Secretary called attention to the appropriate reference in the paper to the late Prof. Cook, and said that by the Executive Council through their Chairman and Secretary had at the time of the death of Prof. Cook presented a letter of condolence to the family. The letter was read and after remarks by a number of the members present the communication was unanimously approved by the Association, and ordered entered in full upon the minutes.

The President then introduced Henry Mitchell, M. D., of Asbury Park, who read a paper on "The Improvement of Sanitary Conditions in the Health and Pleasure Resorts of New Jersey."

(See page 133, of this report for this paper.)

Mr. J. C. Pumpelly, of Morristown, spoke of the paper as one that for its ability as well as for the great importance of the subject on which it treats, should be given to the public. He spoke of the need of healthful surroundings at these places where so many thousands go for health and rest, and of the indifference of local health boards in many places he had visited in our State and on Long Island. Upon his motion the paper was referred to the Executive Council for their action.

The next paper was announced on "The Climate Treatment of Gastro-intestinal Diseases in Children." The writer, Boardman Reed, M. D., of Atlantic City, not being able to attend, his paper was read by the Secretary.

Climatic treatment can at present be carried out only by transporting the patient to some locality having a different climate. Why does a change of air often effect such striking remedial results? The question has never been satisfactorily answered. We can only infer that the breathing of different air acts as a stimulant to the vital processes. The probability is that there are ingredients peculiar to the atmosphere of every locality that have a tonic effect at first, while, like too long a course of quinine, they cease to stimulate. Then upon taking the patient to a different climate other tonic ingredients are inspired with at first invigorating and restorative effect, as before. Some such varying substances there must be

in the air of every region, whether they are gaseous elements unrecognized by the chemist, or only coarser material particles held in suspension, as certain amounts of saline constituents are known to be held in suspension in sea air.

Dr. Reed then referred to his experience in Atlantic City, where cholera infantum is rarely met with, and said, that no case of genuine acute cholera infantum has occurred in his practice for at least four years. It may be only a coincidence that for about the same period of time, the town has had an excellent water supply and a system of underground sewerage in full operation.

He urged that the best treatment of the graver forms of "summer complaint" is the preventive one, and the best method of prevention is to take teething infants away from the large cities before the hot season begins to the country, the mountains, or seashore, where the air is uncontaminated, the heat less intense, and the milk pure. When such preventive treatment has been neglected, and the child has been attacked, change to a more salubrious locality is still usually practicable. To the mountains or seashore is the most beneficial, the relative proximity or convenience of access often properly enough deciding the choice. No complicating conditions contra-indicate the seashore except advanced phthisis, while infants with organic heart disease or seriously enfeebled circulation should not take to very high altitudes.

The doctor then speaks of the advantage of a change of climate in cases of *Entero-colitis*, believing it the most efficacious means of cure in attacks that have resisted treatment at home. When children wasted and debilitated to the last degree with diarrhœa are removed to a favorable locality by the sea, such as Atlantic City, concerning which he could speak definitely from a long personal experience, the result, he claimed, is usually a prompt and surprising improvement.

He believed that this may, and often does, result from the stimulating effects of the change of air alone, but more frequently such patients require skillful medical attention as well as the best of nursing, certainly for the first few days.

Dr. Reed then dwells upon some important points in the use of remedies, and of the importance of certain hygenic precautions, *e. g.*, the flannel belly-band never to be left off, especially at the seashore; of rendering the food and drink as nearly aseptic as possible;

of boiling all water given to sick babies, whether as drink or mixed with their food; of boiling the milk as soon as obtained, and then preserved in cork bottles, etc.

The paper closed as follows:

In the care of these cases at the seashore it is important to pay more attention to the clothing than is necessary in the cities. It should be warmer, particularly at night, and when the child is kept at the beach, as it should be the larger part of the time. Improper feeding, and especially over-feeding, often produces relapses at the seashore as elsewhere. When there is much vomiting the bottle should be taken away and nourishment administered at frequent intervals by the tablespoon or even teaspoon. When the child is in a hotel or boarding-house or at points on the beach where many persons pass it should be protected from the annoyance of being stared at by strangers, an infliction that frets some infants exceedingly. A child worn out by a long siege of diarrhœa has no nerve strength to be wasted, and all such disturbing causes add to the exhaustion. Exceptionally these little patients fail to improve even in the most favored localities, but my later experience is to the effect that when they are sent to Atlantic City before their heart force is so far gone as to be incapable of restoration, they may nearly always be saved.

Dr. Daniel Strock, of Camden, was introduced, and opened the discussion of this paper. He fully endorsed the recommendations contained in the paper and believed if they could be carried out the mortality would be greatly decreased. But the difficulty of carrying them out was an important point in the discussion. The great majority of cases are among the poorer classes, and it is impossible for them to take their children to the seashore as the expense to them is too great. The next best thing is to keep these patients as much as possible in the open air, and observe the strictest care as to food and surroundings. He referred to his experience and observation as corrobative of a point made by Miner, that in cases where the little patients were kept on the ground floor and the floor above it the mortality is greater than when they are kept in a dry basement, on account of the lower temperature of the latter. The care of milk after it is received into the house was referred to as a matter of importance.

Dr. T. W. Harvey, of Orange, continued the discussion. He

spoke of the influence of temperature, humidity, and the presence in the great majority of these cases of micro-organisms, which by their presence and vital actions cause the sickness of the child. The great tendency to destructive organic change in our food which is most active during the heated term give these disease germs their introduction into the system and their chance to develop. He advocated strongly a change of air for affected children, believing it acts as a general tonic. Children from New York will get better at Orange, while children in Orange suffering with the same disease generally improve if sent to New York. Dr. Harvey dwelt at some length on the preventive and curative methods of treatment.

Dr. F. Gauntt, of Burlington, spoke of the influence of temperature as having more to do in the causation of these infantile diseases than anything else. We do not have these diseases in the winter months. The mortality in summer is always much greater when the temperature is over 80°. He advocated taking such children in the cellar where we will find it cooler.

The President then introduced Dr. G. F. Wilbur, of Asbury Park, who read the next paper on "The Need of Medical Officers for School Districts."

(See page 127, of this report, for Dr. Wilbur's paper.)

Dr. E. L. B. Godfrey was then introduced to open the discussion. He was aware that the appointment of medical officers for school districts would be an innovation, and many arguments could be adduced both pro and con. He believed, however, that it could not be denied that whatever contributes to the physical well being of a people contributes both to their happiness and prosperity. If the oversight of officers disciplined by special training and specifically conversant with the manner, methods and results of physical training, can be given or possessed by school children at a time before bad physical tendencies are acquired, or before their results become fixed, the highest good can be attained, the pupils and the State reaping incalculable blessings from such oversight. He said it might be argued that such an oversight is the province of the family physician and that such appointments would affect his interest, but the family doctor does not call sufficiently often into the house during periods of health to see and correct these faults. His services are summoned rather for curative than pre-

ventive treatment. He believed the profession generally would sanction the appointment of such officers.

The Doctor then discussed at some length some of the faults that would or could be remedied by such appointments. The construction of school buildings was referred to where children had to climb to the third story, inducing in so many cases irritability of the heart; bad ventilation with impure air; faulty arrangement of desks as to height and especially as to light, so that the eyes are strained, the nervous system injured, many more children than formerly using spectacles, and how contagious diseases could be prevented or their spreading controlled. He called attention in closing to the point that the body developed more rapidly than the mind, and that if the development of the mind is too rapid it will result in a wreck. After all it was not so much what you know, as what you can *do* and *how long* you can do it, that is the practical outcome of our education.

Prof. Landon, of Bordentown, followed in the discussion. He did not claim to know very much on this subject but he was deeply interested on general principles. In his own school he tried to carry out the principles laid down, he had two physicians visit his school and look after the surroundings and health of his scholars. He was a thorough believer in prevention, and his school had thus far escaped epidemics. Much that had been said related to city schools. We should be as careful as to country schools. He said we should have such medical officers to keep pupils in good health, prevent spread of diseases, to support the teacher against the average school committee whose knowledge of sanitary measures is usually exceedingly poor. A good medical officer he believed would help greatly in these directions.

Prof. E. H. Cook, head-master of the Rutgers-College Grammar school, followed in an earnest and practical address, relating his experience and observation as to the care of pupils in the places where he had lived. He strongly advocated the oversight by competent medical officers, of our school buildings, and of the management of our schools, as affecting the health and physical development of the scholars.

He believed the average school teacher knows very little about the care of the body, and he was surprised that so many parents know or care so little about the bodies of their children. He could

never understand why some fathers or mothers would insist on their children washing their hands and face three times a day and their feet about once or twice a year. He thought we had better observe the rule, the school-master for the mind, the physician for the body and the minister for the soul.

George P. Olcott, C. E., of Orange, said, that as a father with six children, he felt there was not a subject before us of greater importance. He had been obliged to take some of his children out of the public schools, because of certain rules he believed were not conducive to health, one being short recess in which to go home, eat dinner and hurry back to school. He had been obliged to send them to a private school where these difficulties did not exist. No man ought to be allowed to serve on a school-board who had no children, ought to be one rule.

James Owen, C. E., of Montclair, said he had been a school trustee, and had much diffieulty in adopting rules to suit the views of different parents. He had always insisted on competent medical authority in matters affecting health. Ventilation had been one of the troublesome questions in their Board.

Friday Evening, 7.45 o'clock.

The Association met in the Library of the State House. In addition to the members, a large number of the trustees and scholars of the State Normal School were present.

President Benjamin occupied the chair. Prayer was offered by Rev. J. S. Dobbins, of Trenton, who was invited to sit as a corresponding member.

The Secretary announced the Annual Address by the President, Dowling Benjamin, M. D., of Camden, on the "Thermometry of Hygiene." (See page 69, of this Report.)

The thanks of the Association were unanimously tendered to Dr. Benjamin for his interesting and instructive address, and a copy was requested for publication.

Prof. James M. Green, Principal of the State Normal School, Trenton, was then introduced, and read an able paper on "Physical Culture in the School in its Hygienic Bearings."

(For this paper, see page 121, of this State Report.)

SUPT. A. B. POLAND ON PHYSICAL EDUCATION.

The discussion of Principal Green's paper was opened by Supt. A. B. Poland, of Jersey City, who proposed the question: "Has physical culture any place in a system of school instruction?" This he answered in the affirmative by declaring that the modern definition of education, to wit, the equable and harmonious development of all the powers of the child, included physical as well as moral and intellectual training. Admitting the necessity of some sort of physical culture in schools, the question next arises. What forms are available? He classified the various kinds of physical exercises into the following:

(*a*) Natural, spontaneous, non-regulated exercises—play.

(*b*) Artificial, formal, regulated exercise, which includes calisthenics and gymnastics.

Confining then the discussion to artificial hygienic exercise, Prof. Poland sought to prove:

1. That artificial muscular exercises are *necessary*.

2. That they can be *systematized* and *adapted* to the school curiculum.

3. That they can be made *practical* and *efficient* hygienic aids.

Allusion was made to Herbert Spencer's disparagement of formal muscular exercises in lieu of play, on the ground that the pleasurable and spontaneous element of play, essential to its hygienic value was lacking. It was argued in reply to Mr. Spencer that these elements need not be divorced from a system of hygienic exercises. The dangers incident to unrestrained play, its necessary one-sideness and tendency to over development and deformity were considered. The effect of labor on young children in producing abnormal development was briefly discussed. The general physical deterioration of the massed owing to the now universal use of machines, the specialization of labor and increase of wealth with its attendant luxuries were considered in brief. From the forgoing data it was argued that systematic physical training in our schools was absolutely imperative.

The great efforts made in continental countries, notably France, Germany and Sweden to introduce physical training into schools was cited with commendation.

The objections to the introduction into schools of a system of

physical exercises were considered at length. The main objection is two-fold:

(*a*) That there is no available system that is scientific and practical.

(*b*) That the time of the schools is already greatly overcrowded.

In order to prove the possibility of a science of physical training, the speaker laid down the following propositions for the ordering and interpretation of which he claimed there was the basis of a grand science.

1. The vital organic functions of the body require muscular movements for their adequate performance.

2. These muscular movements must be as varied as the diverse functions they aim to assist.

3. They must both in quantity and quality be adapted to the functional demands.

4. They may be natural, or artificial, or both, and the test of their value will be their efficiency in producing the desired end.

Furthermore, a perfect system of hygienic physical training must undertake to apply muscular movements to all their possible uses; to-wit:

1. To secure a perfect physical development when the same is wanting.

2. To maintain the healthful equilibrium when once established.

As a *science*, gymnastics should be founded upon a body of well authenticated and fully classified facts. Its principles and rules should be the safe deductions from the data so ascertained and proved.

The system of Ling, otherwise called the Swedish system, was warmly approved. It was urged that teachers be required to familiarize themselves with the therapeutic and prophlatic value of artificial muscular exercises. There should be no haphazard nor unintelligent work in physical culture. Boards of Education should employ specialists to instruct teachers in gymnastics. Courses of study should lay down obligatory provisions for physical drill. The efforts of the State Sanitary Association to bring about a better state of things in the public schools of the State was warmly commended. Superintendent Poland closed his address by briefly elucidating the following propositions:

1. Public sentiment in favor of introducing rational gymnastics into our public schools is rapidly gaining ground.

2. Most of the systems in vogue throughout the country lack unity and adaptability.

3. A rational system of school gymnastics must be based upon physiological laws, and like a rational course of study, will be obtained only after much experiment and many failures.

4. A practicable system of school gymnastics must take into consideration, also the limitations of the school room, school work, training of teachers, expense of oversight or instruction and other practical aspects.

The science of physiology enables us to lay down the following laws:

1. Muscular growth and development results from rightly executed muscular movements.

2. Rational hygienic exercise is one of the best means of influencing the functional activities of the body, and of securing and maintaining health.

3. The physiological effects of a muscular movement should be determined beforehand, and its force and character carefully proportioned.

4. The effects shall be so classified and localized that the intelligent teacher can apply the right gymnastics for any special case.

5. Exercises should be varied according to the physiological effects intended, and such variation should regard the amount of effort put forth, its quality and continuance.

Special forms of exercise should be devised for the following special ends:

1. To correct any abnormal condition of the blood and its circulation. The pathology of anæmia, headache, heart disease, etc., should be better understood by the teacher and have each its special and appropriate exercise.

2. To secure a deep, calm and powerful respiration. Hence, movements to widen and expand the chest, to increase its mobility, to prevent adhesion of the pleuræ should be devised.

3. To produce strong, vigorous, healthy digestive organs by strengthening the abdominal muscles. Stomach catarrh, hæmorohoidal complaints, etc., can be reached and remedied to some considerable extent.

4. To give tone, vigor and health to the processes of secretion, and to facilitate the rapid renewal of tissues and the discharge of waste products.

5. To correct any pathological nervous conditions, and produce and sustain a healthy normal nervous system with its mental concomitants. Nervousness, undue susceptibility and sensitiveness to impressions, headache, backache, palpitations of the heart, dullness, tendency to cramps and convulsions, such psychical phenomena as an irritable disposition, melancholia, apathy, morbid sensitiveness, inflamed imagination, can often be prevented or cured by timely and appropriate special exercises.

6. To enlarge, strengthen and make flexible the muscles themselves, giving grace, nobility, pose, capacity and endurance to the general physique.

On motion of Dr. Wetherill, seconded by Prof. Watson, a vote of thanks was presented to Prof. Green and Prof. Poland, for their excellent papers and copies were requested for publication.

J. C. Pumpelly, Esq., said that while it may be true as stated that the science of physical culture is not fully understood, it is clear that the two papers had been given as a logical and instructive presentation of the subject. He spoke of the advance that has been made in favor of physical culture, both among our leaders in education and among the people, and recited what physical culture had accomplished in the Reformatory at Elmira, N. Y.

Prof. J. Madison Watson, of Elizabeth, spoke congratulatory words on the progress in this Association in the direction of physical culture. He believed it was due to the Association more than any or all other influences that the sentiment of educators and scientists of the State has been developed that physical culture or training is a necessity. He believed that where systematic training in the school room was most carefully and faithfully followed, we always had the best mental results. A symmetrical development involves physical and mental training in due proportion. He was glad that we had as President of our State Normal School, one who is a thorough believer in the necessity of both.

Prof. E. H. Cook, of New Brunswick, said he wished to say amen to the two papers, that when he was engaged in Normal school work in New York State, he was impressed with the conviction that there was no factor that would develop so much morality in a school

as was developed by physical training. The results in the Elmira Reformatory were referred to where the rating in morality had nearly doubled in three months. Some might object to the extra time it takes, but he believed if we have now four hours to devote to mental work we will accomplish much more in the mental develment if we give ten or fifteen minutes of each hour to physical work. He spoke against high heeled shoes and corsets, believing that they should be abolished, and said he had once in New York city counted 5,000 persons passing where he could observe them and hardly 10 per cent. were of good physique.

Dr. H. C. Wetherill, of Trenton, closed the discussion with an earnest address in favor of physical training, but in opposition to the military drill which he did not believe conducive to the development of a good physique.

Saturday, November 23d.

The second day's session began at 9.30 A. M., President Benjamin in the chair.

Dr. W. K. Newton, of Paterson, read a paper on "The Relation of the Conduits to the Healthfulness of Water." He referred in opening to the different conduits by which water is conveyed from a lake or stream to the consumers: (1) stone and brick masonry; (2) cast-iron pipe, combined iron and cement pipe; (3) wooden pipe; (4) small iron pipes, plain or coated with tar or rustless iron; (5) iron pipes coated with zinc, galvanized; (6) lead pipes.

The Doctor passed the first aud second systems as needing little criticism, because if properly constructed no ill-health has been induced by water carried in them. The material of which the service pipe from the street main to and through the house is constructed varies in different parts of the State. In some cities galvanized iron pipe is almost exclusively used, in others lead pipe is used altogether, while in others about an equal proportion of each is used. The matter seems to be regulated to the custom prevalent among the local plumbers. In a very few cases the rustless iron has been used, and if carefully put in, so as not to disturb the coating on the surface, a very safe and satisfactory service pipe is employed. But this cannot, of course, be used for branches to all the fixture.

In the latter case, however, a minimum of lead pipe is used. So-called galvanized iron is merely iron coated with a more or less thin coating of zinc, hence our consideration of the relations of this kind of conduit to the healthfulness of water, has to do with the effect of the metal zinc, etc., and its results on the human economy.

Water flowing through this zinc-covered pipe contains more or less of the metal or one of its salts, and we may state, as the opinion of all scientific men who have investigated the subject, that the amount of zinc present in water drawn from zinc-lined vessels or pipes is innocent and does no harm.

The use of lead pipes for the conveyance of drinking water is always attended with a certain degree of danger, because such water always contains lead, and the danger varies in a degree with the character of the water conveyed, and the susceptibility to lead poison of those who drink it.

The amount of lead present in water is influenced by the following factors: The length of time the water has stood in the pipes or vessel; the length of pipe, or size of vessel, that is the amount of metallic surface to what the water is exposed; the composition of the water itself; the amount of oxygen in the water or at the surface of the water.

Lead being a cumulative poison, a person may absorb minute doses at long intervals before being affected by the poison, and the injection of as small a quantlty as 1-100 of a grain of lead to the gallon of water has been known to produce the characteristic symptoms, paralysis, colic, etc.

Water in cisterns lined with lead, where the level is often changed, and where the air gains free access to the water, the water is particularly liable to be contaminated to an extreme degree, and a parallel case is the suction pipes attached to pumps in wells where the level of water is changed often. This form of suction pipe should never be used.

Organic matter, nitrates, nitrites and chloride in water, or even impure water, attacks lead, causing them to dissolve rapidly. Soft, rain and distilled water, or one containing much oxygen, attacks lead more rapidly than hard water. Water containing lime does not attack lead as rapidly as others. When we consider the amount of water drawn from lead pipes that is used every day, and

knowing that nearly all of it contains more or less lead, the wonder is that there are not more cases of lead poisoning.

As there is a real danger, the following rules should be observed: Water should not be used that has been allowed to stand in lead-lined cisterns. Lead suction pipes in wells should be abandoned altogether. Water should not be used that has been allowed to stand in lead pipes for a considerable time; that is, the taps should be opened, and the water allowed to flow for a considerable time before used for drinking or culinary purposes; the last rule should be especially observed with water that has stood in pipes over night.

The discussion which followed was opened by Shippen Wallace, Ph. D., of Burlington, who gave instances and observations which he himself had investigated in the same line. Other points were made by James Owen, Dr. Ballard and others, and by a motion of the Association, Dr. Newton was requested to investigate into the healthfulness of conduits and report at the next meeting of the Association.

The President then announced the next two papers on "Tuberculosis" and "Typhoid Fever in Munich," by Prof. S. G. Dixon, M. D., of the Universary of Pennsylvania. A letter was read by the secretary from Prof. Dixon expressing regret that he was unable to be present on account of illness in his family, etc., and stating that he had requested his friend and colleague, Dr. Seneca Egbert to represent him. Dr. Egbert was then introduced and read the two papers, offering remarks in explanation and elaboration of some points in the papers. (For the paper on "Tuberculosis," see page 103 of this report of the State Board of Health).

The paper on "Typhoid Fever in Munich" aroused considerable discussion, some of the physicians present being unwilling to endorse all the points, especially as to the causation of typhoid. It began by showing how much might be done for the health of our people by sanitary legislation. Dr. Dixon set forth the work done and the result obtained under the ample provision of law, in the city of Munich, under the excellent supervision and energetic management of "its grand old sanitary professor," Herr Von Pettenkofer. He called attention to many of the statistics given which show a marvellous reduction in death from typhoid fever in that once afflicted city; for example in 1866 to '80 the ratio

of mortality was 332 per one hundred thousand, while that of '81 to 88 was only 42 per one hundred thousand. That during the decline of typhoid fever there, great improvements have also been made in the water supply, yet from tracing the history of these new auxiliary water supplies, they do not seem to have much, if any relation with the decline of this much-to-be-dreaded disease. For instance, an investigation made in 1888, he cited, to show that both the mortality and morbidity has decreased in the same ratio in all parts of the city, including those districts which were still supplied by the highland conduit,which was looked upon as being the most impure of the old water supplies. The writer said that his idea in presenting these facts was not to refute the idea that typhoid infection is conveyed in water; though he was most persuaded that the so-called typhoid-bacillus cannot live in the average water supplied to the cities over four days. His object was rather to picture the danger arising from the pernicious custom of permitting foul matter to percolate through the sides of sewers and cesspools in thickly-inhabited districts that depend upon obtaining their supply of water from shallow wells. Mother earth's disinfecting powers can be overdone. The moment this power is exhausted the grand cycle of life's changes therein ceases, and the polluted earth becomes a habitat for pathological products. In this condition is the earth underlying many of our cities, towns and villages, not only from cesspits but from unsealed sewer walls. Up to this time the permeability of sewer walls has never been provided against, and consequently in most of our thickly-populated centres, Zymotic diseases are on the increase.

Dr. Dixon argued from the intimate relations shown between typhoid fever and the pollution of the subsoil, that we must direct our attention to the prevention of such conditions, and not be allured from this by water fanatics, who claim that at least a great proportion of typhoid in our large cities comes from the water supplies. He referred to the fact that much had been said and written in this regard about Schuylkill water, but that after a number of experiments he had been unable to propagate the bacillus of Eberth, after submitting it for more than four days to Schuylkill water. From these results he thought we must suspect that but few people are inoculated with typhoid fever from Schuylkill water.

Dr. Egbert was questioned in reference to the experiments on

the Schuylkill River water, some of the physicians present holding that they were not conclusive in demonstrating that Schuylkill water is innocent of the charge of being the chief causative agent or conveyancer of disease in many of the typhoid fever cases in Philadelphia.

Dr. Ezra M. Hunt stated that the paper on "Tuberculosis" he regarded as most excellent, and he should request the favor of publishing it in full. It recognized the fact that science is even yet but on the surface of the knowledge of facts, and far from getting to the depths and at the bottom of all the facts. He did not feel that he could indorse all the points in the paper on "Typhoid Fever," and especially the statements so much relieving water of responsibility in producing typhoid.

The paper on tuberculosis was cautious. There is much of speculative philosophy (so called) mingled with biological observation, and too much reasoning from analogies. It is not safe to infer that all that occurs in animals and in culture experiments occurs in man amid disease. "Festina lente" is a good motto, especially where the observations contradict the long experience and general testimony of practitioners. We hail with joy the spirit of investigation, but we need cumulative evidence for conclusions.

Dr. Egbert had brought with him his microscope with many slides, illustrating the papers read, and spoke from his own experience in the investigation of these diseases, thus adding much to the interest of the members in the papers.

A vote of thanks was unanimously tendered to Prof. Dixon and also to Dr. Egbert for their valuable services.

The following resolutions were unanimously passed:

Resolved, That the Association desires to express its deep sense of loss in the death of Dr. J. L. Bodine, a former president of the Association, and also our appreciation of his extensive knowledge of and interest in sanitary science and art.

Resolved, That the president appoint a committee of five to consider the legislation on stream pollution and report a standard or standards of purity for effluents from sewage purification works at the next meeting of the Association.

The president appointed as the committee, James Owen, C. E., W. K. Newton, M. D., Prof. P. T. Austen, C. Phillips Bassett, C. E., and C. B. Brush, C. E.

The executive council presented through the secretary the report of the nomination of officers for the ensuing year, which was unanimously adopted as follows:

President, George P. Olcott, C. E., East Orange.

First Vice President, Hon. E. O. Chapman, Trenton.

Second Vice President, E. L. B. Godfrey, M. D., Camden.

Recording Secretary, D. C. English, M. D., New Brunswick.

Corresponding Secretary, Prof. J. Madison Watson, Elizabeth.

Treasurer, George W. Howell, C. E., Morristown.

Executive Council, (with the above named officers)—J. C. Pumpelly, Esq., Morristown, Chairman. Prof. Chas. McMillan, C. E., Princeton; C. Phillips Bassett, C. E, Newark; Rev. Dr A. E. Ballard, Ocean Grove; John L. Leal, M. D., Paterson; James Owen, C. E., Montclair; H. G. Wetherill, M. D., Trenton; Prof. F. A. Wilber, New Brunswick; T. R. Chambers, M. D., Orange; A. P. Hunt, M. D., Somerville; William Pierson, M. D., Orange; Prof. E. H. Cook, New Brunswick; Shippen Wallace, Ph. D., Burlington; G. F. Wilbur, M. D., Asbury Park; E. S. Atwater, Esq., Elizabeth; Prof. A. B. Poland, Jersey City; Boardman Reed, M. D., Atlantic City; A. Clark Hunt, M. D., Metuchen.

The president announced the following as the Committee on Legislation: E. S. Atwater, Esq., of Elizabeth; Hon. E. O. Chapman and Ezra M. Hunt, M D., of Trenton; L. B. Ward, C. E., of Jersey City; D. L. Wallace, M. D., of Newark.

James C. Bayles, M. E., of Orange, has been unable to complete the paper requested of him on "The Present Special Sanitary Needs of Our Cities," and was on motion requested to furnish the paper for the next annual meeting. After the transaction of minor items of business the annual meeting, which was regarded by all as one of the best and most practical of the series, adjourned.

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 the local Boards and Sanitary Inspectors.

The following is the schedule of subjects:

SUBJECTS FOR REPORT.

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. Almshouse, 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 topic 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. 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.

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. We regard them as 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.

LEGAL OPINION.

The following questions as to legal points have been answered thus by Judge William M. Lanning, of Trenton:

First. Is a borough located within the limits of a township and in which no Local Board of Health has been organized, subject to the jurisdiction of the Local Board of Health of the township in which the borough is situate?

It is not. The latter part of Section 10 of the Health act expressly provides that "in any township within whose limits a city, borough town or other form of local municipal government now exists, or hereafter shall exist, the jurisdiction of the Local Board of the township shall extend *only* to such parts of the township as are, or shall be, outside of the territorial limits of such city, borough, town or other local municipal government."

Second. May a physician residing in a borough located within the limits of a township, and in which the borough taxes and township taxes are assessed at the same time and by the same officer, be ap-

pointed as a member of the Local Board of Health of the *township?*

I think he may. Section 10 of the Health act provides that the Township Committee, the Township Assessor and one physician to be appointed by the Township Committee, shall constitute the Local Board of the township. If the Assessor or a member of the Township Committee should reside within the limits of the borough, it is clear that that fact would not render him ineligible as a member of the Township Board. If residence within the borough does not disqualify an Assessor or a member of the Township Committee, there is no reason for holding that it should disqualify a physician.

Third. Is it within the power of the Legislature to extend the provisions of the supplement to the Health act relating to plumbing, passed February 22d, 1888, to townships having a population of 2,000 or more?

This question is not easy to answer. The opinion of the Court of Errors in the High License-Local Option law, lately rendered, might possibly be cited as an authority for the exercise of such a power. I think a safer plan would be to extend the provisions of the Plumbing law to those townships in which the density of population exceeds a certain number per square mile, or to those townships which now have, or may hereafter have a public water-supply.

NOTE.—A Township Board is a legal Board without a physician upon it, but it is always best to have a medical member, if there is one residing in the township. If the Local Board does not in such case appoint one, this Board can and generally does. We get our information direct or from the annual report. The office of Township Physician, where there is such an office in the township, does not make the person a member of the Board of Health, but a medical member of the Board is such by appointment. He must reside in the township, but can be a member of a Township Board if he resides in any borough or town of the township in which the Assessor of the township levies tax.

ATLANTIC COUNTY.

ABSECON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. H. Bates, Joel Steelman, James W. Lee, Towers Townsend, Frank Champion, Jonathan Hand, M. D. E. H., Health Inspector.

The number of acres in the incorporation is 8,000.

The water supply is wholly by wells. The water is never discolored.

The water has no taste of iron or any other taste; it is generally soft. It has no bad taste at any season of the year. There are no cisterns. The drainage is natural and sufficient. The usual water level secures dry cellars.

The houses generally have cellars and are largely used for storage of vegetables. The tenement houses are occupied by one family.

The cesspools are built with open sides and cleaned by the gardners.

There are no prevailing diseases.

There are no slaughter houses.

(Signed) E. H. MADDEN, M. D.
Town Physician.

ATLANTIC CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Borton, President, Atlantic City; Edward S. Lee, Treasurer, Atlantic City; George W. Sheppard, Secretary, Atlantic City; Samuel B. Rose, Atlantic City; Jacob H. Leedom, Atlantic City; Eugene L. Beed, M. D., Atantic City; Julius Cotz Atlantic City. Lewis Reed, Jr., Health Inspector.

Population, 12,000, in summer 50,000.

The Atlantic City Water Company get their supply from mill pond and driven wells, and pump to a reservoir in Atlantic City across the meadows through iron pipes. The Consumers' Water Company get their supply from artesian well, at the depth of 1,200 feet, and two more wells are now being driven. Some few houses

get supply from cisterns. Surface wells are not now in existence.

Systems of underground drainage, known as the West system, pumped and forced in vats and filtered now in use over the city.

Surface water drained off by means of trunks and gutters.

Water closets not connected with drainage pumped out by odorless excavation company, composted, sold and carried to main land and used for fertilizing.

Same as last year.

Our city has been unusually healthy the past year, with nothing special to report.

(Signed) L. REED, JR.
Health Inspector.

BUENA VISTA.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George B. Coxe, Buena P. O.; J. H. Smith, Richland, P. O.; Tobias McConnell, Cedar Lake P. O. Members of Township Committee of said Township.

(Signed) GEO. B. COXE,
Chairman.

EGG HARBOR CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPCCTOR.

John J. Fritschy, Chairman, Egg Harbor City; Francis Norman, Secretary, Egg Harbor City; John Schwinghammer, Egg Harbor City; Joseph Fecher, Egg Harbor City.

Although the excessive rains during the past year caused much dampness in cellars and dwellings, the general health of the city, has been satisfactory. Some cases of typhoid fever have been reported; but the persons infected brought the disease from Philadelphia.

Four complaints of nuisances were received during the year. The nuisances were promptly abated. The slaughter-houses have been inspected and found in order.

A public bath is being erected and will be opened next summer.

The sanitary condition of our school house is good.

We have two canning factories which are kept clean and neat.

Our cemetery is over a mile from the built up portion of the city and well attended to.

(Signed) F. NORMAN,
Secretary.

EGG HARBOR TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John C. Fifield, Bakersville; Benjamin Lear, Pleasantville; Samuel A. Smith, English Creek; Dr. Sherman DeMill, Scullville; Theodore Smith, Scullville; John W. Smith, Assessor, Bargaintown. No special Health Inspector.

Water supply—wells.

Cellars used for storage of vegetables, etc.

Principally privies on the surface, and emptied by shoveling out and burying.

No disease among animals this year.

No slaughter house in Township this year.

A new factory on the salt meadows about three miles from main shore and one mile from Atlantic City, using bones and tallow, etc.; quite offensive as it is passed on the way, which seems to be the only complaint.

No prevalent diseases this year; the township has been very healthy. We have a sanitary code; burials, etc., are kept in accordance. Vaccination of school children is not conformed to as the law requires.

During the past year the township has been divided. Two boroughs have been formed, *i. e.* Pleasantville and Linwood, taking nearly one-half of former population in our most thickly-settled districts; therefore, Egg Harbor township is quite scattered, except that portion extending along through Steelmanville, Bargaintown, Scullville and English Creek. We have only two resident physicians.

J. W. SMITH,
Assessor.

GALLOWAY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Boice, Absecon; James E. Strickland, Leeds Point; Lardner Scull, Leeds Point; E. A. Higbee (Secretary), Leeds Point; Constant Giberson, Port Republic; Joseph Sahl, Egg Harbor City.

In making the report for the Township of Galloway, have but to say that the Board of Health has but little use in this township. It is large in area, healthfully located, and drained by nature. There are no slaughter houses, nor anything calculated to endanger public health within the township. No contagious disease existing, nor has existed within the township during the present year, neither to the people nor to the animals.

Neither has any disease been prevalent.

E. A. HIGBEE,
Assessor.

HAMILTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John V. Beckett, Chairman Mays Landing; Daniel E. Iszzard, Treasurer, Landing; Daniel E. Rape, Mays Landing; Francis B. Glover, Mays Landing; Andrew G. Stewart, Weymouth; Charles I. Abbott, Assessor, Mays Landing; D. B. Ingersoll, M. D., Township Physician, Mays Landing; Andrew G. Stewart, Health Inspector.

There have been no changes since my last report worthy of a special report, or that would require a special mention, on the subjects as named under the titles of A. B. C. D. and E. That of F. perhaps, might be classed with the above, for I have repeatedly called the attention of the State Board of Health to the utter want of sanitary conditions of many tenement houses. Yet I esteem the subject of so vital importance that I will again mention it. Many of the tenement houses in this township are destitute of that sanitary condition that should be provided in every case. Many of them are not supplied with any water at all. Others with water that "*will do to wash with but is not fit to drink;*" others with water that "*stinks a little but otherwise it is good.*" And thus these poor and ignorant—in many instances—ones are forced to drink the

infusion of toads and *other poisonous substances*, or carry the water some distance from their neighbors. These tenants are not aware of the evils resulting from the use of such water, consequently they use it, and very frequently disease and death is the result. If now the Local Board interefere and forbid the use of this water, it will only force those tenants to use the water from their neighbors' wells, and will thus work an annoyance to them and labor to themselves. It will not strike at the root of the matter nor effect a remedy.

Let us have a law accompanied with a penalty that will force the landlord to supply all the necessary sanitary conditions of his tenant houses, and then, if need be, force the local boards to execute that law. In no other way in my judgment can the evils be remedied.

And again, as to the refuse and execreta. This is not properly cared for. Many of the tenement houses have the privies too near the house, and these are not properly cleaned—hence, they become a source of annoyance and discomfort to the family and neighbors, as well as to be the source of greater troubles. The remedy for this might be included under the general law so necessary for tenements and tenement houses.

No changes in I, J, K, L, M, N, O, P, Q, R, S, T, U and V have been made since our last report, nor have their been any prevelent diseases during the year, either of man or of animals.

(Signed) D. B. INGERSOLL, M. D.,
Township Physician of Hamilton Township.

HAMMONTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS.

Charles Woodnutt, Hammonton; James P. Patten, Hammonton; Edward North, M. D., Hammonton; James H. Seely, Hammonton; A. J. Smith, Hammonton. Edward North, M. D., Health Inspector.

There is nothing new to add more than has already been given under the above heads.

Our population, we think, has increased considerably since our last report on that subject, probably numbering between 3,300 and 3,500. The Italians who come here as berry pickers are, many of

them, becoming permanent settlers in certain localities of our beautiful town, and will need the watchful care of our health inspector, as to their manner of living, for it is generally known that many of them have a personal antipathy against the external application of pure water, and also another habit of trying to find out how many can occupy the least amount of space at the same time, within circumscribed limits, or in other words twenty will occupy a building that should accommodate but four or five people. Their only salvation from diseases of all kinds is from the fact that much of their time is spent in the open air. Men, women and children spending the whole day in the fields or in their door yards, doing all, or nearly all their cooking in the open air. Thus far we have experienced very little trouble with those living in this neighborhood. We have some times doubted as to whether we got a full report of births and deaths from among this class, but have taken special pains to impress on their minds the importance of this matter and the penalty for non-performance of the same.

(Signed). A. J. SMITH,
Clerk.

MULLICA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theodore Weeks, Green Bank; Charles Saalaman, Egg Harbor Township George Huntsman, Pleasant Mills.

No board formed this year.

(Signed), W. S. MILLER,
Assessor.

SOMERS POINT.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Japhet Townsend, Somers Point; Fred'k Stuth, Somers Point.

Somers Point, situated on west side of Great Egg Harbor Inlet, bay and river. Population, 400. Climate mild. 1,600 acres.

Water, spring wells, soft and clear.

Drainage, surface; no malaria and no swamps near by.

Houses with cellars used for storage, and no two tenement houses for families.

Cesspools, half cement and half surface.

No slaughter houses.

No manufactories.

One school house; two rooms.

Canvas fire escapes to hotels.

Two cemeteries.

Laws regulated by council.

No registration.

At present no quarantine necessary.

Sanitary expenses estimated about $5.

Stoves and heaters for heating purposes.

No prevalent diseases; only colds, etc.

(Signed) N. D. VAUGHAN,
Borough Clerk.

BERGEN COUNTY.

ENGLEWOOD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Abram Tallman, James Harris, Henry J. Brinckerhoff, Hardy M. Banks, M. D., G. W. Chamberlain. Po-t Office Addres, Englewood, N. J. John J. Post, Health Inspector.

Population about 5,500. Township about 1,000 more.

The Hackensack Water Company supplies about one fifteenth of the residents of the village of Englewood. They derive this water from the upper Hackensack, source Rockland Lake, pure, spring water, water soft. Is not bad at any season of the year.

None of the inhabitants of Englewood depend on cisterns.

The best of water from wells. Next in quality of that from the reservoir.

The number of families who require this water is rapidly increasing. Water never discolored. No iron. The reservoir is located at New Milford, about seven miles distant from the business portion of the village, and is under a thorough system of cleansing and

purification. Hydrants have been placed in many of the principal streets from which, in case of fires, water can be taken.

No complete system of drainage except a private drain about one eighth of a mile long running through the principal business street (Palisade avenue) of the village. This small drain is of little use, and the Board of Health will speedily have a better and more elaborote one, with proper connections, constructed. The subject is now being agitated, and action will probably be taken at the next meeting of the Board of Health, with a view of having the old drain or sewer removed. Sinks and privies are growing less. The Inspector keeps a lookout on all and whenever he discovers the imperfect condition of any privy, notice at once is given to the owner of the premises to cause the building, vault, etc., to be thoroughly cleaned and cleansed. The east branch of the Overpuck creek, a short distance below the village and upon private grounds, refuse, etc., has been dumped. Orders havebeen given for discontinuance of the same.

Nearly all the streets and avenues of the town (village) have been macadamized, and by reference to abstract of ratables of the county, particularly from the records of the Road Board of this township, it will be seen that the tax rate for roads, repairs, etc., is greater than any other tax.

All streets are kept cleanly.

The houses are generally well constructed and public and private buildings property ventilated.

Owners and tenements exercise great efforts in keeping the houses neatly and cleanly.

Gas is used in many of the houses. Both the houses and streets are lighted by gas and kerosene.

Refuse and excreta removed.

The markets (meat and vegetable) are kept properly.

No diseases of animals.

The people of Englewood are ever ready by vote and money to do all they can for the education, comfort and convenience of their children. Less than one year has elapsed since a large addition was added to the old school building. In fact there was a change in the entire building. The grounds have been neatly graded; the child no longer dreads to go to school. The school building is warmed by means of heaters. Nothing allowed either within the

school building or upon the ground attached thereto that may in any wise affect the health of the pupils.

No almshouse, save a poor house to which the needy are taken, when not otherwise provided for from their own means or of their relatives and friends. A physician is employed by the township to visit and ascertain and supply those in feeble health. A hospital building is under consideration; the grounds have been purchased upon which a building will probably soon be erected.

Englewood has a "lock-up." Evil doers fear our Marshal of the Protective Society and Constables of the township.

The fire guards consists of a company of well drilled men, ready to report promptly "on duty" when occasion may require their services.

There are two cemeteries, Mt. Carmel and Brookside, situate near the northern part of the town. The grounds of each are constantly being cared for and neatly kept.

The Board of Health have printed by-laws, which are freely and plentifully distributed. No citizen has an excuse for pleading that he is ignorant of what is required of him to assist in preserving the good health of the village.

Nothing different from last report.

Vaccination under charge of the physician of Board of Health.

Cellars generally dry.

Very, very few basements to houses.

Cesspools built generally with open bottoms. Privies emptied by means of force pump, into closed barrels and immediarely carted away by a gentleman owning a team used for that purpose.

No prevalent diseases within the past year.

(Signed) JOHN J. POST,
Inspector.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

We have no Board of Health. Names and addresses of the Town Committee: William G. Ackerman, Wyckoff; Albert Lazier, Campgaw; John Ramsey, Oakland.

The health of the Township has been good for the year.

(Signed), JOHN W. ACKERMAN,
Assessor.

HACKENSACK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. S. C. Wells, president, Hackensack; J. A. Romeyn, treasurer, Hackensack; D. G. Jeffers, secretary, Hackensack; B. B. Barkman, Hackensack; A. D. Brower, Hackensack; M. E. Clarendon, Hackensack; Lemuel Lozier, Hackensack. D. M. W. Heath, Health Inspector.

Water supplied by the "Hackensack Water Company, reorganized." Source at New Milford, three miles above the village, beyond the influences of tide and sewerage. Slight taste of iron, slightly hard. Was discolored during the summer, caused by stagnation of water in the reservoir. Through the efforts of this Board this has been remedied; instead of using the larger reservoir an iron tank of much smaller size has been built inside the reservoir, insuring a constant fresh supply. The reservoir is regularly cleaned and the hydrants are regularly blown out. In many of the older houses and in streets where water mains have not yet been laid wells and cisterns are used.

Natural drainage to the Hackensack river. Excellent sewerage system, built under the supervision of competent engineers of the Hackensack Improvement Commission. It consists of large brick outlets with pipe laterals, and are thoroughly flushed twice daily by the tide, and are ventilated by manholes throughout its entire length. The surface water is drained into the creek, which runs just beyond the inhabited portion of the village and thence into the Hackensack river, into the sewers and directly into the river. The usual water level is such that dry cellars are assured. During the past year, however, by reason of the heavy fall of rain, many cellars not contiguous to the sewers had water, but they were generally pumped dry as soon as possible.

Seven miles of macadamised streets, which are being extended annually. Sixteen miles of stone sidewalks. Streets, walks, and public grounds in good condition.

Basements not generally occupied. Few tenements.

Streets have been lighted by gas until within two months. Electricity is now used for this purpose. Gas is used in residences and places of business. Oil is also extensively used. Electricity is now being introduced for private use.

Refuse is removed by scavengers. Sewers are generally used by houses contigious to them. Cesspools are required to be laid up

with cement and to be water tight. Cesspools are cleaned by an odorless excavating company.

No epidemic.

Local slaughter houses only. Kept in good condition under direction of Health Inspector.

One silk mill employing about 300 hands (male and female).

Three public, one parochial and one kindergarten schools, all under excellent management, and are properly heated and ventilated.

Hackensack hospital, an admirably managed institution, containing about twenty beds, almshouse not in the village. Township cares for poor.

Well disciplined fire department (volunteer). Abundant water supply. Alarm bell with street signal boxes.

Cemeteries, with one exception, not in town. Strict regulations with regard to burial of persons who have died from contagious diseases.

We are revising our ordinances and will send copy.

Our expenses were unusually heavy the past year, by reason of our suit against the Bergen County Board of Freeholders.

Furnaces and stoves.

About twenty cases of scarlet fever, all in light form. Investigation by this Board shows that nearly all the cases were due to out of town influences. There was an unusually large number of persons affected with measles. No serious cases.

(Signed) D. G. JEFFERS,
Secretary.

HARRINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles L. DuBois, Chairman, P. O., Northvale; Barney N. Ferdon, P. O., Closter; Abraham M. Knight, P. O., Closter; Isaac Kipp, Secretary, P. O., Closter; H. A. Crary, Physician, P. O., Closter.

There has been no complaint made to this board during the year of any nuisance.

As regards diseases, the only prevailing diseases we have had this year has been a severe type of malaria with a typhoid tendency,

that has prevailed during the summer and autumn, and also an epidemic of dysentery that has been quite prevalent throughout this township during the months of September and October.

There has been no contagious diseases among animals in this township during the past year.

ISAAC KIPP,
Secretary.

HOHOKUS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William H. Murray, Ramseys; Lewis H. May, Ramseys; William Thurston, Ramseys; Abraham Banta, Mahwah; C. P. DeYoe, Ramseys, physician. Lewis H. May, Health Inspector.

One of the northern townships of Bergen County, northern boundary, the New Jersey and New York State line. No large towns.

Surface undulating.

Wells furnish water almost entirely. Natural drainage to public sewers.

Houses generally well built with cellars. No tenement houses.

A number of cesspools.

No prevalent disease among animals.

Slaughter houses well kept; not much used.

The school buildings, most of them built within the past few years.

No contagious diseases.

C. P. DEYOE,
Physician.

LODI.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Van Bussum, Corona; James Van Bussum, Garfield; Henry Stromeyer, Little Ferry; S. Martin Tygert, Physician, Carlstadt.

The supply by wells and cisterns about equally divided.

There is no drainage, cellars usually dry.

Streets in a fair condition; no public grounds.

Houses generally have cellars, used for the storage of vegetables, and are mostly occupied by their owners.

Refuse and excreta used for feeding domestic animals, and for fertilizing the soil.

No disease has been prevalent among animals.

There are no slaughter houses, abattoirs.

There are six school houses and six churches.

There are two fire companies in the village of Carlstadt.

There are three cemeteries in the township.

Public health laws and regulations are under the control of the Township Board of Health.

The vital statistics are attended to by the Assessor of the township.

The township physician attends to such matters.

Money for sanitary expenses has been voted by the people.

Dwelling houses mostly heated by wood and coal stoves, and ventilation obtained by the old method of doors and windows.

There has been no prevalent diseases this year.

(Signed) JOHN VAN BUSSUM,
Secretary.

MIDLAND TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Taplin, Chairman, Maywood; J. R. Oldis, Rochelle; C. T. Labriskie, Ridgewood; Nicholas G. Hopper, Assessor, Ridgewood.

A, B and C were reported in previous years. No change.

Water supply, wells, cisterns, springs and two rivers.

Hackensack water works situated in the eastern part of township, supplying Hackensack, Hoboken, etc., with water.

Drainage is provided for by ordinary means.

Roads are being worked in the old way, but more interest is being manifested and the condition greatly improved.

Excreta are disposed of in privy vaults. Slop water in cesspools.

No markets.

No diseases of animals.

No slaughter houses.

Five school houses, all of which are nearly new and in good repair. Two chapels and three churches.

One almshouse.

No cemeteries, but private burial grounds and vaults.

The sanitary improvements this year have been the removing of a nuisance caused by a pig sty situated near the public road near Cherry Hill. Complaints having been made it was at once removed upon being notified by one of the board.

Prevalent diseases. Malaria but less than former years.

ORVIL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Bernard O. Blenis, Saddle River; O. M. Jennings, Saddle River; George B. Smith, Allendale. Charles W. Badeau, Allendale, Health Inspector.

Orvil Township is situated in northern New Jersey. The climate is changeable but healthy.

The land is rolling.

Wells, natural springs and running streams.

Natural drainage.

Mostly frame houses, and mostly occupied by owners.

Kerosene used for lighting.

Excreta carted on land.

Markets, none.

One cotton mill in operation, one woolen mill not running.

Five public and one private school, two public halls.

Two cemeteries are in the township.

Public laws.

All returns made to me are returned to Trenton.

There has not been any contagious diseases. The doctor attends the vaccination.

(Signed) ABRAM H. ACKERMAN,
Assessor.

PALISADE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Milton Turnure, M. D., Tenafly; John H. Huyler, Tenafly; Alfred Jarvis, Tenafly; N. C. Demarest, New Bridge; J. H. Anderson, Schraalenburg.

There has been no survey made.
The lands are drained into the brooks.
The waters are well cared for.
No method for removal of excreta.
Nothing especial to report.

(Signed), JOHN H. HUYLER,
Assessor.

RIDGEFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John S. Edsall, Chairman, Leonia; John C. Abbott, Treasurer, Fort Lee; Joseph Schlosser, Jr., Vice President, Fort Lee: John H. Mannix, Assessor and Secretary. Alex. Clendinen, M. D., Coytesville, Health Inspector.

Ridgefield Township is situated in the southeasterly extremity of Bergen county, and is bounded on the south by Hudson county, on the east by the Hudson river, on the north by Englewood township, and on the west by the Hackensack river. It contains about four thousand inhabitants, of almost every nationality (Chinese excepted). The climate is good and the locality unusuually healthy.

The eastern portion, with the exception of a valley about an eighth of a mile in width, running along the Hudson river from Fort Lee to the Hudson county line at Shady Side, is about three hundred feet above the level of the river. This portion is very stoney, while a mile to the westward, all the land extending westward is perfectly level and almost completely void of any large stone; the greater portion of this part of the township is used for agricultural and farming purposes.

The water supply is chiefly from wells and cisterns, but anumber of private houses on the west side of the township obtain their supply from the Hackensack Water Company, whose pipes extend through the township, north and south.

There is no sewerage, the natural lay of the land carrying all overflows very efficiently to the river on either side.

The streets or public roads are under the control of the Public Road Board, which is composed of seven commissioners, they being constituted under a special act for this township alone. The roads

are macadamized, and will compare favorably with any in the county. There is only one public park in the township, and that is situated at Coytesville, on the Palisades, and commands an uninterrupted view of the Hudson river, which runs about four hundred feet below, and an exceptionally fine bird's-eye-view of New York City, the City Hall of which is about ten miles distant, due south.

The houses are chiefly frame and are mostly occupied by but one family, a house containing more than one family being the exception. The mode of lighting the houses is almost exclusively by kerosene lamps. The refuse is seldom if ever allowed to accumulate, it being usually satisfactorially disposed of daily.

There are five meat markets in the township, but it is a rare occurrence for any of them to kill anything larger than a calf occasionally, and great care is always taken that no nuisance shall arise from such slaughter to the neighbors, or in fact, any one else

There is no disease of animals worth mentioning, the most being among horses, and they usually may be accredited to general debility, old age, &c.

There is an oil refinery at Edgewater which employs about 100 men; a chemical works at Shady Side employing 150 men; a sash and door factory at Edgewater employing 30 men; a dye works at Nordhoff employs 50 men and women; two piano action factories at Fort Lee employ 40 men, and a book bindery at Coytesville employs 15 men. About 100 men find employment at Fort Lee and vicinity in making Belgian paving blocks, from the blue stone quarries, which are very plentiful in that neighborhood.

There are seven public schools, two parochial schools, and one institute for the education of females, presided over by the Sisters of Charity. There are two public halls, one at Leonia and the other at Fairview. There is no alms house, hospital or other charitable institution in the township. There is no prison, but an abundance of officers, there being no less than 25 at Fairview and vicinity, members of the Protective Association; a very recent ogranization known as the Law and Order Society, composed of about 10 active members or marshals, and three constables at Fort Lee. There is one volunteer fire company located at Fort Lee, but the fires are few and far between. The houses are so constructed that fire-escapes are considered unnecessary. There are three cemeteries, one at Ridgefield, one at Fort Lee and one at Edgewater. There are no

vaults, the burials being entirely in ordinary graves. The local Board of Health are guided entirely by the laws and regulations sent to them from time to time by the New Jersey State Board of Health, and when occasion requires it they act promptly without fear, favor, or partiality.

The vital statistics department is in the charge of the Assessor, who collects the marriages, births and deaths, and once in each month forwards the same to the Vital Statistic office at Trenton, as required by law.

The sanitary expenses are defrayed by individuals, who deem it necessary to make alterations or improvements for their own convenience and health, and not by any public appropriatipn.

The township has not been visited by any contagious diseases during the last year past, and taken altogether the last year will compare favorably with any preceding one, notwithstanding the annual increase in population, which is owing in a measure to the vigilance of the local Board of Health in suppressing any thing which would tend to become a nuisance and eventually detrimental to the health of the public.

JNO. H. MANNIX,
Assessor.

RIDGEWOOD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. A. King, Chairman, Ridgewood; Edward Keeley, Ridgewood; John G. Hopper, Assessor, Ridgewood; Dr. J. T. De Munth, Medical Member, Ridgewood; William Macthi, Inspector; Ridgewood.

The health of the township during the past year has been very good.

There has been three complaints made to the Board, and in each case the causes of the complaint was abated.

Our water supply is usually from wells, which when not contagious to privies and cesspools is good.

There have been no cases of contagious diseases among live stock reported to the Board of Health.

(Signed) THOMAS TERHEUN,
Secretary of Township.

SADDLE RIVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry A. Hopper, Fair Lawn; Peter Alyea, Dundee Lake; Wm. H. Doremus, Paterson; Isaac A. Hopper, Fair Lawn.

There has been nothing special to report.

No prevailing epidemics. We have been comparatively healthy this year. The board has been called out but once.

(Signed) ISAAC A. HOPPER,
Assessor.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stephen Trautwein, Kingsland; John Kehoe, Lyndhurst; David Brown, Rutherford; A. L. Watson, Secretary; Samuel E. Armstrong, M. D., Health Inspector.

Since our last report Union Township has undergone division of territory, and what used to be Union is now split up into two portions, that part northeast of the Erie Railroad being known as Boiling Springs Township, and that southwest of the same dividing line retaining the name of Union. Our territory by this means has been reduced about one-third. The township, as it now exists, is made up almost entirely of a ridge of land extending from the limits of the borough of Rutherford on the north to the Essex county-line on the south, being bounded by the Passaic river on the west and the Hackensack on the east. It is evident from this description that the natural drainage of the township is quite perfect.

There are two school buildings, accommodating fifty scholars and two teachers in the one and the other one hundred and thirty scholars and four teachers.

Diptheria, scarletina, and measles have prevailed to a limited extent in certain localities; proper isolation and disinfection has been insisted upon by the local Health Board.

(Signed) SAMUEL E. ARMSTRONG, M. D.,
Health Inspector.

WASHINGTON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alonzo House, Mont Vale; Gilbert Ackerman, Park Ridge; John C. Blauvelt, Westwood; John H. Wortendyke, Paskack, Assessor.

Nothing additional to add from last year's report.

(Signed) JOHN H. WORTENDYKE,
Assessor.

BURLINGTON COUNTY.

BEVERLY TOWNSHIP.

There is nothing to report about Beverly Township that is new, the general health of the inhabitants has been good, and free from epidemics.

(Signed) CHARLES VANSCIVER,
Secretary of the Board of Health.

BURLINGTON CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward S. Lansing, Burlington; Shippen Wallace, Burlington; Robert Waln, Burlington; J. Hutchinson Lukens, Burlington; William H. Kimball, Burlington. Charles Stowell, Sanitary Inspector by Board of Health.

The water supply is from the river Delaware. It is a public supply by the city. Nearly all houses in the city take the water. Water is discolored when there is a freshet in the river. No iron or other taste. It is soft. Not bad at any season of the year. Reservoirs and pipes cleansed at stated periods of the year. No sewerage of consequence. Very few depend upon wells for water supply; none on cisterns.

There is an almost perfect system of drainage by a pumping station at "Sluice" in this city. The water level is such as to secure dry cellars. No swamps of consequence. No malaria now.

Only sewer for a few blocks on York street, this city.

Houses generally have cellars; not occupied. Very few are

used for vegetables. Very few houses occupied by more than one family.

Cesspools are used. These are cemented, built of brick, emptied by men, having night soil wagons.

No prevalent diseases. No contagious diseases among cattle.

Slaughter houses inspected, cleanly; they are not a nuisance to neighbors.

CHESTERFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles B. Holloway, Chesterfield; Simeon Hannold, Crosswicks; John F. Rogers, Crosswicks; Charles T. Haines, Crosswicks; T. W. Ridgway, Chesterfield.

Wells and cisterns furnish the water supply.

Open gutters are used for drainage.

All cellars are used for storing vegetables.

No houses with more than two families.

Principally open bottom cesspools are in use.

Hog disease has prevailed across North End Township.

One slaughter house is located in the township.

CINNAMINSON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William R. Lippincott, Cinnaminson; Isaac Evaul, Palmyra; E. H. Ogden, Riverton; Timothy Morton, Parry; Alexander Massy, Jr., Riverton.

The health of Cinnaminson Township has been unusually good during the past year.

No epidemics have occurred. We have had but little typhoid fever, and malaria troubles are not at all frequent.

The villages of Palmyra and Riverton are supplied with most excellent water by a private corporation. Their works have just been completed, and as yet but few people have taken their water.

This supply is derived from a large well dug near the Delaware

river, and this water is distributed from an eighty thousand gallon tank, located in a field a mile from the source of supply.

They have no system of sewerage, but the Township Committee have under consideration a plan of sewerage for a portion of Riverton, and it is hoped that this can be extended, from time to time, until it meets the wants of both villages.

(Signed) ALEXANDER MASSY, JR,
Secretary.

DELRAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles Heiss, Riverside, Assessor; John Folz, Riverside; Henry Freck, Riverside; Elwood P. Austin, Bridgeboro. Dr. Alexander Small, Health Inspector.

Fifteen hundred inhabitants.
Streets and drainage are good.
No public grounds.
Shoe factory and hosiery mills in the township.
Two schools; no other public buildings.
Two cemeteries are located in the township.

EVESHAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David D. Griscom, Marlton, Richard H. Leeds, Marlton; David T. Ballinger, Marlton, Township Committee; P. V. B. Stroud, M. D., Marlton. William L. Brown, Assessor.

Nothing new to report. Families are supplied with water by wells; generally good. Considerable underdraining to fit land for agricultural purposes, and yet some cellars have water in them in the spring of the year, or unusual wet times. No swamp of any extent.

The health of the inhabitants of the township believed to be good average.

The Assessor has inquired and not heard of any contagious diseases amongst animals.

There are two slaughter houses in the village of Marlton. They have been inspected and are not complained of as a nuisance.

(Signed) WILLIAM L. BROWN,
Assessor.

FLORENCE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Kale, Florence; John Peacock, Florence; Robert Cottom, Florence; Joseph West, Florence; Charles A. Baker, Florence. Charles A. Baker, M. D., Health Inspector.

Malarial diseases have been prevalent during the entire year.

We have had no typhoid fever here for several years. This is attributed by the health board to our natural drainage facilities.

In the lower portion of our town, known as "Foundry Town," where most of the workmen reside, the most active measures are required to preserve a good sanitary condition.

The water closets back upon narrow alleys, which are difficult to keep clean and from which offensive odors arise.

A new cemetery (since last report) has been located near Florence station. Several burials have taken place there. No residence nor wells, however, are located near it.

The cesspools at Foundry Town are not cemented. The contents are removed occasionally and dumped on a neighboring farm.

CHAS. A. BAKER, M. D.
Secretary.

LITTLE EGG HARBOR TOWNSHIP.

(Including village of Tuckerton.)

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. M. Berry, F. French, Eph. Berry, Committee; Alfred Palmer, Assessor; T. T. Price, M. D., Secretary. T. T. Price, Health Inspector.

Water supply is from wells.

Surface drainage and pretty good. No sewerage.

Cellars under all houses of pretension. Houses frame.

Out-houses. Cesspools, or boxes emptied once a year are used.
Comfortable frame buildings for schools.
Cemeteries are not near populous part enough to be disagreeable.
Vital statistics are fairly well attended to.
No contagious diseases to report.
Neuralgia has existed to some degree.
We have had no epidemics the past year among men or animals.
The Buffalo gnat or horn-fly was very annoying to stock during the summer. It had not been observed before this year in this locality.

(Signed) THEOPHILUS T. PRICE.
Inspector.

MANSFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. A. Ingling, Assessor, Columbus; B. H. Atkinson, P. T. Warren, Wm. A. Townsend, Committee, Columbus; D. G. Van Mater, M. D., Columbus.

The water supply is a natural one, moderately soft.
No sewers. Drainage as a general thing good. Some water in cellars in lower part of Water street.
Most of the houses have more or less vegetables in cellars at this season of the year. There are about one hundred houses and about five to a house.
Ordinary water closets in use.
Slaughter houses are out of town.
There are public schools, private school and town hall.
Columbus Cemetery is located in the township.
Nothing particular to report as regards prevalent diseases.

(Signed) D. C, VAN MATER,
Inspector.

MEDFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elwood H. Kirkbride, Medford Henry L. Garwood, Medford; J. Reeve, M. D., Medford; Charles H. Kirby, Medford.

All the subjects from A to W have been answered in former reports, and there is nothing further to add.

In reference to subject W, would report that the year has been unusually healthy and free from contagious diseases, except for a few weeks after the new year, when we were visited by diptheria in a malignant form; nearly all the cases could be traced to contact with those who had had the disease or who had been in contact with it and had not changed their clothes. The number of cases were comparatively few, but the mortality high, about eighteen per cent. It showed an unusual disposition to attack the trachea, and great efforts were made to isolate the cases and disinfect the houses and it soon disappeared. There was a recurrence of typhoid fever at Chairville, a village one and a half miles from Medford, there being six cases, five in persons who had moved into the place within a year. I might state that this village, which contains only sixteen houses, has had, to the best of my knowledge, in the past ten years over forty cases of typhoid fever with a number of deaths. In 1888 there were no cases, the first year for eight years that it escaped. The wells have been cleaned out, but not this year, and the water from some has been declared unfit for use, though apparently all right so far as the taste and appearance goes. The soil is a sandy loam, and there are no cesspools. It has been the case for a number of years that every new family that moved into the place had the disease, and four-fifth of the cases have occurred in August each year, though this year three commenced the latter part of July. The first appearance of it ten years ago was in cold weather, always after that in hot.

(Signed), - J. REEVE, M. D.
Inspector.

NEW HANOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPCCTOR.

Benjamin Remine, Chairman; L. D. Woodward, William Poinsett, Thomas Platt.

There have been no contagious diseases among the inhabitants of the said township. The health has been good as far as reported.

The inhabitants are taking more care in drainage; they find it a great help in securing good health. Something should be done to compel them to return the births to the proper persons so they would get sent in to the State Board of Health. There is great neglect in the physicians of the said township.

No contagious epidemics among animals heard from.

(Signed), BENJAMIN REMINE,
Assessor and Chairman of the Board of Health.

PEMBERTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Hollingshead, Pemberton; Joseph S. Budd, Pemberton; W. K. Budd, Members of Board.

NORTHAMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard C. Barrington, M. D., Chairman; George H. Branson, Inspector; Samuel A. Atkinson, Clerk; Joseph C. Kingdom; J. Fred Laumaster.

Water supply is from Rancocas Creek, and is used generally by citizens. Water works operated by private subscription. Water is soft and considerably discolored, said to be caused by streams running through cedar swamps. Very agreeable to the taste. The creek receives no sewage above point of supply. Some wells in town; water generally good. No cisterns used for drinking water.

Sewage system in part of the town and works satisfactorily. Some defective drainage in places where the sewer does not run, but as a rule drainage is good. Wet cellars in some parts of the town not infrequent. Malaria not usual with us,

Houses generally have cellars. No tenement houses.

Sewers are used to drain about half the town; system will probably be extended. Very few cesspools.

No prevalent diseases. Assessors do not inquire as to losses of animals, but contagious diseases are reported to board.

Slaughter houses are inspected and kept in good condition.

(Signed) GEORGE H. BRANSON,
Health Inspector.

TABERNACLE TOWNSHIP.

There is no Board of Health in the Township of Shamong.

(Signed) W. S. HAINES,
Assessor.

SOUTHAMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

C. H. Haines, John W. Haines, Francis C. Naylor, Committee; Charles G. Naylor, Assessor; John C. Brown, M. D.

Population 700.

Water supplied by wells.

No two families live in the same house. No storage at all of vegetables. No basements. No cellars.

Cesspools built open; generally carted out on farm land.

There have been no diseases of animals of any kind during the year past.

(Signed) JOHN. C. BROWN, M. D.,
Inspector.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Gustave Voss, Green Bank; George Wright, Bistro; Somers Sooy, Green Bank; A. E. Koster, Assessor, Green Bank.

The water supply is good. It is taken from wells and springs.

No need for sewers.

Most houses have no cellars. Those which have are used to store vegetables.

There are no slaughter houses in Washington township.
The general health is good.

(Signed) A. E. KOSTER,
Assessor.

WESTHAMPTON TOWNSAIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. R. Barrington, M. D., Mount Holly; Jos. G. Parker, Mount Holly; Jos. W. Gardner, Mount Holly; Geo. W. Frazier, Smithville. Geo. W. Craig, Clerk and Inspector.

WILLINGBORO TOWNSHIP.

We have no Board of Health in our township.
The names of the township committee are Oliver Parry, Beverly; A. J. Jorden, Burlington; Alex. Thomson, Rancocas.

(Signed) J. M. STOKES,
Assessor.

CAMDEN COUNTY.

CAMDEN.

NANES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George F. Hammond, 20 South Third street, Herman W. Miller, Soutwest corner Eighth and Mt. Vernon street; Chas. W. Watson, 432 Federal street; Wm. T. Head, 601 West street; T. P. Varney, City Hall; John W. Donges, 1801 Broadway; George R. Fortner, 542 Federal street. Eugene B. Roberts, City Hall, Health Inspector.

The water supply is taken from the Delaware river, and is supplied by the city. Fully two-thirds of the houses receive water from that source. It is at times very much discolored, caused by heavy rains or high tides in the river. The reservoirs are cleaned when deemed necessary. The supply of water is more or less contaminated by the sewerage, which empties into river from Philadel-

phia and Camden. There are a number of wells in the outlaying parts of the city, from which water is used, but very few cisterns.

As a general thing the drainage is very good, but on account of the low ground along the river front, we have had considerable trouble during the past summer by having water in a great number of cellars. There are also vacant lots in different parts of the city, which at times are covered with stagnant water, but the Board of Health are compelling the owners to fill them up as rapidly as possible.

The houses in almost all cases have cellars. Basements very seldom used except for storage purposes.

Cesspools are constructed according to sanitary code by being built of brick and cemented on sides and bottom, causing them to be water tight. Excreta is removed from the city in tight box wagons or air tight barrels.

There have been no diseases among animals to the knowledge of the Board of Health during the past year. The city does not keep a register of persons having horses and other animals.

There are several slaughter houses in the city and they are kept in good conditions. All drain into sewer and are inspected every week.

The city is supplied with two hospitals and one dispensary, which are partly under control of city and a Board of Directors, all being well managed institutions.

All factories and large buildings are provided with fire escapes. The erection of same being governed by law.

There are three cemeteries, namely, Evergreen, Old and New Camden, situated in city limits. The Board of Health closed up Butler's Cemetery during the year on account of violations of law.

The city is governed by the sanitary code of the Board of Health.

Health expenses are paid out of money appropriated by City Council.

Heating of buildings is principally done by stoves and furnaces, in some instances by steam.

Diphtheria and typhoid fever has been the most prevalent diseases during the year.

(Signed) EUGENE B. ROBERTS,
Health Inspector.

CENTRE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ezra C. Bell, President, Mount Ephraim ; Joseph M. Haines, Mount Ephraim ; David A. Shreve, Haddonfield ; John H. Jackson, Haddonfield. William B. Jennings, Haddonfield, Health Inspector.

We are glad to say that we have been very much favored with good health and have had no contagious diseases during the year.

We think it has been an unusual year for good health generally.

The Board has not been called out to abate any nuisances, and our inhabitants seem to take more interest in keeping all things pertaining to the welfare of health in a better condition than in former years.

(Signed) JOHN H. JACKSON,
Secretary.

DELAWARE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Graff, Chairman, Ellisburg P. O.; William D. Coles, Assessor, Ellisburg P. O,; E. Winslow Coffin, Ashland P. O.; John A. Meredith, Haddonfield P. O. W. S. Long, Health Inspector, Haddonfield P. O.

As this Board has fully complied in a former report with the requirements of the State Board for general information relating to the township we omit a repetition of the matter. We are glad to be able to report the absence of contagious and epidemic diseases in man. Four cases of typhoid fever have been reported. Ten (10) cases of Typhoid Pneumonia in cattle—none fatal. Seven cases of supposed Texas fever occurred in one drove recently brought from Philadelphia—three of which proved fatal. No report of these was made to the Board. No complaints of nuisances of any kind have been presented. The Health Inspector has made regular visits to each school, and while the buildings have not in all cases been constructed according to the recommendation of the State Board, as regards windows facing the pupils and in one instance the absence of a storm door, the health of the pupils has

been exceptionally good, the teachers reporting freedom from all epidemic and contagious diseases. Vaccination is not carried out as fully as it should be.

(Signed) W. S. LONG,
Secretary.

GLOUCESTER CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. A. Walmsley, M. D., President, Gloucester City; Duncan W. Blake, M. D., Gloucester City; William J. Thompson, Gloucester City; E. J. Steer, Gloucester City; Patrick Mealey, Gloucester City; William H. Guy, Gloucester City; Dr. John K. Burnett, Health Inspector.

Gloucester City is located on east side of Delaware river. Newton creek is on the north and Little Timber creek on the south side. The population is between seven and eight thousand. There has been no epidemic in the city; but a few cases of scarlet fever, measles and croup. The water supply of the city is principally from a reservoir located along Newton creek, which furnishes pure spring water; when said supply is not sufficient, they receive water from the creek.

Council has appropriated $18,000 for sewers for the present year, which are being built of brick and cement pipe. Have found that a number of houses along the line of brick sewers, that have had from ten to fifteen inches of water in cellars, have been thoroughly drained since sewers have been laid.

The streets of city (on advice of Board of Health) are having gutter-stone laid where they are not paved, and gravelled from gutter to gutter, and in rains throws the water into gutters which is carried off by sewers to Delaware river.

For street lighting, the light is supplied by the Gloucester City Electric Light Company, and our city is as well lighted as any of its size in the State.

We have ten policemen and one lockup; three public schools and one private school.

Six hundred dollars have been appropriated by City Council for Board of Health for year.

DANIEL F. LANE,
Secretary of the Board of Health.

GLOUCESTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Brewer, Blackwood; Seth C. Bishop, Kirkwood; Joshua B. Sickler, Chew's Landing: Joseph E. Hurff, M. D., Blackwood; Jos. S. Stewart, Chew's Landing.

HADDON TOWNSHIP.

The township officers of Haddon township did not organize as a Board of Health this year.

J. STOKES COLES.

STOCKTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Leolf Reese, M. D., Cramer Hill; Benjamin P. Abbott, Cramer Hill; George Molineaux, Cramer Hill; Charles Pedigree, Cramer Hill; H. K. Leddinger, Cramer Hill, Health Inspector.

Stockton township is situated between Coopers creek and Pensaukin creek, river Delaware and Camden city. Generally about thirty feet above the Delaware river. Population about 7,000. Climate temperate.

Soil, sandy; no minerals. Ground rolling.

Water is good, with few exceptions, and is procured from sunken wells, from thirty to seventy feet deep.

There is no underground system of drainage, all being surface, on a natural grade to river and creeks.

The streets are unpaved and there are no public grounds.

Houses are frame, occupied only by single families.

There are but few street lamps, and these, as well as private lamps, consume coal oil.

The excreta is used as a compost on farms, and no complaints have been made of cesspools.

We have no markets.

No special diseases of animals are reported or known.

There are no slaughter houses.

There are two woolen mills, a soap works, and chemical works.

There are 15 school houses, built of wood, with two exceptions, fairly ventilated and kept in good condition as to repair and cleanliness.

There is no almshouse, no hospitals and no public charities. When needed, the county almshouse is used.

The police force consists of three constables. No prisons.

One fire apparatus. Hook and ladder and buckets.

We have three well kept cemeteries, and one pauper burial ground about to be declared a nuisance on account of its crowded condition, and containing two and three in one grave. It is situated one mile from the present centre of population.

No regular code of health laws is established, but the Board of Health is preparing it.

Registration and vital statistics are kept by the Assessor.

There have been no contagious diseases. Vaccination is generally carried out.

All the heating is done by stoves burning coal.

The health of the township has been very good. The diseases being principally light cases of malaria and the usual diseases of children.

There have been several nuisances abated on the notice of the Inspector.

(Signed) H. K. LEDDINGER,
Inspector.

WATERFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

B. W. Bennett, Berlin; John Hampton, Berlin; Wm. Haines, Berlin; W. D. Walton, Gibbsoro; Wm. H. Norcross, Berlin; Edward Stafford, Glendale.

Waterford township commences ten miles south of Haddonfield, and runs along the line of the C. and A. R. R. a distance of fifteen miles.

The water supply is from natural springs and wells.

Natural drainage by means of running streams toward the Delaware river.

Country villages streets not named; public grounds none.

Principally farmers.

No prevalent diseases are reported.

Two slaughter-houses.

Only one extensive manufacture, that the paint firm of John Lucas & Co., situated at Gibbsboro. Balance made up of farmers and Philadelphia business men. There is one glass-house at Atco.

There are seven public schools.

Cemetery situated in Berlin.

Typhoid fever has been prevalent in some degree.

(Signed) W. D. WALTON.
Assessor.

WINSLOW TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. M. Jewett, Winslow P. O.; Elias Russell, Sicklerville P. O.; Charles Albright, Elam P. O., Committee. M. G. Burdsall, Wilton P. O., Assessor.

There is no physician in the township.

There have been no prevalent diseases the last year in the township.

There is nothing of especial interest to report.

(Signed) M. G. BURDSALL.
Assessor.

CAPE MAY COUNTY.

CAPE MAY CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. H. Phillips, M. D., President, Cape May City; Wm. F. Cassidy, Secretary, Cape May City; Chas. Foster, Cape May City; Wm. Essen, Cape May City; J. P. Hand, Cape May City; Geo. Young, Health Inspector.

Cape May City on Atlantic Ocean at southern point of New Jersey. Climate mild and equable.

From well, pumped by water works and distributed in mains,

and used by most of the houses; it is always clear, no taste, is pure and soft all the year round. Reservoirs are cleaned at least once a year; only a few use well water. I know of but one citizen. City water is used in all places for drinking where it is distributed.

Drainage is mainly through sewers. Most cellars are dry. There is no malaria.

There are four or five houses with basements, which are used for kitchens. There are few tenements occupied by two families.

Sewers are used in the thickly settled parts of the city. Cesspools are open at bottom, when full emptied by dipping out and carried off.

There has been no prevailing disease the past year.

Slaughter-houses are not allowed in the city limits.

(Signed) E. H. PHILLIPS, M. D.,
President.

DENNIS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John F. Goff, East Creek; Edmund W. James, Dennisville; Remington Corson, South Seaville; Morris Warwick, Dennisville, Assessor; G. G. Carll, South Dennis, Township Physician.

We have nothing in the schedule of subjects that has not already been reported.

The general health of the township has been good. No epidemics or contagious diseases to report. In two cases where nuisances were likely to occur, timely warnings of the board have been heeded, and the board has not been called on to abate them.

(Signed) MORRIS WARWICK,
Assessor.

LOWER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stephen W. Weeks, Cold Spring; William C. Town, Cold Spring; William C. Rutherford, Secretary, Cold Spring; William L. Cummings, Fishing Creek.

The Board of Health of Lower township beg leave to submit the following as their report for the past year.

The health of our township has been very good indeed during the whole year. We have had no contagious diseases among our inhabitants. The Board of Health was called on to drain some low grounds in the vicinity of Cold Spring and after looking in to the laws of State Board we ordered the parties that made the complaint to abate the nuisance themselves which they did. This occurred last April. It was an unusually wet spring but the standing water did not cause any sickness. The sanitary condition of our township has been looked after by our local board, and all matters coming under this notice have had due attention. Their has been no disease among horses, hogs, or any other animals the past year, and our farmers are encouraged in keeping a larger quantity of stock and take pains to do all they can to keep them in a healthy condition.

(Signed) WM. C. RUTHERFORD, Secretary,
STEPHEN WEEKS, Chairman,
WM. L. CUMMINGS,
WM. C. TOWN.

MIDDLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel E. Douglass, Cape May C. H.; Townsend W. Garretson, Cape May C. H.; I. M. Downs, M. D., Cape May C. H.; Howard C. Buck, Rio Grande; Stillwell H. Townsend, Burleigh.

The water supply is either from dug wells or driven ones.

Cellars are mostly used for storing vegetables. I think there are six houses with two families.

Cesspools have open bottoms.

Slaughter houses are all in good condition.

The general health of the people of this township has been good for the past year. There have been no epidemics of any character, either among people or animals.

(Signed) STILWELL H. TOWNSEND,
Secretary.

UPPER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Richard S. Godfrey, Tuckahoe; Griffin Corson, Petersburgh; Sylvenas Corson, Seaville; Reuben S. Robinson, Tuckahoe; Randolph Marshall, M. D., Health Inspector.

We have nothing of interest to report this year. No epidemics have prevailed and no complaint has been made to Board of Health.

(Signed) R. MARSHALL, M. D.
Inspector.

HOLLY BEACH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edward Tunis, President; Martin L. Harrison, Secretary; William H. Bright. James Brannan, Health, Inspector.

This Board has nothing new to add to the report of last year. Our city has been very healthful the past year, and the members of the Board are taking more interest in their work, and are doing their best to bring this place up to a good sanitary condition. There are numerous drawbacks to contend against, but are becoming less, as the inhabitants see the necessity for vigorous and prompt work.

Our water supply is derived almost exclusively from cisterns, over which we exercise a close watch and see that they are kept in a clean and wholesome condition. We also have some few wells in use, with pumps, but are used chiefly for laundry purposes.

We have no system of drainage established as yet, depending altogether on surface drainage, which is totally inadequate.

Our houses have no basements or cellars, being raised from one to two feet from the ground, and our greatest trouble is in the number of houses under which water stands through the fall and winter.

Our cesspools are provided with water-tight receptacles and the contents removed semi-weekly from May to November, and at least once a week during the winter, and oftener if found necessary,

the work being done by this Board under contract, over which we exercise a close supervision.

Have had no prevalent diseases. A few cases of mild malaria and three (3) cases of diptheria, all in the one house, one case terminating fatally.

We are at present forming a plan to divide our city into four (4) parts, which we will designate as No. 1 Sanitary District, and so on, each member of the Board to have the charge of one district; and we hope by this means to establish a friendly spirit of rivalry between the members of the Board, as each one will vie with the other in having their district in the best shape, and as each member would then only have a small portion of territory to overlook, it would not only simplify their work, but the citizens of that district could see that their member was taking the interest in the work that he should.

(Signed) MARTIN L. HARRISON,
Secretary.

OCEAN CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. Conver, Ocean City; Benjamin Newkirk, Ocean City; Harry Sutton, Ocean City; Jacob Steelman, Ocean City; J. S. Waggoner, M. D., Ocean City.

My report of Ocean City will differ very little from last year. The general health has been good; some derangement of the bowels during the summer, but very easily controlled. We have had no prevailing diseases, although in the early part of last winter we had a visitation of scarlet fever, but it proved to be of a very mild type; in all, there were some eight or ten cases, but no deaths. We controlled its spreading by keeping all children of families afflicted with the disease from attending school until all danger was passed.

(Signed) J. S. WAGGONER, M. D.,
President of Board.

SEA ISLE CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. H. Lee, Borough Clerk; Uriah Huntley, Assessor; I. P. Delaney, Wm. Luhman, George W. Urquhart, M. D.

Cistern water, with one exception. Continental Hotel has an artesian well. No sewers.

About three houses out of two hundred and seventy-five have basements; no basements are occupied.

Edison system and coal-oil lamps, latter mostly in winter.

No sewers, no cesspools. Tight boxes, six inches above the ground, emptied in summer twice a week, winter twice a month.

No slaughter-houses in the city.

Our city for the past year has been unusually healthy.

(Signed) R. H. LEE,
Borough Clerk.

WEST CAPE MAY BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas H. Hughes, President, Cape May City; Joseph H. Brewton, Secretary; Downs Edmunds, Cape May City; Daniel F. Crowell, Cape May City; Frank Newkirk, Cape May City.

We have been very much favored this year. No contagious disease of any kind. Health in the Borough has been good. Our water supply is chiefly from surface wells, although we have quite a number of driven wells, and the water from them is most excellent.

The Board of Health has only been called out once this summer to abate a nuisance, and that was the waste water from manure piles running into a well, which was at once attended to.

We had one slaughter house in our Borough, but it was kept in a good condition and no complaint made concerning it. Our school building is in a good condition, well aired, and stands on a high and dry piece of ground, and good health abounds among the children.

We have no health inspector.

(Signed) JOSEPH H. BREWTON.

CUMBERLAND COUNTY.

BRIDGETON.

When I first received your blanks for report of our Board of Health, I wrote you that this city had no board, but that an ordi-

nance was being framed creating a new Board. The ordinance was duly passed and a board elected, but owing to a flaw in the ordinance the same was set aside and a new one drawn, which also proved to be erroneous. We have now a third one which has passed its second reading, which if correct will take effect February 15, 1890.

(Signed) CHAS. B. MOORE,
Recorder.

COMMERCIAL TOWNSHIP.

NANES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Seth Bowen, Chairman; Constant A. Hand; Henry C. Mayhew; Daniel T. Howell, Assessor; David McElwee; Dr. Samuel Butcher, Physician. Dr. Samuel Butcher and Seth Bowen, Health Inspectors.

Water supplied by wells and natural streams, usually soft and always good; not bad at any season of the year. Nearly all depend on wells.

No system of drainage except by ditches and roadways; we have no sewerage. At Port Norris, the land is low; in the spring they often have water in the cellars. At Mauricetown, Haleyville, Buckshutum and Bailey, the land is high and the cellars are dry.

We have along Maurice river, in this township, reaching from Port Norris to nearly the northern boundary of the township, about fifteen hundred acres of swamp, and what was formerly banked meadow land, which meadow was very valuable until the owner allowed the banks to go down, and the meadows and swamp now are inundated and overflowed, and grows up in wild oats in the summer, which dies down. In the spring, this has a very offensive smell, so that many have made complaints that they have to put their windows down at night to keep out the smell of decayed vegetation, and the Board holds that it causes malaria, which we have been troubled with more since these meadows have been out, and we would be pleased if some method could be adopted to get relief from this evil.

(Signed) DR. S. BUTCHER,
SETH BOWEN,
Health Inspectors.

DEERFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elijah R. Parven, Assessor, Deerfield street; Henry M. Dare, Committee, Rosenhayn; Phineas Hires, Committee, Deerfield street; Joseph Golder, Committee, Deerfield street; Dr. Chas. C. Phillips, Deerfield street.

I have for some time been thinking about and investigating into the sanitary condition of our township, with a view of rendering my annual report, but can find nothing special or different from previous years. From the extreme dampness of the past months, and the luxuriant vegetation, we anticipated a prevalence of malarial and typhoid diseases, but as yet such has not been the fact, for we have had but very little sickness and very few deaths. No epidemics have visited us, the conditions requisite do not exist—no stagnant pools of water, no manufactories, the few slaughter-houses well conducted, residences well heated and properly ventilated. Not only is it healthy as regards the human race, but the lower animals appear to suffer less from disease than in some other parts of the State.

Our Board of Health has regular meetings, and by proper ordinances and regulations endeavor to impress upon the people the necessity for their own good, as well as the public at large, to take all precautions for the maintenance of the health of the township.

(Signed) DR. CHAS. C. PHILLIPS,
Secretary.

DOWNE TOWNSHIP.

P. H. Leaming, Joel Husted, Edward D. Fleetwood, Committee; A. P. Glanden, Physician; George Chance, Assessor.

Downe township is located on Delaware Bay.
The population is 2,000.
Climate is mild.
Water supply is from wells.
Drainage and sewerage is such as found in country townships.
Roads are indifferent.
Houses and tenants are good.
Mode of lighting is by oil.

Excreta is used as fertilizer.
Two slaughter houses, and well kept.
One can house.
The principle trades are oystering and farming.
Their are five school houses, and are well kept.
The two public buildings are good.
There are four burial places.
The public health laws are carried out by the Board of Health.
Registration returned by law.

GEORGE CHANCE,
Assessor.

FAIRFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Mark S. Westcott, Fairton; E. O. Davis, Fairton; James H. Elmer, Fairton; Dr. J. C. Applegate, Health Inspector.

Located in the western part of the county along the Cohansey river, extending to the Delaware bay. Population about twelve hundred (1,200). Climate mild and temperate, with rather dense atmosphere.

Sandy soil with dry bottom and is very porous. Topography generally low, with the town elevated and gradually sloping to the Delaware bay and Cohansey river. Contour, south of Bridgeton, east of Delaware bay and Cohansey river, north of Lawrence township and west of Deerfield township.

Water supply from wells

Drainage is natural into the Cohansey river.

Streets and public grounds are high and kept in good condition.

Frame houses with cellars, tenanted by laboring class of people.

Lighting by lamps.

Refuse and excreta deposited in out houses and removed by night carts.

No markets.

No diseases of animals.

One slaughter house and kept in first-class condition.

One glass house employs about seventy-five men and boys.

Schools are located on high ground with good surroundings, courses and graded.

No almshouse or hospitals.

No police or prisons.

No fire guards or escapes.

Two cemeteries located a mile from the town.

Vital statistics are forwarded by assessor of township.

Laws of vaccination disregarded.

Heating principally by stoves.

Various forms of rheumatism and a contagious skin affection diagnosed "Tinea Favosa Epidemis."

The health of our community during the past year has been exceedingly good, due in most part in our opinion to the heavy rainfalls giving rise to high tides, which carry with them an important factor in disease among us, the malarial poison.

No regular house-to house inspection has been made, but general inspection and close observation have been practiced during the whole year, from which we have nothing unfavorable to report, except that the laws relating to vaccination have been wholly disregarded.

The force at the glass manufacturing establishment has been increased from fifty to seventy. An excellent supply of water, free from gaseous discharges, is now furnished them.

Our water supply for the town is entirely from wells.

Dwelling houses are sufficiently high to secure dry cellars generally, which (cellars) are, in a few instances, utilized for the storage of vegetables, etc.

In regards to the management of the slaughter house and outhouses that might readily become nuisances, we can only report favorable.

Rheumatic affections have been more prevalent among us than usual; this, we attribute to the unusually wet season.

An occasional case of typhoid fever has come under our observations, but in every case all the necessary precautions were taken to prevent the spreading of the affection.

No disease among animals has been reported. No epidemic has occurred except a contagious skin affection, mostly among children, which was transmitted to us from Port Norris though a child.

Every one who came in contact with one of these became a victim —about twenty-five in all. It was purely local and responded readily to local treatment with parasiticides.

We learned of Dr. Sharp that it spread extensively in Port Norris, and yielded about in the same manner. Where or how it originated we do not know.

J. C. APPLEGATE, M. D.,
Inspector.

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel R. Mills Chairman, Greenwich; John N. Glaspell, Secretary, Greenwich; William P. Gest, Greenwich; Samuel M. Watson, Greenwich; Dr. S. M. Snyder, Health Inspector.

The Board met in May and organized. As there were no complaints made to the Board and they did not know of any nuisances, there was no business for the Board to attend to.

Our township is in a healthy condition.

The canning of tomatoes is quite extensively carried on, with a great deal of credit to the managers and with no detriment to the community. The refuse is carted to the neighboring fields and in a few days is plowed under.

We have no epidemic among people or animals.

(Signed) DR. S. M. SNYDER,
Health Inspector.

LANDIS TOWNIHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Judson L Beck, M. D., President, Vineland; I. D. Eilenberg, Vineland; James Chance, Vineland; W. W. Whiting, Vineland; George Davidson, Secretary, Vineland.

Slaughter houses are inspected quite often, especially during spring and summer.

Tillyer Bros., glass works. Nothing injurious to health.

GEORGE DAVIDSON,
Secretary.

LAWRENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Henry S. Garrison, Cedarville; Ephraim Bateman, M. D., Cedarville; Harbert O. Newcomb; Enos T. Blackwell, M. D., Physician. Cedarville. No Health Inspector.

The heath conditions of this district do not vary materially from those reported last year. No complaints have been made to the Health Board, and there have been no diseases pointing to a preventable source. No business or trade has been carried on in such a way as to create apprehension or danger. Sanitary expenses are at a minimum. No allowance is made, as far as I am aware, by the Township board for public vaccination, and no work of that sort is done.

Bateman's Hall is the only building reaching a height of three stories; it has no fire-escape. No disease can be said to have been prevalent. Among animals there has been no general disease, and deaths are only occasional. The educational interests of the place are well cared for, the buildings suitable and well ventilated, and no abuse is known to exist in connection therewith.

ENOS T. BLACKWELL, M. D.,
Secretary.

MILLVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edwin Conover, President, Millville; Samuel Misskelly, Millville; Richard Radcliffe, Millville; Silas C. Smith, Millville; T. C. Wheaton, M. D., Secretary, Millville; L. H. Hogate, Millville; Josiah H. Murphy, Health Inspector.

Millville has had a comparatively healthy year. The local Board of Health has been watchful and active and to this fact is largely due the healthy condition of the city.

The Health Officer was a paid officer for the three summer months, and he, with the Board, inspected many places, and gave personal attention to all complaints.

The death rate during the year ending August 31st, was 147; the highest during any month was 29 in August. The causes of death have been numerous, but none showing prevalent diseases;

nine deaths were from pneumonia and twenty two from consumption.

The water supply of the city is the same as heretofore—from water works and private wells. The water from the former is soft but has a small quantity of iron in it; it is used quite extensively for drinking purposes. There is no known pollution at the source of supply. The pipes were frequently flushed and kept clear of any impurities.

The drainage of the streets is not as satisfactory as the Board could wish, because of the level surface. The city has expended $5,000 on roads and streets this year, and they are kept in very good condition. We have no sewers and all drainage is surface drainage.

The cesspools have received proper attention, very few of them are cemented, however; they are cleaned and emptied under a city ordinance.

There are numerous slaughter-houses in the city, but they are so well managed that there have been no complaints made against them.

One nuisance in this city is the hog-pen, and there has been considerable complaint in this direction. This question will be doubtless settled before another year.

In closing we wish to thank the State Board for valuable circulars and assistance rendered whenever sought.

(Signed) L. H. HOGATE.
Secretary.

STOW CREEK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles O. Bowen, Chairman, Shiloh P. O.; Edward H. Sheppard, Roadstown; David Ogden, Greenwich; Ephraim Mulford, Assessor, Roadstown; Dr. Joseph Tomlinson, Roadstown

The water supply is by wells and cisterns. Almost all depend on wells. I do not know of but one family that depend on cisterns. Many wind mills are used to raise the water. Depths of wells from 60 to 100 feet perhaps.

No system of drainage. Cellars are nearly all dry. There are many swamps, few ponds, and not many cases of malaria.

Houses nearly all have cellars, and many used for storing vegetables. No tenement houses of more than two families.

Cesspools have open bottom and sides.

No known prevalent disease. The Assessor sometimes makes inquiries, but not as a customary thing.

No slaughter house in township at present.

No manufactories in township.

Three school houses in good condition, hall in two, and cellar partly under one.

One cemetery, but small.

No registration and vital statistics, except what is kept in the Health Board. A short record of each marriage, birth and death is sent to the Assessor.

The Board of Health has never been called upon to exercise any care over any case of disease whatever, and pay no attention to vaccination.

Heating is by stoves. Coal is extensively used. No system of ventilation.

No prevalent disease among man or beasts. But the season has been a wet and very unproductive one, particularly of fruit, caused, perhaps, by the many heavy wind storms of the season.

EPHRAIM MULFORD,
Assessor.

ESSEX COUNTY.

BELLEVILLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Eastwood, President, Belleville; Richard P. Scaine, Belleville; Chas. Coase, Belleville; I. F. Wisschusen, Belleville; George T. Casebolt, Belleville; William Connolly, Assessor, Belleville; D. M. Skinner, Town Physician, Belleville. Edmund J. Sandford, Health Inspector.

There is nothing to add to former reports of special interest.

(Signed) D. M. SKINNER,
Health Inspector.

BLOOMFIELD TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theo. H. Ward, President; Frank T. Benson, Reuben N. Dodd, Charles L. Seibert, George W. Cook, Charles H. Bailey, M. D., Samuel H. Baxter, Health Inspector.

Bloomfield is supplied by the Orange Water Company, a private corporation of East Orange. The water is not introduced in all the houses in the streets through which the mains pass, such people still using their old wells, but in all the new houses the water is introduced. The water is pure and hard.

We have no drainage systen. As a rule we have dry cellars. Some in the low lands were flooded during the severe rains of the past summer. We have little swamp land, and malarial diseases this summer were less than ever before. We have no sewers.

Most houses have cellars. How much the poor people use them for storing vegetables is unknown. In the neighborhood of factories, as in the Watsessing district, most of the houses are occupied by two families.

No sewers. Some cesspools are cemented, but in the new buildings, where they are sunk in grade, they are laid up with loose stones, so as to allow percolation through the side walls.

As a town we are enjoying unusual health. We have had no epidemics during the past year. The assessor inquires concerning the loss of animals and contagious diseases.

We have no slaughter houses.

(Signed) CHARLES H. BAILEY, M. D.,
Health Physician.

CALDWELL.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. Munson Canfield, Assessor and Secretary, Caldwell; J. M. Mead, Caldwell; H. V. N. Jacobus, Cedar Grove; S. Van Order, Caldwell; Frank C. Goble, Verona; E. E. Peck, M. D., President, Caldwell.

During the past year Caldwell township has not been visited by any epidemic and but few sporadic cases of contagious diseases have occurred.

The principal source of annoyance comes from the desire of a

few farmers to have dead horses and night soil deposited on their lands, but these nuisances have been promptly abated as soon as reported.

(Signed) E. E. PECK, M. D.
President.

CLINTON TOWSNHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ira Meeker, President, Irvington; M. Osborne Christian, M. D., Secretary, Irvington; Abram Voorhees, Assessor, Irvington; J. W. Fisher, Waverley Park; William H. Goldsmith, Newark; John Keegan, Manhattan Park; Louis E. Voorhees, Irvington. M. Osborne Christian, M. D., Health Inspector.

The health of the township for the past year has been excellent. No epidemics. Zymotic diseases scarce. Following the freshet of July 30, we had a few cases of malarial fevers taking on typhoid symptoms. Probably due to the overflow and deposit from the East Orange dumping grounds located at Vailsburgh, at the headwaters of the Elizabeth river. Hygienic conditions are good and excepting the occasional incursions of Newark scavengers we have few annoyances.

(Signed) M. OSBORNE CHRISTIAN,
Secretary.

EAST ORANGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. E. P. Howard, Chairman, East Orange; T. R. Chambers, M. D., Secretary; Richard Coyne, East Orange; N. M. Culberson, East Orange; David Wilson, East Orange; J. Frank Smith, East Orange; Abraham H. Ryan, East Orange; Francis A. Nott, East Orange; Thomas E. Vermilye, East Orange, and Henry L. Jepson, East Orange. Henry Blanrock, Health Inspector, East Orange.

Population, over 12,000.

There is a probability that before next report the town will be lighted by electricity.

The schools and school buildings in excellent trim, but crowded. The land is bought and plans are being studied for a new high school building.

The Board of Education, which was formed some six month since, has been doing excellent and progressive work. Each dis trict has lost its old trustees, and they, with the funds and posse sions of each district, have become merged into one body, th Board of Education. It was through this means that the ste have been taken for the new high school. The Smead system ventilation, with the exception of their "closet" system, has m with unanimous approval and will be employed.

The sanitary and plumbing codes have been provided for th township in pamphlet form, one of which is sent with this mail the State Board. The plumbing code has received many chang from that proposed by the State Board.

Connections have been made with our sewer system, and it working and promises to continue to work satisfactorily.

Expenses of the Board amount to $701.50.

(Signed) T. R. CHAMBERS, M. D.,
Secretary

LIVINGSTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

David Flyn, Livingston; Nelson Smith, Livingston; Bern W. Dickerso Chatham; Alson H. Walker, Roseland; Frank Meeker, Livingston. George DeCamp, Secretary, Roseland. Dr. E. E. Peck, Health Inspector.

The health of the township has been good for the past ye There have been no complaints to the Board of Health of any ki in regards to any contagious diseases. There has been no pre lent diseases of any kind.

(Signed) GEORGE E. DECAMP,
Assesso

MONTCLAIR.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTO

John H. Wilson, Chairman; Isaac Denby, George Inness, Jr., A. Eben Gieson, Warren S. Taylor, J. S. Brown, M. D., Physician; R. P. Francis, D., Inspector; Robert B. Harris, Secretary.

For two years there has been a public water supply in the town, ıanaged by a private company. The water comes from a large ell sixty-three feet deep, at the bottom of which are four artesian ells from thirty to sixty feet deep. Another artesian well has een sunk near the first well but has not yet been used. There is o known source of contamination for the water, and an analysis ıade in August last shows it to be of excellent quality. (*Vide ppended report*). At present about six hundred families are sup- ied with public water.

Montclair, lying as it does on the side of the Orange mountain as a natural system of drainage that is, undoubtedly, one of the ief reasons for the well-known healthy condition of the town. here are no swamps in the region, and the usual water level is ch that in but few houses is there any difficulty in keeping the llars dry.

There is no artificial system of drainage or sewerage in the town, t steps have already been taken to investigate the best methods sewerage available, and it is expected that before long some defi- te action will be taken.

The majority of the houses have cellars, and, as a rule, vegetables e not kept in them.

A few cesspools are cemented, but the majority are built with en bottoms and sides. Many of the cesspools are now built so to be self-emptying by syphonage into one or more adjacent sspools. The remainder are emptied by the odorless excavating paratus and the contents deposited on land well removed from y dwelling.

The town almshouse is in good condition and the health of the nates excellent.

Enclosed is a copy of the last health ordinance passed in June, 89. Copies of this were sent to every householder in town.

The past wet summer, following an equally wet spring and winter, s been, in some respects, almost an ideal one for breeding disease; t it is very gratifying to note that the town has been remarkably lthy during this period. No sign of an epidemic of any kind s been seen, and another proof has been given of the naturally lthy location of Montclair.

PROF. CHANDLER'S REPORT.

The water so examined was taken from both extreme ends of the service, No. 1 being drawn from the pumping station at Watchung, and No. 2 from the last hydrant on Orange road, where the water is but seldom disturbed, and therefore liable to become discolored.

The tabulated certificate of analysis, and the accompanying letter explaining the results, were as follows:

Enclosed please find the results of the examination of the two samples of water taken by Mr. Pellew. You will notice that they are presented in two different forms for your convenience.

The results are very satisfactory. The waters show no evidence of contamination. The absence of nitrites and the small amounts of free and albumenoid ammonia and sodium chloride are the most important indications of purity. They show a trace of phosphates, and the amount of nitrogen in the form of nitrates is rather high, but this is often the case with excellent waters drawn from cultivated regions.

The water is a little hard, and will undoubtedly make incrustations in boilers. The tube which Mr. Pellew brought back with him contains incrustration which consists chiefly of carbonate of lime, with a little carbonate of magnesia and a trace of phosphate of lime, and a little oxide of iron, just such a deposit as this water would be likely to produce.

Very sincerely yours,

C. F. CHANDLER.

The samples of water from Montclair, N. J., sampled by C. E Pellew, marked "No 1 from pumping station," and "No. 2 from last hydrant on Orange road," submitted to us for examination contain in one U. S. gallon of 231 cubic inches:

	No. 1. Grains.	No. 2 Grains
Appearance in 5-foot tube	clear. colorless.	turbid yellowish
Odor	none	none
Taste	none	none
Chlorine in chlorides	0.6177	0.824
Equivalent to chloride of sodium	1.0191	1.358
Phosphates	traces	traces
Nitrites	none	none
Nitrogen in nitrates	0.1441	0.144

		No. 1. Grains.	No. 2. Grains.
Free ammonia		0.0009	0.0012
Albumenoid ammonia		0.0067	0.0058
Hardness equivalent to carbonate of lime.	Before boiling.	6.1578	6.4377
" " " "	After boiling.	2,7991	2.6591
Lime		2.4491	2.5574
Magnesia		0.7481	0.8764
Oxide of iron and alumina		traces	0 1633
Soda		0.5409	0.7213
Potassa		0.1259	0.1281
Sulphuric acid (s o 3)		0.3587	0.3447
Equivalent to sulphate of lime		0 6098	0 5861
Organic and volatine matter		0.9622	0.8165
Mineral matter		8.4412	9.3747
Total solids at 110 degrees		9.4034	10.1912

(Signed) RICHARD P. FRANCIS, M. D,
Health Inspector.

MILLBURN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. M. Deen, Short Hills; E. B. Renwick, Millburn; Chas. H. Robb, Millburn; John D. Parkhurst, Millburn; B. F. Lord, Millburn; Isaiah Williams, Assessor.

Wells and cisterns furnish water.

Drainage, especially in lower part of village, is very bad. There is a plan under consideration to remove a certain pond-dam and restore certain streams to their natural courses, also instituting a system of ditches through lands surrounding this pond, in order to thoroughly drain them. If such work should be done, it would undoubtedly benefit not only the lower portion of the village, but much of the township. There is no system of sewerage, save at Short Hills, which is altogether private.

The Inspectors have visited every place in the village proper, and have advised the cleaning and removal of all privies, and collection of garbage, which they have thought necessary. The citizens have, in a great measure, removed any nuisance thus advised, but some have been quite remiss in that respect.

There has been no epidemic of any kind. There have been a few cases of diptheria of a bad type. I must say the health of the township has been very good for the past year.

NEWARK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Hon. Joseph E. Haynes, Newark; Ald. Alex H. Johnson, Newark; Henry R. Baker, Newark; Tyler Parmly, Newark; Dr. T. B. Mandeville, Newark; Dr. Charles M. Zeh, Newark; Dr. H. C. H. Herold, Newark; S. S. Sargeant, Newark; Wm. B. Guild, Newark. Health Officer and Secretary, Dr. D. L. Wallace.

It is with great pleasure I am able to inform you that the contract for a new water supply has been signed. It is to be taken from the head waters of the Passaic and according to the contract is to be delivered in two years' time.

We have at present time 178 miles of streets in city of Newark. Of these 135.87 are graded. Of the 135.87 miles of grade streets 46.45 are paved. The majority are paved with cobble stones, but within the past few years this has been discarded and all new streets are paved either with oblong granite blocks, Belgian blocks or asphalt. The last mentioned has recently been adopted, genuine Trinidad asphalt, with a substantial concrete foundation being laid. We have now three-fifths of a mile of this pavement, and when spring opens we expect to pave a number of our present dirt streets with this beautiful pavement.

Up to November 1st we have laid and have in use in the city 82.61 miles of sewers, of which 47.59 are of brick and 35.02 of pipe.

During the past year the Board of Health have given this subject close consideration, and the members have visited the different western cities to examine the various plans used. As regards the disposition of garbage our Board is satisfied that the "Merz System," whereby certain portions are utilized, is the best and entirely devoid of offense and completely within the bounds of strict sanitary requirement.

We are now looking into a method for the disposition of refuse from vaults and cesspools, and we hope in a short time to adopt both.

We have at the present time considerable diptheria and some typhoid fever in our city. While there are a few cases of scarlet fever it is of a mild type, very few deaths having occurred.

A committee of the Board is now considering the advisability of placarding houses where contagious diseases exist, and also the arranging with the trustees of the Newark City Hospital for a wing

in that institution to be used for cases where isolation cannot be practised at the patient's house.

(Signed) DAVID L. WALLACE.
Health Officer.

ORANGE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEATLH INSPECTOR.

George H. Hartford, 63 Ridge street, President; Francis J. E. Tetreault, M. D., 110 Main street, Orange; Augustus Eichborn, 54 Essex street, Orange; John T. Platt, 23 Chapel street, Orange; Stephen Collins, 9 Collins street, Orange; Chas. Buttner, M. D., Secretary and Health Inspector.

The water supply is by the city and the quality of the water has been entirely satisfactory during the past year. Impurities caused by decaying stumps in the reservoir have been removed. The reservoir is supplied by a small river, with no pollution above the point of supply. The pipes are regularly flushed by the proper officer as often as may be necessary. There is no perceptible taste and no discoloration; the water is soft.

As a general thing the drainage is good, the outlet being Parron brook and Second river. Much could be done by this city to better the drainage by having Parron brook widened, deepened, and straightened, so as to provide for heavy rain-falls, such as we have had during the past summer. The common council has taken the necessary steps looking toward such an improvement. There are in different parts of the city vacant lots, which are at times covered with stagnant water, producing complaint and disease; but the Board use all means in their power to correct this condition by either draining or filling up such lots.

The subject most important to Orange is effective sewerage, but little progress has been made in that direction. We are still a cesspool town, cesspools being simply sunk in the ground and only cleaned when complaint is made and the owners are compelled to comply. The contents are removed either by an odorless excavator or by the dipping process into barrels and removed from the city and covered.

There are no slaughter houses in the city, and no swine are permitted to be kept in the city limits.

A handsome new brick school house, costing $30,000, was erected during the summer, and fitted with the most approved sanitary appliances, under the personal supervision of Mr. Aug Eichborn, a member of this board, to whom much credit is due. No child is allowed to enter school without having been previously vaccinated.

Our factories are all in a fair sanitary condition and no new manufactories have been added.

We have this year adopted a new sanitary code, in which nuisances are defined and measures taken for abating the same satisfactorily.

During the year quite a number of streets have been macadamized, gutters curbed and paved and many sidewalks have been flagged.

During the past year the health of the city has been good. This has been particularly so in regard to diarrhœal diseases in children, there being few cases and of a very mild type. There occurred about one hundred cases of scarlet fever, mild in character and with very little mortality.

The system of a house-to house inspection, inaugurated several years ago, is still continued and extended, and is productive of very much good.

Sanitary expenses are provided under the law of 1887, the Board submitting its demands to the common council, which body allow such proportion as they deem proper. So far the amounts allowed over the per capita of five cents have been satisfactory.

Contagious diseases must be reported by the attending physician and are quarantined, when in their opinion it is necessary. Physicians are allowed twenty-five cents for each report they make.

(Signed) CHARLES BUTTNER, M. D.,
Health Inspector.

SOUTH ORANGE BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Arnold Tanzer, South Orange; Henry Lilly, South Orange; Isaiah Ball, South Orange; Edward Self, South Orange; N. Martin, South Orange; Howard Stanley, South Orange; Wm. J. Chander, M. D., Health Inspector.

Dug and driven wells supply some water. Public supply by Orange Water Company. Water very good, except in the fall,

when it is low. Reservoir has not been cleaned in four years. Water supply is good, being uncontaminated by sewerage. Three-quarters of the village depend upon wells, the remainder upon cisterns or springs.

Cellars are generally dry. Since the drainage of our swamps or low grounds there has been little or no malaria. There are no public sewers.

Most of the basements are unoccupied and are not used for storing vegetables. We have about twenty-five tenement houses.

There is an ordinance of the village compelling privy wells to be cemented water-tight and emptied frequently.

Have had no prevailing disease, and no diseases of horses, cows or hogs reported.

Slaughter houses are well-looked after.

There are no new manufactories.

Our village contains about three and a-half square miles, and about one hundred and twenty-five dwellings. There are no new physicians or undertakers.

(Signed) A. A. HANSOM, M. D.
Medical Inspector,

WEST ORANGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Edwin P. Smith, President, Orange; John Otterbein, West Orange; John B. Vanwagener, West Orange; Ephraim I. Jacobus, West Orange; Robert N. Drew, Orange Valley; Lewis Van Buskirk, Assessor, Orange Valley; Dr. B L. Dodd, Orange.

The water supply is principally from wells and cisterns. There are a few families living on the line of Orange using Orange City water, which is considered very pure and soft.

There is no system of drainage or sewerage. The streets and roads are kept in good condition.

About one-third of the houses have basement kitchens; usually dry.

Mode of lighting has been, up to October 1st, by gas and oil; since then, that portion formerly lighted by gas, is now lighted by electricity.

Those that have cesspools have them cemented.

There is but one slaughter house, and that is kept in good condition.

There has been no unusual sickness during the year.

(Signed) LEWIS VAN BUSKIRK,
Assessor.

GLOUCESTER COUNTY.

CLAYTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. A. Williamson, Clayton; S. C. Newkirk, Clayton; Thomas McClure, Unionville; Samuel S. Fisher, M. D., Clayton; A. G. Silver, Clayton. H. C. Buckingham, Medical Inspector.

There has been a heavy rainfall during the season. Some cellars have been flooded, but the health of the borough has been unusually good. A few cases of dysentery and five cases of diphtheria, two of which was fatal. The surface drainage is very much improved by the grading of the streets.

No garbage and decaying matter allowed to accumulate in back yards. The privies are very generally cleaned twice a year, and the excreta used by the farmers.

The low, swampy land within the borough is being drained.

(Signed) H. C. BUCKINGHAM, M. D.,
Medical Inspector.

WEST DEPTFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John C. Budd, P. O., Woodbury; Joseph A. Moore, P. O., Woodbury; Alonzo P. Rambo, P. O., Thoroughfare; Dr. George E. Reading, P. O., Woodbury; Mark Clement, Assessor, Woodbury.

Location on Delaware river, between Mantua and Timber creeks. Climate healthy.

Farmers generally have their winter supply of potatoes in their cellars. No houses have more than two families.

No contagious diseases among cattle.

There is very little to report from our district. Its sanitary condition and health is good. Have had no nuisances reported to the Board.

(Signed) MARK CLEMENT,
Assessor.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Lowder, Chairman, Newfield; Wm. Tyler, Newfield; Chas. D. Smith, Treasurer, Franklinville; A. A. Smith, M. D., Malaga; Joshua C. Richman, Malaga.

We are purely local, and have no disease of any note, except about eighteen head of cattle went mad from dog-bite.

(Signed) JOSHUA C. RICHMAN,
Assessor.

GLASSBORO TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Iszard, M. D., Glassboro; W. H. Beckett, Glassboro; F. C. Allen, Glassboro; C. D. Fisher, Glassboro; Howard Iszard, M. D., Glassboro.

Our report for this year is about the same as last, no new enterprises having started. Several dwelling houses have had steam heating appliances put in during the year. Steam has also been put in the public school house.

The health of the town has been better this year than last.

The Board of Health has been unable to do much as we were refused an appropriation at the last township meeting to pay for inspectors.

(Signed) HOWARD ISZARD,
Secretary.

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Benjamin L. Fish, Gibbstown; Joseph L. Devault, Paulsboro; Robert A. Jester, Paulsboro; Jacob Ballinger, Paulsboro.

The water is furnished from wells from eight to ten feet deep in Paulsboro and most of the township. Surface water and generally soft.

Natural drainage. The water level is close to the bottom of the cellars.

Houses have cellars. Not much used for storage of vegetables.

Houses are built with open side. Not cemented. Cleaned out about once a year.

Slaughter houses are in bad condition.

School houses in good condition.

(Signed) JACOB BALLINGER,
Assessor.

HARRISON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Christopher Knisell, Mullica Hill; Jonathan G. Foster, Jefferson; Allen S. Clark, Evans Mills; Eli Heritage, Richwood; E. E. DeGrofft, M. D., Mullica Hill.

Our water supply is entirely from wells; no discoloration; soft, and no unpleasant taste as far as we have learned.

No sewerage, the village being situated upon a hill, and nature has provided excellent drainage.

Our streets are kept in a clean condition. No public grounds.

All of our houses have cellars, and in many instances, especially among the farmers, the cellars are used for the storage of vegetables. We have no tenement houses that have more than one family in them.

Our cesspools or privies are mostly built over an excavation of two or three feet in depth, with open bottoms, and the excretia is removed by horse and cart and buried in the earth.

There has been several cases of scarlatina, with one exception of a mild form. Also three cases, during the month of September, of malignant diphtheria, one of which proved fatal. The three cases, however, occurred in different families, and although all of the families were quite large, none of the others contracted the disease, due, we believe, to cautionary and sanitary measures employed as soon as the cases were seen. We insisted upon isolating them at

once, and having disinfectants rigidly employed. We are not aware as to whether the assessor inquires as to the contagious diseases of animals.

We believe our slaughter-houses are kept in very fair condition, as we hear of no complaints.

Our school buildings are in excellent sanitary condition, thoroughly ventilated and heated from the basements. With very few exceptions the school children have been successfully vaccinated.

There has been one case of glanders. The horse was promptly killed.

There is no house to house inspection, as we do not deem it necessary, as our people as a rule are well informed as to ventilating and heating.

(Signed) E. E. DeGROFFT, M. D.,
Secretary.

LOGAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas J. Gaskill, President, Bridgeport; J. Clark Helms, Secretary, Repaupo; Hance Helms, Bridgeport; John Kirby, Bridgeport; E. T. Oliphant, M. D., Bridgeport. E. T. Oliphant, M. D., Health Inspector.

Water supply entirely from wells; depth from 14 to 25 feet. Some few cisterns, and water used for washing purposes only.

No system of drainage other than drain-tile in low farm lands, and in some few cases ponds are drained into creeks and meadows, and from meadows into creeks and rivers by tide sluices.

Generally dry cellars except in a few instances. Houses generally have cellars, used for storage to a small extent, for potatoes for family consumption.

No sewers.

No animal disease this year.

Slaughter-house about the same as last year.

No manufactures.

No public buildings except school-houses, and they are in a good sanitary condition.

Cemeteries are located half a mile from town, and are on high, dry land, and burials are about four and a-half to five feet deep.

Return of vital statistics are promptly made; Local Board has had no occasion to quarantine any contagious disease.

Heat for dwellings is principally by stoves in the rooms.

No prevalent disease during the year.

(Signed) E. T. OLIPHANT, M. D.,
Health Inspector.

MANTUA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. Leo Eldridge, Chairman, Mantua; John H. Sharp, Jefferson; Charles H. Ferris, Pitman Grove; J. Mason Tomlin, Assessor, Barnsboro. Dr. E. Z. Hillegass, Mantua, Health Inspector.

Our people depend on wells for their supply of water, which is all that could be desired. It is hard.

We have no system of drainage. Cellars are dry as a general thing. We have some few swamps, but malaria is not very frequent. Occasionally we meet with a few cases of intermittent fever.

Our houses generally have cellars, and comparatively few are used for the storage of vegetables. We have no tenement houses of more than two families.

We have no sewerage. Our cesspools are built with open bottom, and the contents are carted away and buried in the soil.

We have had quite a number of families afflicted with typhoid fever, owing, no doubt, to the rainy summer months. The assessor inquires each year as to contagious diseases.

We have one slaughter house, situated in the centre of our town. It is inspected daily during the hot summer months. The stench arising therefrom was at times almost unbearable. We had an unusual amount of trouble with the owner ere the nuisance was abated. It ought to be removed as it will always continue to be a nuisance in summer time as long as it remains at its present location.

We have no trouble with our few manufactories.

The following is an interesting account of some cases of typhoid fever occurring in a family in this township. The drinking water upon analysis was found to contain evidences of contamination of both wells:

William Duffield, aged 20, robust and healthy, occupation a farmer, on August 7th was taken with a chill, headache, slight fever, etc. In a few days his bowels became loose, fever increased, and every symptom indicating that he had a typical case of typhoid fever. He was confined to his bed eight weeks.

Edwin Duffield, aged 17, robust and healthy, occupation a farmer, was taken sick about the same time with every symptom pointing to the same malady. No unfavorable symptoms arising during his length of sickness, which was about six weeks.

Lizzie Duffield, aged 25, rather frail, has been feeling badly for about a week before her brothers were taken ill, finally she was taken with nausea, vomiting slight, fever, ochre-colored stools, in fact all the symptoms indicative of typhoid fever. She had a very serious time all through her sickness. High temperature and violent deliverance. Confined to bed seven weeks.

The three above cases used the water from the barn-yard well for drinking purposes in preference to the household.

Mrs. Duffield, aged 53, robust and healthy, the mother of the children was taken with a chill on October 1st, and symptoms pointing strongly to the same malady. She was confined to her bed for six weeks.

Ivy, aged 6, strong and hearty, commenced about the same time that her mother was taken with symptoms of typhoid fever. She was confined to her bed three weeks with no unfavorable symptoms.

Ada Duffield, age 27, rather frail, was taken ill on October 13th, with slight symptoms of typhoid fever; she was confined to her bed about one week. An abortive case, without a doubt.

Charles Duffield, age 11, strong and healthy. On November 17, was taken ill with the same disease. He was confined to his bed six weeks, with no unfavorable symptoms.

George Duffield, aged 15, strong and healthy. On the 27th day of November was stricken with the same disease. No unfavorable symptoms occurring, he is still confined to his bed at the present writing.

So far, the head of the family (Mr. Duffield) has escaped the sickness.

(Signed) DR. E. Z. HILLEGRASS.
Health Inspector.

MONROE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. B. Sickler, Chairman, Williamstown; John W. McClaver, Secretary, Williamstown; H. K. Bugbee, Williamstown; D. S. Champion, Williamstown; J. Gaunt Edwards, M. D., Williamstown.

The water supply is obtained from wells and springs. The water is most generally soft and par excellent in quality and quantity. The wells vary in depth from 10 to 25 feet. The strata of soil through them being gravel and coarse sand.

The drainage and sewerage is wholly surface, our town being situated on the water-shed of the Atlantic Ocean and Delaware river water slopes, and is 162 feet above sea level, consequently there are no ponds or creeks in the immediate vicinity of the town.

Nearly all houses have cellars for general storage, which as a rule are situated in a bed of gravel. Many have water in them.

The Board of Health inspect and cause the prompt removal of all refuse and excreta.

A mild form of epizoota occurred among the horses in September and October; but few malignant cases, however, occurred.

There is but one slaughter-house in the town, which is kept in good condition.

There are two school buildings, one of three teachers and a primary of one teacher. A night school is kept open for five months for the accommodation of the factory boys.

There are no fire guards, apparatus, or escapes.

There are three cemeteries, and all within the town limits.

The Board of Health adopted the code of laws recommended by the State Board, with such amendments as seemed essential to our township: they were approved Aug. 14th, 1889.

The Board of Health have made frequent visits of general inspection, held several meetings, and taken prompt measures to remove all nuisances, the expense of which will not exceed one hundred dollars.

The heating of buildings is by coal and wood; many have heaters in their cellars. Ventilating is carefully looked after.

There has been no new epidemics, the diarrhœa and dysentery of four years ago has existed each summer, but in a milder form, except in new localities, where it would be of severe form, and some-

times fatal. The prevalent diseases are of malarial origin, and consumption.

(Signed) JNO. W. MCCLAVER,
Secretary.

SOUTH HARRISON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Horner, Harrisonville; Alfred Lippincott, Harrisonville; Nathan Wilkinson, Harrisonville; Samuel F. Stanger, M. D., Harrisonville; Thomas Borton, Mullica Mill.

Our water supply is derived from wells and cisterns. The water from wells is hard, and during the summer months at times is very offensive and unfit for use.

As to drainage, it is secured by tileage. Without good drainage our cellars would frequently be half full of water.

Most of our houses have cellars, which are largely used for the storage of vegetables.

Cesspools are placed at sufficient distances from wells to prevent likelihood of contaminating the drinking water.

We have had but a very small number of contageous diseases this year. The general health has been good.

(Signed) SAMUEL F. STANGER. M. D.
Township Physician.

WEST DEPTFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. George Reading, Woodbury; Mark Clement, Woodbury; John C. Budd, Woodbury; Joseph A. Moore, Woodbury; Alonzo P. Rambo, Woodbury.

We have but very little to report from our district. The health and sanitary condition of our district is very good. There has not been any complaint during this term.

This is about all there is, excepting the boundary. West Deptford township is bordered on the north by the Delaware river, West

Mantua creek, east Timber creek, south by W. J. R. R. and Mantua and Woodbury turnpike.

(Signed) MARK CLEMENT,
Assessor.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Wilkins, Turnerville; Charles Nicholson, Turnerville; Evan Davis, Hurffville; Frank Allen, Hurffville; Dr. C. B. Phillips, Hurffville.

The health of the township during the past year has been excellent. No epidemics and very little malaria or bowel troubles. The sanitary condition of the township is first-class. The Board of Health has had no complaint during the year.

(Signed) DR. C. B. PHILLIPS, M. D.,
Inspector.

WOODBURY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Thomas P. Smith, Chairman, Woodbury; George K. Carroll, Treasurer, Woodbury; Wallace McGeorge, M. D., Woodbury; Charles Walton, Woodbury; Geo. E. Reading, M. D., Woodbury; Wm. M. Carter, Secretary, Woodbury. Wallace McGeorge, M. D., Health Inspector.

Woodbury is located on Woodbury creek, three miles from the Delaware river, on the West Jersey Railroad, eight miles from Camden. It has a population of about 4,000, and has an even climate. By the Geological Survey, it is given as a red sand bed, and lower marl bed, with laminated sand and clay marls. The upper layer is sand or clay, striking mud or marl at a depth oi from 6 tc 12 feet. Many of the wells in the city are merely surface water, for the reason that if wells were dug into the marl strata, the water would be bitter or smell offensively in many places. Occasionally a good well of pure water would be obtained, but many more poo. supplies would be obtained from well-digging.

To obviate this difficulty, and on account of the contaminatior of many wells from the multiplying of water-closets, which were sc

constructed that all their liquid contents would sink into the soil; and for a better system of fire protection, the inhabitants, at a special election held for that purpose, voted to build a water-works, and the city has now a fair supply of good water, obtained from the head-waters of Mantua creek. The reservoir is on Roe's hill, which is 144 feet above the ocean level, and as levels in Woodbury range from 20 to 72 feet, it is seen that there is considerable pressure, which is utilized in times of fire, and forces the water to the third-story of any house in the city. The number of water-renters is now over 500, but the water-works are not yet self-sustaining. The source from which the water is supplied is above any contamination from sewage, but may at times be somewhat affected by the water running from the marl beds into Mantua creek above our water-basins. About one-half our people still depend on wells. Especially is this true in the rural portions of the city, where the water-mains have not yet been laid. Some people use cisterns, preferring rain water for cooking and drinking purposes. By request from the Board of Health, the fire-plugs at or near the "dead-ends" of the mains are flushed twice a week for the purpose of improving the character of the water where there are only a few takers, and not enough water used to keep the water in circulation.

There is no general system of drainage, but the contour of the ground enables the majority of our citizens to drain effectively, and there are not many wet cellars in the city. There are no swamps near us, nor malaria. Compared with ten or fifteen years ago, there is less intermittent fever, and the city has been, and is now, remarkably free from epidemic diseases. Fifteen years ago, there was a good deal of diptheria; now, and for years, there is less than one-fourth the amount seen in practice ten or fifteen years ago.

The streets are kept in fair order, and they are lighted by electric lights, and by gas lamps in those sections where the electric circuit is absent. The "arc-light" system is used, and seems to give general satisfaction.

The Board have contemplated a change in the matter of the construction of cesspools and in regulating their cleaning, but have not yet decided what is the best course to adopt. It is evident that some change must be made, as four-fifths of the complaints made to the Board have been of offensive water-closets, and inspection

has demonstrated most of the complaints to be worthy of attention.

Our slaughter-houses are better managed, and but one complaint has been received this year. The public schools are well looked after and fire protection added to all of them. The public buildings are all right, except that the prison has lately had more or less of the odor of an old or unclean jail. The defect in the plumbing has been remedied by the freeholders, and there is an improvement in the condition of the county jail since that time.

By ordinance no new cemeteries or burying-grounds are permitted within the city limits, and the church grave-yards are not allowed to increase their area for burial purposes. There are very few inter-mural interments now.

The Board has not yet adopted any code for their guidance, working under the code formulated by the State Board and general laws. Having shown a disposition to be reasonable in remedying all complaints made to them, and yet displaying sufficient energy to command the respect of their fellow citizens in abating nuisances the Board is pursuing the even tenor of its way.

Council has appropriated $100 for the use of the Board, but the money was not available for work this summer. For this reason the Board has been cramped in carrying out some needed reforms and correcting some sanitary clauses.

The inspector in making this report would state that he has received much valuable assistance from the secretary of the Board William M. Carter, who by reason of his practical experience as a surveyor has been very useful. All the members of the Board have shown a willingness to act in abating nuisances, and we have been assisted very materially in one or two cases by the advice and labors of our solicitor, Lewis Starr, Esq.

I am happy to close this report by stating that we have no prevailing diseases and that the past year has been a healthy one for the city.

(Signed) WALLACE MCGEORGE, M. D.,
Health Inspector.

WOOLWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Moore, President; Swedesboro, Charles P. Batten, Swedesboro; Howard

V. Locke, Swedesboro (Township Committee); Samuel Avis, Secretary, Swedesboro (Assessor); Benjamin F. Buzby, Physician of the Board and Health Inspector, Swedesboro.

Generally by wells.

Cellars mostly dry. A portion of Swedesboro requires underdrains for the cellars in very wet seasons.

Streets and roads—gravel, sand and clay.

Very few houses have basements. Nearly all have cellars. A considerable portion of the cellars are used for the storage of sweet and white potatoes, and a few other vegetables. No tenement houses of more than two families.

No diseases of animals worthy of note.

No complaint of slaughter-house.

Manufactories and trades same as heretofore. The glass factory here has been closed for over a year.

The schools are generally well conducted and well attended. The school houses are ample—one new one erected the present year, to replace one that was too small.

Four constables—no prisons.

There seems to be very little guard against fire—a few individuals own fire extinguishers.

There are five cemeteries and burial grounds in Swedesboro.

Code of ordinances of Board of Health adopted and published, as in form given in Chapter LXVIII, penalty $20 in each case. Any complaints being made to any member of the Board of Health, said complaint is immediately investigated. There have been very few complaints, or causes for complaints, and they have been remedied at once, upon being made known to the persons causing the nuisance.

Dwellings heated chiefly by coal stoves in the rooms. Several dwellings in Swedesboro have heaters in their cellars, by which they heat the rooms.

No epidemic of contagious diseases.

(Signed) SAMUEL AVIS,
Secretary.

HUDSON COUNTY.

It may not be amiss to briefly refer to some work done during

the period indicated.

Eighteen cases of smallpox were reported, and many of them were removed to hospital. The most stringent measures as to isolation, fumigation and vaccination were taken.

Complaints of obstruction of sewers by reason of breaking down, etc., were frequently received and relief afforded by urging the attention of the proper agents. In some cases the Board made repairs, and paid for them from its own fund.

Complaints were made that swill-men were rendering themselves obnoxious by reason of filthiness of wagons, and the resulting offensive odors. Arrests followed, and an amelioration of the trouble was soon brought about.

Four cases of typhoid fever were reported from 179 Wayne street, Jersey City. On inspection of premises, it was found that the water, etc., pipes were without traps. This matter was rectified.

A sanitary inspection of School No. 6 was made by the Sanitary Engineer of Board, Mr. Frank A. Earle. The drainage was very defective. Certain improvements were suggested and urged upon the Board of Education. Following this, a general examination of the school took place, and some necessary changes indicated.

A large amount of dumping of foul smelling garbage on sunken lots, notably by the Lehigh Valley Railroad and West Shore Railroad, or rather upon their property, was brought to a termination; the railroad officials, in most cases, promptly acceding to the requests of the Board.

A general inspection of sunken lots covered with stagnant water was ordered, and notice sent to owners to abate the nuisance. Suits were instituted, and much improvement was brought about.

The assistance of the Board was frequently asked by local health officers and always given.

The large accumulation of horse manure on the west bank of the Hackensack river, owned by the New York Horse Manure Company was complained of and carefully inspected by the Inspector and President.

This manure pile was about 900 feet long by 35 feet wide, and averaged about 15 feet in height. After many interviews and consultations with the representatives of the company, the Board finally took chancery proceedings to secure the removal of this manure. The case is now pending.

Certain cow stables, of which it was rumored that the cows were unhealthy were examined, and many improvements were made and and one owner compelled to remove from the county. At least, the action of the Board resulted in the removal of his dairy.

By the order of President Gordon, of this Board, several inspections of diseased cattle at abattoir were made, and a number found to be affected with Actino-mycosis or "*lump-jaw*," were killed, and the carcases rendered unfit for food by reason of injection with carbolic acid solution.

It was found that scavengers were in the habit of dumping night-soil on unfrequented streets in various parts of the county. Evidence being obtained against certain parties, this evil was to a large extent stopped.

A case of typhus fever was found in the town of Union. It was isolated and premises fumigated. No other cases were reported.

The Board has directed its efforts toward improving the plumbing of buildings, and with considerable success.

(Signed) C. J. ROONEY, JR.,
Clerk.

HUNTERDON COUNTY.

ALEXANDRIA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David Phillips, Chairman, Little Rock; Jonathan Kugler, Frenchtown; George W. Weller, Mount Pleasant; M. D. Knight, Township M. D., Little York; Jos. P. Stout, Assessor, Everettstown. M. D. Knight, Health Inspector.

The Health Inspector reports the health of the township good for the last year, with no contagious diseases. This is about all there is to report as far as I know.

JOSEPH P. STOUT,
Assessor.

BETHLEHEM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

T. I. Hoffman, Bloomsbury; David Alpaugh, Norton; Joseph Mayberry, Junction; Dr. J. S. Lindabury, Bloomsburg; John E Dalrymple, Pattenburg

The water supply is from springs, wells and cisterns; as to the exact number I am not able to tell.

As to drainage it is very good, and the water level is so that the cellars are usually dry.

The houses generally have cellars, which are largely used for storing vegetables. Do not know of but two houses that are occupied by more than two families.

There have been no contagious diseases during the last year.

The general health of the people has been very good for the last year.

As there are no towns of any size in our township, I don't know of anything more to report to you; as it is, things are kept in pretty good shape generally, to the best of my knowledge.

(Signed) J. C. DALRYMPLE,
Assessor.

CLINTON TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

N. W. Hoffman, Lebanon; John H. Knox, Lebanon; Peter Rockafellar, Lebanon; Jacob S. Hulsizer, Annandale; W. E. Berslaw, M. D., Annandale. No Health Inspector.

Water supply—mostly wells, cisterns and springs; generally very good.

Mostly natural drainage.

Refuse and excreta mostly used to fertilize soil and excreta are usually left in cesspools.

There are two or three slaughter houses in the township. The Board, upon complaint, inspected one in Annandale, and directed that it be thoroughly cleansed and disinfected; that no large animals be slaughtered there, and the refuse from smaller animals be removed and buried. The order of the Board was obeyed, the nuisance abated, and no further complaints received. No complaints received as to other slaughter houses.

All schools and school buildings are now in first-class condition, a new school house having been built in Annandale.

Cemeteries are in good condition.

Physicians and ministers report their cases occasionally, and no fault to be found.

Owing to the absence of any "small-pox scare" for several years, the people are somewhat negligent as to vaccination of their children. No contagious diseases have been in existence during the past year.

Dwellings are heated mostly by stoves, but new dwellings and some old ones are now heated by hot-air furnaces.

This Board respectfully submits this report.

(Signed) W. E. BRESLAW,
Chairman.

DELAWARE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. C. Reading, Secretary; Sergeantsville; Jas. Servis, Sergeantsville; Calvin Strimple, Stockton; Nelson Lambert, Sergeantsville; I. S. Cramer, M. D., Sergeantsville.

Our township Poor-house is kept in good condition.

The cemeteries are all kept in proper order.

The past year has been healthy, and we are glad to be able to report that it has been remarkably free from epidemics of any kind.

We are without any system of drainage in the township.

The supply of water in this township is mostly springs and wells.

(Signed) JOS. C. READING,
Secretary.

EAST AMWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Van Marter, Reaville; Ira Higgins, Westville; Theodore Craft, Westville; Van Horn Locy, Ringgold; P. C. Young, M. D., Ringgold, Health Inspector.

East Amwell Township occupies a southern position in Hunterdon county, bounded on the south and east by Mercer and Somerset counties, on the west by Delaware township, and on the north by Raritan township. It has a population of about 2,000.

The surface of the township is agreeably diversified with valleys and hills, which give it natural drainage. All our streams empty into the Raritan river. The Sourland Mountain Range extend along the southeastern border of the township.

The Amwell Valley constitutes one of the richest and most fertile agricultural valleys in the county of Hunterdon.

Ringoes—its largest and most important village, has a population of about 350, and about 60 houses, generally frames. The cellars mostly all have a lime and sand floor, and are used for storage of vegetables.

Our water supply is from wells and cisterns.

We have several slaughter-houses in the township, and all refuse arising from such is admirably managed by the proprietors so as not to be a nuisance to neighbors. I have never had any complaint in this particular.

We have four public schools, all in good condition. One poor-house in the township, which is always kept in good sanitary condition.

No disease can be said to have existed as an epidemic, though the past year has been a busy one for the physician.

Scarlet fever, whooping cough, erysipilous, cancer, diarrhœa, cholera morbus and diptheria have prevailed more or less. Very little malaria for the past year or two. I cannot record a heavy mortality for the past year,

(Signed) P. C. YOUNG, M. D.
Health Inspector.

FRANKLIN TOWNSHIP.

I have no report to make. The Township Committee have never organized, although I have often called their attention to so doing. The health of this township is excellent, only one case of fever during the past year to my knowlege. General health good all over the township.

(Signed) E. C. TRIMMER,
Assessor.

FRENCHTOWN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

O. B. Kugler, Secretary, Frenchtown; J. C. Hawk, Frenchtown; S. B. Lyons, Frenchtown; H. I. Srope, Frenchtown; A. B. Nash, M. D., President.

Located on Delaware river; population, 1,200.
Water supplied by wells, cisterns, Delaware river and creek.
No drainage except by street.
Mode of lighting—coal oil lamps.
Refuse and excreta carted away.
Two meat markets.
Two slaughter-houses.
Four wood-working establishments.
Four churches, one town hall, two schools.
Police station in town hall.
Only one fire-escape—A. P. William's building.
One cemetery.
Dwellings are heated by stoves and heaters.

(Signed) O. R. KUGLER,
Secretary.

HIGH BRIDGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. C. Alpaugh, M. D., High Bridge; John K. Apgar, High Bridge; Owen Aller, High Bridge; George M. Rinehart, Cokesbury; Stephen Apgar, Cokesbury.

Refuse carted away; some thrown in the streets.
We have no regular markets.
All slaughter-houses are out of town.
We try to carry out health regulations.
A few cases of dysentery and scarlet fever have occurred. Bronchitis has prevailed during theyear.

KINGWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Kugler, Tumbel; Wm. G. Baggs, Kingswood; Augustus Fields, Baptisttown; George E. Dalrymple, Assessor, Baptisttown; E. D. Leidy, M. D., Baptisttown. E. D. Leidy, Health Inspector.

I have nothing to report for the past year. The health of the township has been unusually good; no nuisance complained of. We have only one physician in the township, and no undertaker.

(Signed) GEORGE E. DALRYMPLE,
Secretary.

LAMBERTVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPCCTOR.

Gervas Ely, President, Lambertville; W. H. Wilmot, Clerk, Lambertville; Wm. Lyman, Lambertville; J. L. Coryell, Lambertville; Dr. G. H. Larison, Lambertville; Robert H. Dilts, Health Inspector.

Along the Delaware river. Population about 5,000. Climate healthy. Acres, about 700.

Long and narrow.

City water supply; analysis shows it to be free from contamination. Water-works owned by private company.

No sewers; surface drainage; cellars dry.

Streets are partly macadamized and part dirt.

Houses all have cellars; very few basements; where basements exist, they are used as kitchens.

Gas and oil; electric light soon coming.

Cesspools with open bottoms, and emptied by the party in charge of the Board of Health.

No cesspools permitted in the built-up part of the town, and all kept clean by inspection.

Steam saw mills, paper mills, spoke works, flour mills, etc. Nothing to cause injury to health.

Three public schools in good sanitary condition; one or two private schools.

City jail cleaned frequently, and inspected by the inspector.

Four cemeteries—one old and not used.

City Clerk records the births, deaths and marriages.

Scarlet fever and scarlatina have prevailed.

LEBANON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Hipp, Glen Gardner; Joseph Fritts, Glen Gardner; Andrew C. Cregar, Califou; A. S. Banghart, Secretary, Glen Gardner.

Lebanon township is situated in the northern part of Hunterdon county with a population of about 2,800 inhabitants. Our climate is very changeable, especially in the spring and fall. Our soil is of that nature peculiar to limestone, and the contour of the county is mountainous. Our water supply is mostly by springs, and as a general rule, is excellent in quality. Drainage is natural. Kerosene is used as our light. Excreta is very often left to decompose on our vacant lots. There has not been any disease among animals with the exception of cholera among hogs. Our butchers are especially careful as to the refuse and the slaughter houses are kept clean.

Our school houses are in good repair and are as well built and ventilated as any in the State. The past year has been very unhealthy; a great deal of sickness and many deaths from natural causes. No epidemics have been with us this year except some cases of diptheria in Glen Gardner. Our health board has not done anything this year. I think our township should have an Inspection made, then if the committee refuse to act the Assessor and Inspector could look after the health of the township to some extent. We have not had any Inspector since Dr. Thomas Cary went away.

(Signed) A. S. BANGHART,
Secretary.

RARITAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Myles Cunningham, Flemington; Wm. L. Thatcher, Flemington; George W. Fulper, Flemington; Andrew J. Green, Flemington; John H. Ewing, President, Flemington.

There is nothing new to report. Questions have been answered fully.

We have had no epidemic during the year, and are able to report that the general health is rather better than usual.

(Signed) ANDREW J. GREEN,
Secretary.

READINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Fisher Pidcock, White House Station; P. S. Latourette, Pleasant Run; James Lane, Readington; W. W. Pursell, M. D., White House Station; D. T. Stryker, White House Station.

TEWKSBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. T. Miller, Califou; Manning L. McCrea, New Germantown; Harmon L. Sutton, Califou; Nathan L. Tigew, Mountainville; David C. Farley, Mountainville; Wm. J. Moore, New Germantown.

The health of Tewksbury township has been very good for the past year. No epidemics have prevailed. Malaria quite prevalent, as might be surmised from countour of country.

Our supply of water for cooking and drinking purposes is mostly from springs and wells, and is generally of a good quality.

Most of the houses in the township have cellars, and are used for the storage of fruits and vegetables.

Refuse is generally buried or fed to pigs, so that there is no accumulation from this source. At Califou, a good deal of fault has been found on account of the collecting of decomposed beer grains around depot, rendering the air foul. This has been referred to the proper authorities, but no action has yet been taken.

There have been no diseases among cattle or animals the past year.

Local Health Board passed health ordinance last spring; Health Board is in good working order.

Vaccination is very much neglected.

Our public schools are well ventilated, and as good as any in the State.

Drainage and sewage is generally fair.

(Signed) DR. T. MILLER,
Health Inspector.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph H. Exton, High Bridge; Isaac B. Case, Pattenburg; A. B. Boliean, M.

D., Jutland; E. R. Robinson, Jutland, Chairman; Morris Stockton, Pattenburg, Secretary and Assessor.

Located in the northwestern part of New Jersey. Population about 1,250. Climate is temperate.

No epidemic or diseases of animals in the township during the year.

One slaughter house.

One peach basket factory.

The principal business is farming.

Six schools and six school houses. No other public buildiugs.

Four cemeteries and four burials.

Public health laws and regulations are well enforced.

The township physician states that the health in the township at present was never better. No contagious diseases of any kind. Our board is well organized, and our last meeting was October 12th. Up to that date there has not been anything before the board for consideration. The season has been an unusual wet and cold one.

(Signed) MORRIS STOCKTON,
Secretary.

WEST AMWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John B. Drake, Pres., Lambertville; Lemuel Phillips, Clerk, Lambertville; Edward M. Larew, Rocktown; Joseph K. Lee, Lambertville; George H. Larison, M. D., Lambertville.

No hog cholera this year.

Vital statistics are looked after by physicians.

Nothing of much note. A little scarlet fever.

The rains in excess does not or has not done any serious damage to the general health.

There has been a better degree of average health than for many years past.

(Signed) GEORGE H. LARISON,
Physician.

MERCER COUNTY.

EAST WINDSOR TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. H. Cunningham, Hightstown; Levi Updike, Hightstown; John Whittick, Hightstown; W. D. Wear, Assessor, Hightstown.

The borough of Hightstown has a Board of Health with a health inspector.

W. D. WEAR,
Assessor.

HAMILTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. George R. Robbins, Hamilton Square; Amos Cole, Yardville; John Kirby, Yardville; Joshua Lee, Trenton; Wm. A. Blake, Allentown, New Jersey.

The water supply of Hamilton township is from wells and springs.

The drainage is by underdraining. We have a number of small swamps, but very little malaria.

Our streets are such as are common to country towns. We have no public grounds.

Houses are tenanted by a respectable and comfortably situated class of people.

Such as are usually used in the country.

Only such as are common to animals.

Schools are well kept and in good order.

Almshouse is very nicely kept.

Cemeteries are very nicely kept.

Public health laws are well enforced.

Statistics are well reported.

Children are well vaccinated.

Health expenses are paid by the township.

Heating by wood and coal.

Only such diseases have prevailed as are common to all communities.

(Signed) WM. A. BLAKE,
Secretary of Board of Health.

HIGHTSTOWN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Mason, President, Hightstown; Thomas C. Pearce, Secretary, Hightstown; F. D. Budlong, Hightstown; George Y. Wood, Hightstown; Charles Manlove, Hightstown. Thomas C. Pearce, Health Inspector, Hightstown.

Water is mostly supplied by wells. Many have been examined by our medical physician. Some wells have been filled up on account of bad water.

Most cellars are drained to a creek running through the centre of the town. We have no sewerage system.

The sewers and cesspools are generally cleaned out twice a year. Usually built with open bottoms.

No diseases of animals, except a few cases of glanders being condemned and killed by order of the Board of Health. No disease among the cows and hogs.

Slaughter houses are kept in clean condition and closely watched by the inspector. It is now a matter before the board whether they shall not be removed from the city limits.

One public school and Peddie Institute and Home Seminary are in a good sanitary and healthful condition.

Regular Board of Health, regular meetings, and watching closely the sanitary condition of the city.

The people have been thoroughly vaccinated.

Sanitary expenses are about $150.00.

THOMAS C. PEARCE,
Medical Inspector.

HOPEWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. A. Weart, Hopewell; Wesley Case, Lambertville; Jas. R. Bergen, Pennington; E. L. Welling, M. D., Pennington; Wm. D. Hill, Hopewell.

LAWRENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob R. Wickoff, Dutch Neck; William J. Tindall, Edinburgh; Dr. Franklin, Hightstown; S. Judson Allen, Assessor, Lawrence Station.

PRINCETON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. J. H. Wykoff, President, Princeton; Dr. E. H. Bergen, Princeton; H. B. Cornwall, Princeton; A. L. Rowland, Treasurer, Princeton; John Vandeventer, Princeton; Geo. W. Brewer, Secretary, Princeton. Jas. K. Brown, Health Inspector.

Population 3,000.

Water company private company. About one-third of the houses have supply from the company, rest use wells. Water is soft, pipes are cleaned.

No drainage except natural.

Houses generally have cellars.

No sewers except on college and seminary grounds mostly all cesspools are cemented.

Last spring several cases of cerebro spinal meningitis among horses but none at present time.

The town is mostly lit by gas. But the Pine Electric Company have introduced their lights in all the stores.

Slaughter houses are all out of Borough limits.

There is no manufacturing company in the place.

They are at present in the borough (five) 5 schools private and public, outside of the regular college and seminary.

The town has one regular Marshal, assistants are sworn in on special occasions, and contains one jail.

College buildings are the only ones having fire escapes.

There are three (3) cemeteries in the borough.

Under control of Board of Health.

Vital statistics reported monthly.

All college buildings heated by steam, most of the private dwellings by furnaces, while domitories of seminaries are heated by stoves in each room.

The streets are being macademized in part each year, which is paid for by an appropriation of the Council.

There has been no disease prevalent for the past year.

(Signed) GEO. W. BREWER,
Secretary Board of Health.

PRINCETON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry B. Bayles, Princeton; Henry E. Hale, Princeton; Edward G. Warren, Princeton; Dr. E. H. Bergen, Princeton; Jesse Suook, Princeton.

The Board has had regular meetings.

Only one complaint was was made during the year; that was investigated and remedied. The Board also gave notice to the road overseer to prohibit any one from throwing refuse of any kind on the highways.

TRENTON CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEATLH INSPECTOR.

G. D. W. Vroom, President; Thomas S. Chambers, Treasurer; William Cloke, Secretary; Dr. Cornelius Shepherd; William Hewitt; Carroll Robbins; Albert Clayton; James H. McGuire, Health Inspector; James H. Tindall, Assistant Inspector.

The water department is in fair condition; the source of supply is abundant and the quality fair. We have ample pumping facilities and when the new ascending main is competed, will be able, with our combine pumping power, to deliver into the reservoir, ten million gallons of water in twenty-four hours, which will far exceed the demand for years to come, at the present proportionate increase.

We have now sixty-six miles of water pipe, from four to thirty-six inches, and eleven thousand buildings that use city water.

Continual complaints are coming to this office of the bad condition of the wells of water in the city, used for domestic purposes.

The water from the different wells has been analyzed and has been found to contain large proportions of organic matter.

Kitchen waste and laundry sewage, sewer principally into cesspools, although sewers are being rapidly constructed, some have been finished and are waiting to be accepted by the city. We have a mile of Petty Run water drain, and two and one-third miles of sewarage pipe laid. The drainage from the annexed districts of Chambersburg is very bad; there being no sewers, and no system of sewerage, and the land is very level.

The northwestern part of the city is very wet, the soil is of clay substance, and the cellars and yards are kept in a wet condition, and will be so until the sewage system is adopted throughout the city.

The streets are in a fairly good condition, the same being kept in a good sanitary condition by the street commissioner. Some of the streets are paved with granite blocks. We have a new park in the western part of the city which is a credit to our city. It is kept in good order by the Superintendent. We have a public square in the Tenth ward, which has lately been improved, and is now in a good condition.

The houses in the annexed district of Chambersburg are mostly frame, in Trenton proper they are principally brick houses. We have very few tenement houses, and two families are the average living in these tenements, except where the Italian and Hungarian element reside.

The city is lighted by gas and electricity. The streets near the city limits are lighted by gasoline lamps, which afford a very dim light.

Ashes, refuse vegetable matter, etc., are put in boxes, barrels, etc., placed on the sidewalk in front of the premises, and then hauled away by garbage collectors, who are paid by the city. Common council awards the contract for collecting the garbage to the lowest bidder. Mr. John Hess holds the contract for the present year. Excreta is taken from privies and hauled away to the proper dumps outside of the city limits, by licensed excavators. We have seven licensed excavators, who pay a yearly license of twenty dollars each.

We have two public market-houses, both are kept in a good, clean and healthy sanitary condition. They are visited regularly by the inspector or his assistant.

There are fifteen slaughter houses in the city. They are kept in a fairly good condition, they are visited regularly by the inspectors and the proprietors are frequently cautioned, in regard to keeping their places in good sanitary condition.

We have twenty public-school buildings in the city, the cellars and grounds are kept in a good clean condition by the janitors. The modes of ventilation are very poor and totally inadequate, owing to the crowded condition of the schools. Especially can this

be said of the Centre street school. The condition of the assembly room of this school calls imperatively for prompt action. No light or air reaches this room, except that which passes through halls or class-rooms. Resort is had to artificial light during much of the time, which is necessarily injurious to the eyesight of the children in attendance.

The city almshouse, situated on Princeton avenue, is a large, commodious brick building standing back about one hundred feet off the street. The present steward is Mr. Louis F. Baker. There are thirty-five male and sixteen female inmates in this institution at present, but when cold weather sets in the number will be increased. The drainage from this place is very bad, the building inside is in good sanitary condition, the walls of each room are as white as lime can make them, and the rooms are well ventilated. The one great fault of this institution is there is no bath room for the inmates. This is a matter which the managers should think seriously over. We have two hospitals, the Homœopathic and St. Francis, both are kept in good sanitary condition.

The State Deaf and Dumb Institute has perfect sanitary arrangement.

The State prison has at present 977 inmates, and only seven hundred cells. The sanitary arrangements, in and around this institution are as good as can be, under the present circumstances. The present keeper is John H. Patterson.

The county jail has at present forty-eight male and three female inmates, the cells are clean, with one exception; from this cell an offensive odor is emitted, which seems to emanate from an old cesspool. This should be remedied immediately. The warden is Mr. John G. Murheid, his assistant is Mr. Thomas Price.

The Central Police Station is kept in a good and clean condition, but is suffering greatly for the want of proper sewerage, which will be remedied in the near future. The second precinct has not the advantages which the Central has.

The Mt. Zion African cemetery, the Cathedral cemetery, and Mercer cemetery are kept in a poor condition. The others are kept in a very good condition.

The vital statistics are kept by the city clerk. The undertakers have been dilatory in filing their burial certificates. But since one of their number has been prosecuted and the penalty imposed by the court,

they have been more prompt in filing the same. The undertakers, in defence of themselves, claim that the physicians do not make their returns as they should, thus hindering them. The undertaker was prosecuted upon two charges for the violation of section 36 of the Sanitary Code. The fine imposed was $50.00 and costs.

We have a small-pox hospital, situate near Greenwood cemetery. This building is in a very dilapidated condition, and at a very little expense could be put in good shape.

The expenses for the fiscal year were $2,025.54.

The prevalent disease of the year has been diptheria, of which there has been twenty two cases; scarlet fever, nine cases, and typhoid, eight cases.

We have been engaged during the past year in making house to house inspections, but have been unable to do the work as it should be done, as we have only such small force, myself and my assistant. We have made one thousand three hundred and sixty-two house inspections during the past year. Have served seven hundred and eighty seven notices by mail. Have received ten hundred and ninety-four complaints at this office.

There are at least 8,000 cesspools in the city.

Have issued ten hundred and sixty scavenger permits, have received the sum of one hundred and forty-five dollars for scavenger licenses, which I have paid into the city treasurer's hands.

(Signed) JAMES H. MCGUIRE,
Health Inspector.

During the year I have collected six hundred and sixty-one samples of food, including ninety-five samples of milk in the city. These were sent to the chemists employed by the Dairy and Food Commissioners of the State. When the results of the analysis in each case was known the dealer in the article tested was notified concerning these results, and if the article in question was adulterated or below the legal standard the dealer was further notified that the continued sale of the adulterated food would be followed by immediate prosecution. By rigidly following this plan of action I have been enabled to free the city of Trenton from nearly all adulterated or debased articles of food, and I may say,

without fear of contradiction, that no city in this State is so well protected against the evils of impure articles of food. As a proof of this statement I may mention the fact that samples taken recently were in nearly all cases pure and up to standard.

Of the 95 samples of milk examined only 9 were below the standard, a condition of things that may well cause our citizens to congratulate themselves on the purity of their supply of milk. Below I give some of the results of the inspection of our milk supply.

Number of samples tested 95 ; 45 samples contained 12 per cent. of solids and not one over 13 per cent.; 34 samples contained 13 per cent. of solids and not over 14 per cent.; 6 samples contained 14 per cent., of solids and not over 15 per cent.; 1 sample contained over 15 per cent. of solids ; 9 samples below the standard.

Have received seventy-five dollars in penalties, from persons selling unwholesome meat, which has been paid to the treasurer of the Board of Health.

(Signed) JAMES MCGUIRE,
Inspector.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Coleman, Chairman, Windsor; Forman Hutchinson, Windsor; Harrison Yard, Robbinsville; Dr. Geo. H. Franklin, Hightstown; John B. Yard, Secretary.

We have no report to make this year, as we have had no complaints of any consequence.

(Signed) JOHN B. YARD,
Secretary.

MIDDLESEX COUNTY.

CRANBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Alex. S. Stults, Cranbury; David Farr, Cranbury; Alex. Mason, Cranbury; S. J. Chamberlin, Assessor, Cranbury; Henry C. Symmes, M. D., Health Inspector.

Located fourteen miles from New Brunswick, the county seat. Population, 1,800.

Depend mainly on mills. The water, as a rule, good.

The slaughter-houses are in the country, some distance from the town.

Five district schools. One private school.

One institution, the Garrison Home, for feeble-minded.

The cemeteries are all well kept, the laws pertaining to the burial of the dead being well attended to.

There has been a good deal of sickness throughout the township during the past year. The prevailing diseases arising from malarial causes.

(Signed) HENRY C. SYMMES, M. D.,
Health Officer.

EAST BRUNSWICK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John O. Cozzens, Chairman, Spottswood; Conrad Kohlhepp, Milltown; John H. Perdun, Milltown; Benjamin Peterson, Assessor, South River; John C. Thompson, M. D., South River; S. M. Disbrow, M. D., South River.

The town of Washington, which is included in the limits of the township of East Brunswick, appointed a Board of Health through its Board of Commissioners, viz: Charles Whitehead, Alfred Stutts, Abraham C. Price, James Bissett and John J. Bissett, M. D., P. O. address, South River, N. J., in May last. They have not organized as a Board of Health at the present time.

There is nothing further to report, more than is set forth in the report made a year ago.

(Signed) BENJAMIN PETERSON,
Assessor.

SAYREVILLE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John S. Heston, President, Sayreville; M. S. Higbee, Sayreville; M. Salmon, Sayreville; J. H. Blackman, Physician, Sayreville; Eugene A. Wagner, Secretary, Sayreville. A. L. Rue, Health Inspector.

At the last meeting of the Boarth of Health of the township of Sayreville held before this the members of the Board resolved that the secretary of the Board notify the New Jersey State Board of Health that there is no contagious or infectious disease in this township, and that the township is in a healthy condition as usual.

EUGENE A. WAGNER,
Secretary of the Board of Health.

MADISON TOWNSHIP.

Climate generally healthful and being near the ocean the air abounds with humidity. We have an abundant supply of water from wells and springs.

No sewers and surface drainage.

Houses generally have basements and cellars, in the country cellars are used for the storage of vegetables.

No prevalent diseases.

Seven public schools all in good condition.

The poor of this township are boarded at different houses.

No lockup.

Two burial grounds in fair condition.

Dwellings heated by stoves and furnaces.

Ventilation as in all country places.

The most prevalent disease has been Diarrhœa and Malaria.

No regular slaughter houses.

No factories.

Lighting is by kerosene lamps.

Madison township has as yet never organized a Board of Health.

(Signed) C. H. WARNE,
Assessor.

MONROE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. Redmond, Jamesburg; Richard Lewis, Jamesburg; Samuel Butcher, Hightstown; Dr. J. R. Suydam, M. D., Jamesburg; Chas. Edwards, Clerk of Board, Prospect Plains; Chas. G. Hoffman, Assessor.

The health of both township and borough of Jamesburg is in good condition. No epidemic up to date and no disease among the cattle in township as far as I can learn. The Reform School is in our township, and it is well looked after by Superintendent Otterson and officers of the institution. Mr. Elliott, the farmer, has everything removed as soon as possible. Receive our water throughout the township from wells. The houses and farms are in a comfortable condition.

(Signed) CHAS. G. HOFFMAN,
Assessor.

NEW BRUNSWICK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Henry R. Baldwin, M. D., President; Chas. H. Voorhees. M. D.; Peter T. Austen, Ph.D.; H. B. Willis, Treasurer; H. B. Cook, City Clerk; P. A. Shannon, City Physician; A. Van Nest Baldwin, Health Inspector.

Located on the west bank of the Raritan river, at the head of tide-water navigation.

Population is estimated at 22,700.

Climate is generally healthy.

During the year the temperature has been unusually low, and the rainfall excessive, being about 10 inches above the average (average rainfall per annum, 37 inches. From January 1, 1889 to November 1, 1889, 47 inches).

Geological formation, principally red shale, with, in some locations, a deep layer of sand and gravel.

The area of the city and township is 2,875 acres.

In contour the city presents a perfect water-shed, with a gradual elevation from high water mark to an average altitude of 90 feet toward the west.

The city is traversed from west to east by four water courses, the most northerly one finds its outlet through an aqueduct, into the river. The two central ones empty into the canal. The fourth, and most southerly also empties into the canal. Three brooks and their tributaries drain a large area and are very gradually being converted into aqueducts.

The quality of the water has been about the same as usual.

During the heated summer months the water runs high in organic matter, and if allowed to remain too long in the reservoirs, becomes almost unfit for use. The organic matter is almost entirely of vegetable origin. The introduction of a practical filtering process would greatly improve the character of the water. The wells are as a rule, in bad condition. One well in particular, appears to have been the source of a large number of cases of typhoid fever.

The portion of the city which is sewered requires no particular attention, for the system is in as good working order as such a system can be. This Board of Health has condemned said system in former reports, and still does so. The traps and plumbing in many houses are in bad condition. Nothing but a careful house to house inspection, and the enforcement of strict laws regulating the plumbing, will avail to obtain a sanitary control of these matters. The unsewered portion of the city contains a very large number of privies and cesspools, of which inspection shows the majority in bad condition. Owing to the uncertainty about the ownership of some of the property, caused by trouble in the collection of taxes, systematic inspection and enforcement of laws has hitherto been impossible. Those districts which have been covered by the Commissioners of Adjustment are now being inspected, and orders to clean are issued in each instance where the privy is found to be full or in bad condition.

A disease has been prevalent among cattle which has proved fatal in many cases. The symptoms are high febrile action, rose-colored eruption on teats, nose and legs, in some cases sores and abscesses being found over the whole body, accompanied by intense irritation, and always by marked constipation. By some, the disease has been attributed to a strange fly, which has made its appearance this summer, but as the disease has prevailed where this fly has not been found, and in many places where flies were found no cases of this disease occurred, it is not likely that they were the exciting cause. Prof. Smith, entomologist, at the State Experimental Station, says the flies are not the cause of the disease.

We have a code of Health ordinances regulating the sanitary condition of the city, consisting of the following:

Defining nuisances and providing for their abatement.

Regulating contagious diseases.

Pertaining to diseases of animals.

In regard to privy wells and cesspools.

Pertaining to the removal of offal, vegetable matter, material removed from sewers and sewer basins, slops and liquid house-waste, and house-to-house visitation.

Defining the duties and powers of inspection of the Board.

There has been an improvement during the past year in the reports from physicians, of births and deaths, but there is still one physician in the city who has never as yet made a birth return.

The Board takes pleasure in reporting the fact that physicians are notifying this Board of cases of contagious diseases which occur in their practice with more regularity, thus enabling a more perfect tabulation of these diseases, and also in preventing children from attending school, who reside where the disease exists, and further, in the prevention of public funerals in such cases. Tne Board has done considerable work during the year in the enforcement of private funerals in cases of contagious diseases, being obliged in one or two instances to call in the aid of the police. We are now provided with two record books for the tabulation of said diseases, one in which the cases are recorded as soon as reported. The other is for the yearly summary of the cases.

We hope in this way to be able to compare the reports of each year as to the number of cases, and particularly the location in which certain diseases occur, and by the use of disinfectants, stricter quarantine, and removal of cause to diminish their prevalence.

At the last charter election the Board was voted the sum of one thousand dollars for its expenses, which has been found adequate.

The health of the city throughout the year has been generally good. Diptheria has been the most prevalent disease, although the number of cases has been small in comparison to the size of the city, only 97 cases having occurred, which is less than 5 per 1,000. Scarlet fever has been mild in type and the number of cases small; 40 cases only reported, which is less than 2 per 1,000. In typhoid fever, the statistics have been more gratifying; 21 cases reported, being a trifle over 1 per 1,000. In connection with typhoid fever, the Board has taken considerable pains in all cases to ascertain, where possible, the water supply, and we are pleased to report that in no instance was the disease traceable to the public water-supply, but to water obtained from public or private wells, and pumps throughout the city. Is not this fact suggestive of the necessity of

condemning all pumps and wells, either public or private, within the thickly-settled districts, knowing as we do that it is impossible in such districts to prevent the contamination of such sources of water supply.

The disinfection of the streets, gutters, etc., has been carried on steadily during the spring, summer and fall, the disinfectant used being a solution of Bromine in water, 1 lb. to 200 gallons. Our experience with this is most satisfactory, for it far surpasses in efficiency any others that we have tried. Printed complaint blanks are supplied to all drug stores, which are filled up and mailed to the Inspector by the complainant, the name of the latter being held confidential by the Board. Complaints are entered in a record book.

A. VAN NESS BALDWIN,
Health Inspector.

NORTH BRUNSWICK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles M. Snediker, Assessor, Milltown; Dr. F. E. Riva, Milltown; Phillip Kuhlthan, Milltown; John N. Bodine, Franklyn Park; James Schurman, New Brunswick.

Bounded on the north by New Brunswick; northwest by Franklyn Park and Somerset county; on the southwest by South Brunswick township; on the southeast by Lawrence's brook.

Population has increased since last census.

The township has sandy loom, shale ground, copper mines, blue stone quaries and clay.

Water supply is by wells and cisterns. As this is mostly a farming community there is no system of drainage.

Township has no public grounds.

Houses are generally frame and occupied by their owners. The cellars on the farms are generally used for dairy purposes and storage of vegetables.

Gasoline and kerosene oil are used for lighting purposes.

No diseases of animals since last report.

There are several slaughter houses. They are in bad condition and the owners have been notified to remedy the evil.

In the borough of Milltown there is an india-rubber factory, where they manufacture rubber shoes and boots.

The borough commission was formed and incorporated last spring. It contains about 400 acres, and situated within the limits of the township. The dwellings are mostly owned by the employees. The population of the borough is about 900 inhabitants. A Board of Health has been organized in the borough, Clarkson P. Stelle, secretary. Address Milltown, N. J. The borough has street lamps.

There are three public school houses in the township and in good condition.

The poor farm of the city of New Brunswick is located in the township of North Brunswick.

The borough commission has two marshals.

The Myer Rubber Company has a thorough fire extinguisher.

There are eight cemeteries located in the township.

The borough commission of Milltown has distributed ordinances regarding health laws and their inforcement.

The assessor forwards the reports at the proper time.

Vaccination is duly attended to.

Dwellings are heated by stoves and heaters.

Scarlet fever, hooping-cough and measles have prevailed.

The Myer rubber factory employes about 500 men, mostly Germans and Poles.

(Signed) C. M. SNEDIKER,
Assessor.

PISCATAWAY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Town Committee, Warren Smalley, New Brunswick; Firman R. Walker, New Market; Abaah Gray, Dunellen. A. S. Coriell, Assessor, New Market; W. J. Nelson, M. D., New Market.

Our board met last spring as usual and organized with the above members. We have had no other meeting and have nothing new to report except less sickness than usual. No epidemics except at present a disease among cattle in our neighborhood.

(Signed) W. J. NELSON, M. D.
Township Physician.

RARITAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph L. Moss, Sr., Metuchen; Luther H. Tappen, Metuchen; Alfred Mundy, Metuchen; Theo. A. Wood, Secretary, Metuchen. F. B. Norton, M. D. Physician.

Nothing done by the Board.
Nothing new to report.

(Signed) THEO. A. WOOD,
Assessor.

THE BOROUGH OF SOUTH AMBOY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. E. DeGraw, (Mayor,) South Amboy; John Scully, Councilman, South Amboy; Patrick Campion, Councilman, South Amboy; John Sexton, Councilman, South Amboy; James H. Gordon, Councilman, South Amboy; Ward C. Perrine, Councilman, South Amboy; Bernard Roddy, President. Bernard Roddy, Health Inspector.

On the south side of Raritan bay and at the mouth of Raritan river. Has natural advantages for drainage but not utilized by the people to any extent until this year.

Water supply entirely from wells, many of them so carelessly constructed and their proximity to closets and cesspools make them a source of danger to many of the people. Some improvement in this direction has been shown during the past year. The question of a water supply for the borough will be an important one next year.

Until the past two years little had been done in drainage and sewerage, this year however considerable has been done in this direction, many low places have been filled up and streets graded to carry the water to the bay.

The public ground on "Clinton Park" has been much improved during the year. A borough hall costing $11,000 has been erected thereon and considerable improvements to the grounds and approaches is a pleasing result of the labors of the authorities.

Houses frame and generally for one tenant. More than one-half of the occupants own the dwellings, except in very few instances the premises are well kept and improvements made. Recently

more attention has been paid to sanitary matters in the construction of dwellings, showing a decided advance on former years.

Kerosene oil has been the only means of lighting to the present year. This year electricity has been in use for street lighting and in a number of dwellings it has been introduced. In another year it may be in general use.

The question as to the disposal of excreta has been our greatest anxiety. With a constantly increasing population and the most indifferent closet system, it has been one of the greatest sources of danger. Many of our people have been disposing of excreta as convenient, rather than as a regard for the public health would suggest. Much difficulty has been met in compelling some of the more ignorant to comply with the ordinance of the Board of Health. However, an advance has been made in this direction.

Two slaughter-houses are maintained, and except on one or two occasions they have been kept in good condition.

School houses are good brick structures and have all ordinary improvements for ventilation, heating and light.

Five cells for prisoners are provided in the borough hall, and as everything is new they are in good condition. Our police force, though not large, meets the wants of the community.

Health laws have been distributed among the people, and the inspector has made over 100 visits to compel or induce by moral persuasion an observance of the laws.

The collection of vital statistics has not been attended to as it should. The physicians do not comply as fully as they should. The community has so recently come out of the simple government of the township that the importance of the new powers that be are hardly realized.

The sanitary expenses of the year will amount to less than $300.

Scarlet fever and diphtheria prevailed to some extent in the early part of the summer and in October. About fifteen deaths occurred in all. Every precaution was taken to cause prompt burial and prevent the spread of the diseases. Malaria and its attendant fevers have been less in the number of cases.

While much is to be done to place South Amboy in a good sanitary condition, yet the year just closed shows considerable improvement in our condition. The citizens are becoming interested in the

proposed sanitary improvements, which is a great point gained in supporting the efforts of the Board of Health.

I might write much more but the above will give a general idea of our sanitary condition.

(Signed) BERNARD RODDY,
Inspector.

SOUTH BRUNSWICK,

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

H. E. Hathaway, Chairman, Monmouth Junction; W. W. Cozzens, Dean's Station; G. W. M. Mount, Kingston; G. D. Van Dewees, Town Clerk; F. G. Stevenson, Assessor, Dayton.

WOODBRIDGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Bernard Dunigan, Woodbridge; Albert D. Brown, Woodbridge; John Lockwood, Woodbridge; Samuel P. Harned, M. D., Woodbridge; Isaac Inslee Woodbridge.

The local Board of Health has had but little to do this year owing to the season. There are no prevailing disease and the township is comparitively healthy more so than usual. The Board have had a number of meetings but few complaints. We have been careful to have stagnant pools drained, hence our good condition.

(Signed) ISAAC INSLEE,
Assessor.

MONMOUTH COUNTY.

ASBURY PARK,

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. D. Pennypacker, President, Asbury Park; J. A. Bradley, Asbury Park; David Harvey, Jr., Asbury Park; E. G. Harrison, Asbury Park; John Rockafeller, Asbury Park; N. E. Buchanon, Recorder Vital Statistics, Asbury Park; E. Wright, Inspector, Asbury Park; Porter L. Lippincott, assistant Inspector, Asbury Park; Randolph Ross, Clerk, Asbury Park; Henry L. Ogden, Chemist, Asbury Park; H. Mitchell, M. D., Advisory Physician, Asbury Park.

The usual work of inspection of premises has been continued. An additional health inspector was employed during the months of June, July, August and September, his time being mainly occupied in making the general house-to house inspection, examining all premises and correcting the records where there has been any alteration. This record shows the sanitary condition of all premises within our jurisdiction, and is open to the public.

Seven (7) cases of scarlet fever, six (6) of measles, and one (1) of typhoid fever have been reported during the year, the case of typhoid fever was imported. No deaths have occurred from contagious diseases.

The water from seventy-five surface wells was analyzed, eighteen of which were found polluted and closed.

The public water supply is very satisfactory; the number of premises now supplied is six hundred and fifty-two (652), an increase of one hundred and twenty-nine (129) since October 1, 1888.

The sewers continue to do their work in a satisfactory manner, and no annoyance has been caused by them. Thirty-five (35) sewer connections have been made this year, making a total of seven hundred and fifty (750).

When our new plumbing and drainage law first went into effect there was great dissatisfaction among the plumbers, but at present they seem to appreciate the efforts of the Board to preserve our health record, and the result has justified the stringency of the Board by the superior quality of the work now done by the plumbers. One hundred and eight (108) plans of new plumbing work have been examined, tested, and approved this year.

The borough commissioners made an appropriation of eighteen hundred dollars ($1,800) for the removal of garbage, which is collected under contract, but has not given entire satisfaction.

The borough commissioners also made an appropriation of fourteen hundred dollars ($1,400) to defray the expenses of the Board of Health, which had previously been borne by Mr. James A. Bradley.

(Signed) W. D. PENNYPACKER,
President.

ATLANTIC TOWNSHIP.

Our town committee have not organized as a Board of Health.

The township has been remarkably healthy the past year. There has not been any contagious diseases in the township.

(Signed) LEVI SCOBEY,
Assessor.

EATONTOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. W. Crater, M. D., President and Inspector, Oceanport; J. W. Johnson, Chairman, Eatontown; Jas. E. Borden, Eatontown; J. Ed. Corlies, Oceanport; Wm R. Stevens, Assessor, Eatontown.

Wells both dug and driven, cisterns and springs.

Considerable land drained by tile underdrains. No regular system of sewerage, usually tile drains laid to cesspools.

Streets are usually kept in good order, room for improvement however.

As a rule tenant houses are well kept.

Excreta is carted away by scavengers in tight wagons at the expense of the owner of property. Ultimately used in compost heaps and regarded as possessing valuable fertilizing properties.

No cases of contagious or epidemic diseases reported to our Board this year.

Slaughter houses are well kept and very few do much business, the "dressed beef of Chicago" finding favor with retail butchers.

Schools well attended, in some instances rather overcrowded. Buildings kept in good repair. I will shortly investigate them and inquire closely into light and ventilation.

None, we have malice for all, charity for none.

No escapes, possess one (1) steam fire engine, one (1) hook and ladder company; rarely have fires.

Unsurpassed cemetery accomodations, fine locations, beautiful views.

Have a set of excellent laws, which fortunately are never enforced, every offender has a "friend," so said offender is informed of the law transgressed, and allowed to continue in his transgression.

As far as known the law on reports is obeyed.

Have been able to manage such diseases thus far without building a pest house. We have plans and specifications ready

and by previous arrangement with a contractor, can have building ready for occupancy in very few hours.

Have never exceeded the $50.00 appropriation thus far.

Stoves, ranges and heaters, ventilation is guarded against as much as possible.

Board has met but once for organization. Have had several complaints of the usual character—sea swill, stagnant water, open drains, &c., all of which I have abated at small expense.

(Signed) E. W. CRATER, M. D.,
Inspector.

FREEHOLD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James Bawden, President, Freehold; W. J. McClure, Secretary, Freehold; A. C. Hart, Freehold; J. O. Burtt, Jr., Freehold; John Enright, Freehold; O. R. Freeman, M. D., Freehold. W. J. McClure, Health Inspector.

A few changes have taken place since the last report from this board.

Two artesian wells have been sunk on the low ground near the track of the N. Y. and Freehold Railroad and east of the town limits, with the view toward a future supply, and water was found suitable for domestic uses. As there was no appropriation for utilizing the same and introducing it for practical purposes nothing further will be done at present. Electric lights have been introduced in the business places, hotels and a few of the residences in the lower part of the town. The plant is owned by the Gas Company.

A portion of South street, having the most travel, and extending from Main street to the crossing of the Pennsylvania Railroad, has been laid with what is known as the Telford pavement, which promises to be substantial and a great and desirable improvement over the old and worn out gravel road. All such improvements contribute to the healthfulness of the neighborhood and the town. Should the experiment prove a success other portions of our much neglected thoroughfares will in due time undergo the same transformation.

Owing to the increased water fall quite a number of cellars which heretofore have remained dry have had water in them, and in some

cases have been inaccessible for the time being but unattended with any unfavorable results.

The condition of the slaughter house is much improved over the previous year; the parties most aggrieved and with whom complaint originated reconsidered the matter and by petition to the board favored a continuance of the business under certain restrictions and until the expiration of the present lease. We are keeping a watchful eye over the premises and will not suffer it to become offensive or a matter for complaint.

Our public school building has been enlarged with an addition of about half the size of the original, which is sufficient for the better accommodation of the scholars for some time to come.

The town commissioners appropriated $150 for expenses of the board, which has been sufficient to meet all demands for the year.

The year has been one with a good showing for health and free from epidemics.

W. J. McCLURE,
Secretary.

HOLMDEL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Morrell, Treasurer, Keyport; James W. Hoff, Keyport; Michael Taylor, Holmdel; Aaron Longstreet, Secretary, Keyport; Dr. Henry G. Cook, Health Officer, Holmdel.

HOWELL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Lutz, Farmingdale; Charles Donahay, Turkey; Charles P. Lafetra, Squaukum; James H. Butcher, Secretary, Turkey; Stephen M. Disbrow, M. D., Health Inspector, Farmingdale.

Water supply is from wells and is generally soft.

Drainage is good and no necessity for public draining, although some cellars have been wet this year as there being so much rain, swamps are well drained as being almost all under cranberry culture.

Mode of light entirely by kerosene.

No prevalent disease this year.

Slaughter houses well kept and no complaint.

Two manufactories, one piano and one powder.

School houses and grounds are in good condition.

The regulations pertaining to health have been well looked after by our Inspector. The Health Board have been frequently called together and several complaints have been remedied.

Vital statistics are received and sent in every month.

There is not much to report from our township as it is large in territory and generally healthy.

(Signed) JAMES H. BUTCHER,
Secretary of Board.

LONG BRANCH CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

W. W. Silkworth, President, Long Branch; E. B. Blaisdell, Secretary, Long Branch City; Geo. W. Brown, Jr., M. D., Long Branch; J. W. Taylor, M. D., Long Branch; James P. Connelly, Long Branch; Charles Morris, Long Branch City; Alexander Cooper, Long Branch. Hugh R. Herbert, Health Inspector.

Water supplied partly by running water and remainder from wells.

All hotels and many private houses are connected with sewer where possible.

Streets not paved. Public grounds in good condition.

Houses generally occupied by one family.

Excreta carted away by scavengers.

Schools well ventilated and some heated by steam; all in good condition.

We have hospital well-equipped and supported by the public.

There are but few fire escapes attached to buildings.

Ordinance of Board of Health in effect.

Vital statistics are collected by Secretary of the Board of Health.

Heated mostly by stoves; ventilated by windows and doors.

Three cases of typhoid fever.

The sanitary condition of Long Branch has been very good during the year.

The water furnished by the Long Branch Water Supply Company is good; a large number of wells are used.

The hotels, and many dwellings have connection with the sewer. It is needed in many streets yet; all the western part of the town is without the sewer.

Efforts are being made to macadamize our main street which, if done, will be a great sanitary improvement.

Garbage and refuse matter is carted away during the summer by wagons that call daily at residence, under the direction of the Board of Health.

Electric lighting for streets has recently been adopted.

A certain amount is appropriated each year by the Long Branch Commissioners for the use of the Board of Heaith.

MANALAPAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William C. Bowne, Chairman, Freehold; William H. Reid, Tennent; H. W. Long, Englishtown; S. C. Bowne, Assessor, Englishtown; A. T. Applegate, Physician, Englishtown; J. C. Suiphen, Clerk, Tennent.

Wells, cisterns and springs furnish the water supply. The water has some iron in it. Have both hard and soft water.

Surface drainage and under drainage.

No prevalent disease has existed.

Slanghter houses are kept in good order.

No factories in the township.

School facilities are kept up to the ordinary standard.

Returns are recorded and forwarded by the assessor.

Our board is governed by the law in regard to vaccination.

(Signed) W. C. BOWNE,
Chairman.

MARLBORO TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Ely; Marlboro; Wm. Carson, Holmdel; Peter C. Vanderveer, Wickatus; William C. Hulse, Marlboro. John W. Herbert, Assessor.

MATAWAN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPCCTOR.

S. A. Close, Matawan ; Garrett Hendrickson, Matawan ; J. F. Lisk, Matawan ; D. C. Mealio, Matawan.

We have about four hundred cres in own incorporation with no stagnant pools, and the township is in a good sanitary condition, the village of Matawan is situated between two creeks which gives us good natural drainage and a great portion of the refuse is carried off by the flow of the tides, we are troubled very little with malaria and the cases are very rare, they are generally contracted elsewhere or caused by undue exposure.

In regard to the supply of water we depend entirely upon wells, and as a rule the water is hard but good and slightly impregnated with iron but it has no bad taste. There are a very few who depends on cisterns.

In regard to the dwellings they are built with cellars and used for storage purposes, there are some few that are built with cellars and used for storage purposes, there are some few that are built with basements and are occupied, but as a rule they are damp.

We dispose of our refuse and excreta to the farmers, they make a compost of it and use it for fertilizing purposes.

We have had no contagious disease here for the past year and very little sickness.

(Signed) D. C. MEALIO,
Assessor.

MIDDLETOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Van Mater, M. D., President, Atlantic Highlands; R. S. Snyder, Secretary, Middletown; D. D. Hendrickson, M. D., Township Physician, Middleton; Township Committee, New Monmouth; J. H. Brainard, Township Committee, Highlands.

This township is most eligibly located, being and lying between the waters of Raritan and Sandy Hook bays on the north and the Navesink and North Shrewsbury rivers on the east and southerly

boundaries, with its lands sloping from the famous Middletown Hills in either direction. Its population in 1885 was 5,802, which has increased very largely since taking the census in that year.

Its climate is more temperate and free from extremes of cold and heat than in other localities, on account of its being largely surrounded by water.

Its natural advantages by reason of its heights and drainage and location has led to new settlements by those seeking summer homes. Its topography lending enchantment to the eye, being delightful views from its heights and constant variety by its contour, leading all to enjoy long drives over its ever varying scenes among its hills and vales.

Its water supply is most healthful, being natural springs from the hillsides. Some, indeed, never failing almost on the heights of the highlands of the Navesink, which, with a little artificial arrangements, supply a never failing run of pure spring water.

By reason of its topography it has natural sewerage where the forces and supplies of natural water facilities flood and flush all necessary parts of the premises. The meadows adjoining the shores are washed and delivered of all waste and sewage by the ebb and flow of the tides.

Public roads are being largely graded and graveled, and the streets of the Atlantic Highlands Borough have been graded and are easily delivered of surplus water by rains or floods.

Houses are being built both elegant in style and material, and the city denizen pay from $250 to $1,200 for three months' rent.

Artificial light is almost wholly produced by kerosene of 150° test, very much of it being stored at the private homes by the barrel for light and the kerosene stove.

Among the farmers and rural homes the refuse is added to the manure pile, and in the borough the same is carried to pens beyond the bounds of the town. The excreta is also carried to the farm for a fertilizer.

The markets are found among the summer residents, and the community not producing. The surplus is taken to the cities.

There has been no disease among the animals during the year.

There are no slaughter houses of note in our bounds, our meats being brought mainly from New York and depots of western killed stock.

We have no manufactories in our borders, but mechanics and tradesmen are fully employed, and more in demand.

Schools and school houses are improving in character and being graded, and the teachers obtaining a good salary, and the houses being supplied one by one with the new and unique furniture. There are but few of the barn-like structures remaining, which exist to the shame of the narrow-minded tax payers of their district.

We have no paupers nor charity institutions, nor do we have the tramp invest our dwellings to any extent.

Our police hardly warrant the name, and an arrest is an exception, being quite unusual.

The Fairview Cemetery in this township, is used for other townships and towns with our own, and is kept above the average in its neatness and taste, as to the grounds and drives.

Where there has been any suspicion of disease breeding matter—animal or other—the Board of Health has been efficient and prompt in making and enforcing ordinances for the community so exposed.

There has been no contageous disease during the year, and vaccination has been compulsory where any were found neglectful.

The expenses for sanitary purposes and expense of the Board of Health have been merely nominal.

Most of the dwellings are heated by stoves with coal, and ventilation is natural and full.

There has been no prevailing disease during the year, although the city has sent many strangers in our midst, and our shores are contiguous to several of our communities.

(Signed) R. S. SNYDER,
Secretary.

MILLSTONE TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. M. Davison, Chairman, Perrineville; Albert Thompson, Clarksburg; Rainbert Ely, Ely; Geo. J. Ely, Secretary, Perrineville; R. M. Smith, Health Inspector, Perrineville.

The Board of Health met at Clarksburg, on the 26th day of October, 1889, and would report no change from last year.

(Signed) GEO. M. DAVISON,
Chairman.

NEPTUNE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

S. W. Kirrbride, Asbury Park; J. C. Patterson, Ocean Grove; Jeremiah Newman, Asbury Park: Dr. H. T. Kinmonth, Asbury Park; L. E. Watson, Ocean Grove.

The local Board of Health have not had much trouble this year. The low lands west of Ocean Grove and Asbury Park make all the trouble. We have had five cases of diptheria outside of the Grove and Park. There is no quarantine. Have now two cases of scarlet fever, but it is not spreading. West Grove has artesian well water; West Park, driven wells. Everything else is about the same as last year.

E. L. WATSON,
Clerk.

OCEAN GROVE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. H. Stokes, President, Ocean Grove; J. L. Hays, Ocean Grove; Holmes Murphy, Ocean Grove; Jos. H. Thornley, Ocean Grove; I. H. Alday, M. D., Ocean Grove; Rev. Geo. W. Evans, Ocean Grove; A. E. Ballard, Clerk and Health Inspector, Ocean Grove.

The annual spring and fall inspections show that the large majority of our residents endeavor to observe the sanitary laws.

The garbage is carted away, between one and two miles, each day in the summer—three times per week at other parts of the season. It is mostly fed to animals and the remainder is composted. Improved methods for its collection and distribution are in process of arrangement.

Plans are being prepared for a second sewer system, which will, when perfected, bring the thirty lots which cannot now connect in union with the general system. In the southern part of the Grove, in cases of long rain storm, the water sometimes rises above the floors of the cellars. Most of these are being cemented, while others are being filled.

There are 764 connections with the sewer system, 120 of which have been made this year. This leaves a little over 100 residences

not yet connected. One-third of these are arranging for it now, and the rest are being pressed into it as rapidly as the circumstances safely permit.

A man is being trained who will devote the necessary time in the summer to regular daily inspection.

A new plumbers' ordinance, similar to that of Asbury Park, has been adopted, and better plumbing already begins to be apparent.

Deodorizers, in cases of nuisance, are freely used, and charged to property owners.

The streets have been kept free from impurities, except where the violent rain fall has washed some places, and water has stood for a few days before the streets were mended. No case of evil, so far as we know, has resulted.

There are 765 connections with an artesian well system, of which 149 were made this year. The water still retains its singular purity, and six new wells are to be sunk this winter for the supply of the increasing demand.

The streets have been sprinkled this yesr with salt water. The experiment promises favorable results.

The physicians report that notwithstanding the severe rainfall of the season, the Grove has been exceptionally healthy. There have been a few mild cases of fever, diagnosed as produced from over-eating and exposure upon the sands after bathing. In the early part of the season, extending over a period of four months, there were reported eight cases of diptheria, four of which were fatal. It seemed impossible to trace them to any definite source except the first, which appeared to come from outside contagion. The best known methods of isolation, fumigation, disinfections and other sanitary rules were enforced, which probably accounts for the fact that the disease did not spread among the people.

All the upper part of Wesley Lake was dug out in the winter and the accumulated mud removed and used as fertilizer.

In the early spring some of the pipes of the sewer outlet lying in the ocean became disarranged from a floating wreck. The tides were exceptionally high all the spring and summer so as to interfere with their proper replacing, and a great deal of annoyance was the consequence. A new system of jetties is proposed, which it is hoped will relieve any danger for the future.

The water reservoir is to be raised thirty feet, in order to secure a fuller water pressure.

(Signed) A. E. BALLARD.
Health Inspector.

RED BANK.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

R. Allen, Jr., President, Red Bank; John H. Cook, Secretary, Red Bank; Dr. A. F. Trafford, Red Bank; M. M. Drohan, Red Bank; Samuel Cullington, Red Bank. James Norman, Inspector, Red Bank.

The report for last year will cover pretty much all the features of the present year.

The town of Red Bank has considerable new territory added to it by a law passed at the last Legislature. The town as at present constituted has not been surveyed so as to ascertain the exact number of acres. The population of the town, including the added portion, is estimated at 4,500 to 5,000.

The town voted an appropriation of $25,000 last spring to increase the water supply. Three new artesian wells have been put down to the lower stratum of water bearing sand, and the supply has been increased nearly or quite three fold. The use of this water is constantly increasing and wells are gradually being abandoned.

Whooping cough has been very prevalent during the past few months, and two deaths from this cause have occurred. Children affected with this disease are not permitted to attend the public school.

(Signed) JOHN H. COOK,
Secretary.

SHREWSBURY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Child, Red Bank; W. Tabor Parker, Little Silver; W. H. Boardman, Little Silver; Thomas P. Brown, Assessor, Red Bank; Thomas Curtis, M. D., Red Bank; Albert C. Harrisson, Clerk, Red Bank.

Water supply by wells. In some localities iron discolors it but generally good.

Cellars dry.

All the houses have cellars used altogether for the storage of vegetables. Not many have more than one family.

Most of the houses have no cesspools, what few have are built with an open bottom, many with a barrell with no bottom emptied by soakage and the solids by throwing out and using on the land.

No prevalent disease.

No inspection of slaughter houses, as none are used outside of corporations.

Whooping cough has been very prevalent in this township this fall, with several fatal cases being reported.

(Signed) THOMAS P. BROWN,
Assessor.

UPPER FREEHOLD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jos. Holmes, Jr., Cream Ridge; I. S. Dawes, Imlaystown; C. C. Wikoff, Allentown; Dr. F. Price, Imlaystown; Albert Nelson, Nelsonville.

Private wells supply water.

By ditches, gutters, tile drains, &c.; no sewers, most cellars are dry at most seasons of the year; no swamps or malaria.

Very few houses have basements, most of them have cellars which are used only for storing vegetables necessary for use of family residing in house; very few houses contain more than one family.

Kerosene principally used.

No sewers, no cesspools; refuse either carted away or carried off by open drains.

No large markets, small ones clean.

Very little disease to date.

No slaughter houses except two small ones which are very properly conducted.

All cemeteries are so situated as not to be dangerous to health.

Most people burn coal for heating purposes exclusively, although some burn both wood and coal and a few wood exclusively.

(Signed) ALBERT NELSON,
Assessor.

WALL TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James L. Allgor, New Bedford; John M. Allen, New Bedford; B. Newberry, Manasquan; A. A. Higgins, M. D., Manasquan; Henry Wainright, Bridle.

There has been no meeting of the Health Board since my last report. The township I think has been healthy except a few cases of typhoid fever at Spring Lake during the summer and they were kept very quiet, all I know about it is from hearsay. I know of no nuisances. In the summer we have very much rain and the cellars filled with water, but that was got out as soon as possible. You will please notice that Belmar, formerly Ocean Beach, is incorporated and has a Health Board, likewise North Spring Lake and Manasquan, the rest of the township is principally farming lands and are kept healthy.

JOHN M. ALLEN,
Assessor.

MORRIS COUNTY.

BOONTON TOWN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. A. E. Carpenter, President, Boonton; Dr. John G. Rogerson, Boonton; William Grubb, Boonton; William J. Powers, Boonton; R. H. Richards, Health Inspector, Boonton; John Warfield, Health Inspector, Boonton.

A full report of our town will be found on file. The general health at present is very good, and there is no disease of any kind reported.

(Signed) JOHN DUNN,
Town Clerk.

BOONTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Ellis G. Myers, President, Boonton; Thomas Byard, Boonton; Horace Ford, Boonton; Gilbert D. Crane, Clerk, Boonton; Joseph Steventon, Assessor and Health Inspector.

As the most part of the township is within the corporate limits of the City of Boonton, the clerk of which has already reported to you, and the general health being very good, with no changes in any of the scheduled facts from last year's report, I refer to it for all particulars.

(Signed) JOSEPH STEVENTON,
Assessor.

CHATHAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. M. Tunis, Chairman, Afton; B. W. Burnet, Madison; Dayton Baldwin, New Providence; Edward P. Miller, Secretary, Chatham.

Population about 3,000.

Location and climate about the same as last year.

Mostly from springs, cisterns and wells.

There is no system of drainage.

Have streets, but no public grounds.

Houses are mostly owned by occupants; a few are rented.

Refuse and garbage buried in the ground.

Five markets.

Have had no contagious diseases.

There are four slaughter-houses and they are kept clean.

We have all kinds of trades, and manufactories for making paper, sash, doors, brooms, bricks, wagons and carriages, etc.

This township is well supplied with public and private schools.

Have no poor-house in this township, but have a share in county poor-house. The people are all very charitable.

Have seven special police appointed by the township committee. There is no lock-up.

Four cemeteries and burial places.

Some have steam, but mostly all furnaces and stoves.

Have had no prevalent disease to speak of this year.

CHESTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Kelsey, Chester; R. C. Carlile, Chester; C. H. Ming, Chester; W. E.

Young, Chester; W. A. Green, M. D., Chester. W. A. Green, M. D., Health Inspector.

During the months of December, 1888 and January, 1889, we had several cases of diptheria, two of which were of unusual severity, and resulted in death.

During the winter of 1888 and 1889, we had a great many cases of pertussis; there were but few bronchial complications, however, and no deaths.

In the early spring of 1889, we had more cases of pneumonia than we usually have at that time of the year, and quite a number of them of unusul severity; no deaths, however, so far as I know, resulted from it.

In April and May we had some dozen or fifteen cases of scarlatina-simplex, but only one proved fatal, and that was a child poorly fed and illy cared for.

The excessive rainfall during the past season filled the wells, springs, and streams with surface water impregnated with poison, in consequence of which, together with the heat, we had an unusual number of cases of dysentery, but all recovered. Typhoid fever here is very infrequent. In the month of August we had two cases in the village, both of them young ladies, thirty years of age, and both of them proved fatal.

Malarial troubles have been less frequent this year than for several years past. Upon the whole, we have had more sickness here during the past year than for several years last past.

No diseases have been reported of animals.

I require all contagious diseases to be reported to me, and then I enforce a strict quarantine, thereby preventing their spread.

(Signed) W. A. GREEN, M. D.

HANOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. P. Cooper, M. D., Troy Hill; George Bates, Parsippany; Marcus Dixon, Pine Brook; Walter Mitchell, Whippany.

The water supply is mostly wells and springs, the part lying in Boonton park depends on cisterns.

There is but little drainage except natural.

The cellars are I think, very dry. There are few houses with basements, the cellars are mostly all used for storing vegetables.

I know of no houses with more than two families.

The assessor does not inquire as to the loss of animals, if there is anything unusual we hear of it.

I do not think the slaughter houses are inspected.

The whole eastern edge of the township is bounded by meadows and large meadows through the eastern part of it. The last 3 years they have been under water half of the time, but they claim Rockaway neck and Hanover neck are the most healthy places in the State, we very seldom hear of a case of chills. There has been none in this part in 20 years.

The camp ground at Mount Tabor is in this township. The water supply is from a spring forced to the top of the hill.

(Signed) Jos. H. BASTEDO,
Assessor.

JEFFERSON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jacob Tallman, Chairman, Oak Ridge; Albert J. Fitman, Woodport; Charles Jennings, Milton; Stephen A. Lindsley, Milton.

The year ending October 1st, 1889, has been with us remarkably healthy. We have very few changes to report.

Water supply is from wells and springs. It is soft, except in the vicinity of iron mines, where it is hard. It is not bad at any time. No families use cistern water for drinking purposes.

No public system of drainage or sewerage; the surface drainage being all that is required. Cellars are dry. Some swamps, but the rainfall for the past year having been so great they have remained filled, consequently no evil results from them.

Most houses have cellars largely used for storage of vegetables in winter. No houses with more than two families.

No sewers used. No cesspools. Common privies without vault; contents in some cases used for fertilizers.

No prevalent diseases this year.

No slaughter houses in the township.

No manufactories.

Schools in good condition and well attended. No other public buildings unless churches are considered as such.

No alms-houses.

The law is strictly enforced in regard to the burial of the dead. There are four burying-grounds in the township.

We have no special public health laws and regulations.

Returns of vital statistics are sent in.

We have no plan for dealing with contagious diseases.

Most of the houses are heated with stoves, burning coal or wood. A few are heated with steam.

No prevalent diseases this year.

There is a vacancy in our Board of Health, caused by the death of Dr. Leonard Bright, our township physician. His place is supplied as a physician by Dr. Sylvester Utter, who has recently moved into the township. His address is Woodport.

(Signed) ALBERT J. FITMAN,
Assessor.

MENDHAM TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. John S. Stiger, Mendham: Marcus Robinson, Mendham; Joseph Campbell, Mendham; M. M. Connett, Brookside.

In regard to the general health of Mendham township. It is thickly populated and the health is generally good.

(Signed) JNO. R. NESBITT, JR.,
Assessor.

MONTVILLE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Husk, Jr., Montville; Walter A. Young, Pine Brook; Garrett B. Jacobus, Glen View; Asa T. Cook, Assessor.

MORRIS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thos. F. Clifford, Assessor, Morris; John Denmar, William H. Mesler, Edgar L. Durling, Township Committee, Morris.

City of Morristown is supplied by "the Morris acqueduct" water. In parts of this city wells and cisterns are used.

No drainage and sewerage.

In the city there are several large tenant-houses. Most of the houses have cellars they are usually dry.

Excreta and refuse is removed by a odorless excavator conducted by a private enterprise.

None of any consequence.

Public health has been good.

Several cases of diptheria also several cases of scarlet fever.

(Signed) THOS. F. CLIFFORD,
Assessor.

MOUNT OLIVE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George A. Smith, President, Drakestown; Samuel S. Wills, Treasurer, Stanhope; Nelson Salmon, Flanders; Dr. D. W. Crawford, Flanders; Enos G. Budd, Assessor and Health Inspector, Budd's Lake.

Refuse and excreta used upon the lands by farmers and others.

No diseased animals as yet reported; inquiry made.

Slaughter-houses kept without complaint.

Sanitary expenses in compliance with the laws.

Health of the township generally good.

Our Board can be called by our recorder, who is instructed to take special notice as sanitary inspector, and act thereon as may be deemed necessary according to exigencies.

(Signed) G. A. SMITH,
President.
EMOS E. BUDD,
Recorder.

PEQUANNOCK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. H. Beam, Assessor, Pompton Plains; R. T. Budd, Chairman, Mountain View; Samuel DeMott, Treasurer, Pompton Plains; F. L. Leis, Butler; H. V. Day, M. D., Bloomingdale.

Our township has been very healthy for the most part the past year, considering the wet season. Some few complaints of nuisance at Butler were made, which were removed on notice by one of the members of the local Board of Health.

Slaughter houses are kept very clean by the owners themselves, no stench whatever from them.

(Signed) WM. H. BEAM,
Assessor.

RANDOLPH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

There has been no organization of Board of Health in this township to my knowledge.

D. S. ALLEN,
Assessor.

ROCKAWAY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James B. Tonking, Mount Hope; Edward Fox, Rockaway; Agustus Munson, Hibernia; John A. Fichter, Assessor, Rockaway.

Water supply is from wells and cisterns exclusively, very few depend entirely on cisterns.

No system of drainage distinct from sewerage. Neither is there a system of sewerage in any part of the township. The usual water level, with very few exceptions, is such as to secure dry cellars. There are, of course, in the township a number of swamps, not very great in extent.

Houses generally have cellars, used in the ordinary way for storing winter supply of vegetables, fruits, etc. Only a few have basements which are occupied. Houses generally occupied by only

one family, except among mining districts, where tenement houses are occupied by two families and sometimes three families. In the township there are about one hundred and fifty tenement houses occupied by two families.

The cesspools are nearly all built with open bottom and sides. There is no system for the disposal of refuse and excreta, except what is used by the farmers as manure.

There is no prevailing disease nor has there been any for the past year among animals.

There are five slaughter houses in the township of which no complaints have been made. Their sanitary condition is as good as could be expected.

The following is a list of new factories: The City Knitting Mills which employs about forty adults and children under sixteen years, (of both sexes) and the Rockaway Manufactoring Company which employ about thirty persons mainly male adults. These buildings are both well ventilated and are heated by steam. Both also are well supplied with proper out-houses.

There are ten school houses all in good condition, four of them being heated by steam and the rest by coal and wood. Said buildings are occupied for school purposes ten months a year. There has been a new Town hall built in the town of Rockaway within the past year and a half. The principal use of which is election purposes and township business.

There is a room in the Town hall used as a prison cell. There is a detective agency in the township who have their headquarters in said Town hall.

For heat, wood, coal and steam. For ventilation, doors and windows.

An epidemic of diphtheria is now prevalent at Hibernia. It began early in the summer and still continues, but not to so great an extent as at its inception. The rate of mortality was high, some families loosing from one to three.

There are no markets in the township, no prevalent diseases among cattle, no almshouses nor hospitals, no police nor prisons, no fire guards, no public health laws and regulations, no quarantine or care over contagious diseases and vaccination, no sanitary or physician fund.

A record is kept of marriages, births and deaths in a book kept for that purpose.

(Signed) JOHN A. FICHTER,
Assessor.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. M. Stephens, German Valley; E. C. Willet, M. D., German Valley; Philip Schuylor, Parker; W. N. Swackhamer, Middle Valley; Henry Wiley, Drakestown.

There is no prevalent disease to be reported and no complaints have been made to the Board during the last year. Other things same as previous reports.

F. M. STEPHENS,
Assessor.

OCEAN COUNTY.

BERKELEY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cornelius Lawrence, Bayville; Thomas J. Harvey, Bayville; Frank Wilsey. Tom's River; Henry Williams, Assessor, Bayville; Divine Butler, Town Clerk, Bayville.

BAY HEAD.

Has no organized Board of Health.

Bay Head is situated on the coast at head of Barnegat Bay. Population in summer, 800; in winter, 100.

Soil sandy, beach and about one-quarter mile to W. Pine and cedar growth, also swamp.

The water supply is from an artesian well 765 feet in depth, and very pure at all times of the year. Our citizens are all supplied with it through tar-coated iron pipes and mains.

Some cesspools are open and others cemented, all being cleaned once every two or three weeks. As our water supply is artesian we have no unhealthy effects from our drainage system, which is the best. Our place being a level plain, no malaria or fevers; place perfectly healthy, and considered one of the finest seaside situations along the New Jersey coast.

Streets graded with good clay and kept in good order and repair. No debris or nuisances being allowed upon same.

Kerosene and lamps in general use.

Garbage carted away every night. Closets are looked after every evening, as we use the pail system.

No slaughter houses.

Fine school. Just built and in good running order. The only other public buildings are two very nice churches, one Presbyterian, the other Episcopalian, also a large amusement hall, together with a borough hall.

(Signed) WILLIAM R. GULICK,
Assessor.

EAGLESWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samnel Ashurst, M. D., Beach Haven; John F. Jones, West Creek; Clara Seamen, West Creek; Joseph P. Haywood, Chairman, Health Board. Samuel P. Cranmer, Health Inspector.

As to the health of Eagleswood township, it is good. No contagious diseases.

Water supplied by wells; water generally good.

Drainage natural.

No complaints as to nuisances.

(Signed) S. P. CRANMER,
Assessor.

JACKSON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEATLH INSPECTOR.

Joseph T. Clayton, Jackson's Mlll; Joseph R. Brown, Cassville; John W. Jamison, Cassville. C. M. Thorne, Assessor.

LACY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Thomas Vanarsdale, Cedar Creek; Garrett Stout, Cedar Creek; Frank Matthews, Forked River. C. B. Weeks, Health Inspector.

There is nothing of importance to report this year. We have had no unusual amount of sickness, no epidemics, no change in drainage or water supply.

(Signed) C. B. WEEKS, M. D.
Inspector.

LAVALLETTE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George Kerr, M. D., University of Pennsylvania, 1864, and Mayor of the borough. No Board of Health.

On the Atlantic coast, sixteen miles below Asbury Park.
Lowland. Sandy soil.
The water supply is from driven wells.
Streets are marked out but not graded.
No drainage system, except good natural drainage. No swamps.
Houses occupied mostly during the summer.
Cemented cesspools. Emptied when necessary.

(Signed) GEORGE KERR, M. D.
Health Inspector.

MANCHESTER TOWNSHIP.

NAME AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Irwin W. Kirk, M. D., Manchester; Chas. P. Heavalind, Michael McCallion, Wm. Montgomery, committee, Manchester. C. F. Pearce, Assessor.

Water supply from open wells and driven pumps. Its nature is clear and soft.

Drainage chiefly by ditches and natural streams, land generally high as to secure dry cellars, swamps near but streams of pure water running through them, malaria not frequent.

Streets and public grounds kept clean.

Houses in fair condition with mainly but one tenant to each.

By kerosene lamps.

Cesspools rare, except the old style of common built water closets.

Ordinary stores and meat shops.

Animal diseases rare, meat shops supplied from foreign markets.

No manufactories, mainly carpenters.

Good schools, buildings and public houses kept in good condition.

Cemeteries and burial grounds properly looked after.

Public health good.

Vaccination too slightly looked after.

(Signed) C. F. PEARCE,
Assessor.

PLUMSTEAD.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Aaron S. Branson, Assessor, New Egypt; E. A. Horner, New Egypt; W. Scott Rafey, New Egypt; Walter Cottrell, New Egypt; W. T. MacMillan, M.D., Health Inspector.

This township has been remarkably free from all forms of contagious diseases the past year.

(Signed) W. T. MACMILLAN, M. D.,
Health Inspector.

STAFFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Stacy G. Hazelton, Manahawken; Lewis A. Cranmer, Cedar Run; John Letts, Manahawken; Chas. H. Cranmer, Manahawken. P. K. Hilliard, M. D., Health Inspector.

Located on the coast line, in the southeast portion of Ocean county. Population, about 1,100. Face of country, rolling.

Water supply good, both by wells and springs.

Drainage, good. No public sewerage.

Schools good; school-houses and churches built with the modern improvements.

Climate variable. Surroundings about the same as is usual in common country villages.

Have had no epidemics and very little sickness during the past year.

(Signed) P. K. HILLIARD, M. D.,
Inspector.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. Edward Bennet, Barnegat; Joseph Pharo, Barnegat; John Predmore, Jr. Barnegat; Asa Cranmer, Barnegat; L. G. Mitchell, Barnegat.

Have nothing interesting since last year. The general health of the township has been excellent. Very few deaths and no prevalent disease.

(Signed) L. G. MITCHELL,
Assessor.

PASSAIC COUNTY.

LITTLE FALLS TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Elias Van Ness, Little Falls; Squires Radcliffe, Little Falls; Eugene Shire, Little Falls; James DeMouth, Little Falls. Mark Van Winkle, M. D., Health Inspector.

Water supply mostly wells, medium hard, generally good. Comparatively few use cisterns.

No system of drainage. Some of the township naturally drained. Centre of village least drained of all. Numbers of cellars in immediate village damp and wet; rest of township comparatively dry. Malaria not as frequent as usual.

Generally cellars. A small percentage used for vegetables Very few of more than two families, probably four to six.

No sewers. Cesspools, some cemented but generally open; allowed to empty by soakage in the ground and on the ground.

Water closets in yards mostly cleaned and used for fertilizers on farms in vicinity.

No prevalent diseases this year. No known contagious diseases of animals.

There are no new manufactories in the township. Beatty Manufacturing Company being the only one of any prominence, employing from 300 to 350 hands in the carpet trade.

There are three public schools in township. The one in the village is in two departments, primary and senior, and would say that the people have been getting a new heater in this school, hoping to have the school in better coudition for the children than formerly. But would also say that the cellar is not properly drained and is damp and musty. Would also state that the water closets for this school are in a filthy condition, especially the boys'.

There are two or three very small and almost disused burial spots in township. Burials nearly all outside of township.

The local health board was continued this spring, and a code for the protection of the health of the people was acted upon, consisting of four sections and printed according to law, with penalty attached.

No regular registration except what Assessor does in his work with vital statistics, which he has done promptly so far as known.

The District Clerk in the work of census taking looks after vaccination of children, whether it has been done. One school closed last spring short time on account of sore throat and scarlet fever, but was soon continued, the danger being passed.

Expenses for sanitary work so far paid out of general fund of township taxes.

Buildings mostly heated by stoves, a few having heaters in the cellars. Ventilation generally good.

There have been but few deaths in proportion to population in the township this year. Three of the same disease being the most of one kind.

MARK VAN WINKLE,
Health Inspector.

MANCHESTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Doras W. Warren, Jr., Hawthorn; John W. Campbell, Paterson; Richard E. Doremus, Paterson; Dr. S. C. Townsend, Paterson; Wm. D. Berdan, Secretary. S. Cyrus Townsend, M. D., Health Inspector.

Water from wells, springs, and cisterns.

There is no system other than natural drainage.

No public grounds in township.

Very few houses with basements. All have cellars, used mostly for storage of vegetables. In making the assessment last June I found six or seven houses with more than two families. The Robertson Silk Company have built four very large houses, capable of accommodating eight families in each house.

Since making my report last year Mr. Wm. Bushman has built a large silk mill and six fine dwelling-houses; each house is built for two families.

Some twenty-five or thirty dwelling-houses have been built in the township the past year. We have macadamized between four and five miles of the roads of the township. As to tenancy, some are neat and very precise, others are careless and slovenly. There were several complaints made to the Board of Health last June of full and foul privy vaults and cesspools. The Board ordered an inspection from house-to-house in the village of Haledon, and thirty were notified to have their privies or cesspools, as the case happened to be, cleaned, and the majority complied with the notice, in fact, all but two or three. We had to complain of these and they were fined, and have given no further trouble.

The most of the cesspools are with open bottoms and sides, and emptied in various ways.

The assessor inquires each year as to losses of animals.

No slaughter houses in the township.

No new manufactories other than silk weaving.

There are five school houses and five public schools in the township; school buildings are good. There is one church and one public hall in the rownship.

There is one Roman Catholic Orphan Asylum for girls in the township.

No police other than three constables; no prisons.

No protection against fire.

There are four cemeteries in the township, one Catholic, one Jewish and Laurel Grove cemetry. Burials are conducted according to law.

We have a code of laws for the health of inhabitants of township.

Nothing to report.

We as a Health Board are as careful as we know how, in relation to the health of the people of the township. Have had no contagious diseases to any extent neither have we had any prevalent sickness the past year.

Dwellings are heated with furnaces and stoves, the greater part with stoves, ventilation from doors and windows.

There have been six cases of scarlet fever reported, no diptheria, no typhoid fever, the health of the inhabitants have been good the past year.

(Signed) WILLIAM D. BERDAN,
Secretary.

PASSAIC CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. F. H. Rice, President, Passaic; Joseph Adams, Secretary, Passaic; Daniel Demarest, Passaic; Levi Aldous, Passaic; Michael King, Passaic. William Hendry, Health Inspector.

The water is supplied by the Weasel Brook and is supplied by the Acquackanonk Water Company, about half of the houses of the city take it. It is discolored a little sometimes, it has an iron taste and is hard. It is bad sometimes in the summer. The pipes are cleaned and the source from which it is taken, does not to our knowledge receive any sewerage above the point of supply. About one quarter depend on wells and about one-quarter on cisterns.

The system of drainage is by surface, but there is a sewer now in construction. The level in some parts in not such as to secure dry cellars.

The main streets of the city are macadamized, while the rest are good hard roads. We have no public parks or grounds.

The majority of the houses are frame ones and are occupied by from one to seven families. The majority of houses have cellars.

The cesspools are not cemented but have open bottoms and sides and are emptied by sanitary companies.

There have been no prevalent diseases among animals to our knowledge.

The slaughter houses are inspected so as not to be a nuisance.

We have in this city five public schools and two private schools. We have a City Hall and a Public Library.

We have one almshouse, one Home and Orphan Asylum and no hospitals.

Several of our mills and houses have fire escapes and an officer has been appointed to see that all have such.

We have two cemeteries in this city, which are very well seen to.

The health laws are enforced by a Health Inspector.

There is a register of vital statistics.

Contagious diseases and vaccination are seen to by the city physician.

The sanitary expenses are not high.

The majority of dwellings are heated by stoves, and seem to be well ventilated.

The prevalent diseases are malaria in summer and diphtheria at times.

(Signed) WILLIAM HENDRY,
Health Inspector.

PATERSON.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Theodore G. Kinne, M. D , President, Paterson; Cyrus W. Baldwin, Paterson; James Mills, Paterson; Frank E. Agnew, M. D., Paterson; B. C. Maginnis, M. D., Paterson; P. A. Harris, M. D., Paterson; John L. Seal, M. D., Health Inspector.

Water is taken from Passaic river, just above Passaic Falls, and within city limits. Furnished by a private company. In the city there are about 9,200 buildings in which water is used. Of this number about 5,500 are supplied with city water. The rest depend upon wells and cisterns. Water is sometimes discolored after heavy rains. No iron taste; soft; but bad at any season of the year. No regular season for cleaning reservoir or pipes; only done as occa-

sion requires. The river above the intake receives surface drainage of small section of city.

Refuse and excreta are disposed of by means of sewers and cesspools, and mixed with the ashes and dumped upon low and swampy ground. The city is building sewers very rapidly, and the Board of Health is forcing property owners to connect premises and outhouses with them. Over 500 connections have been made the last year. This work will be prosecuted vigorously in the future, until all privies and cesspools on sewered streets shall be abolished. All cesspools built since the organization of the Board of Health have cemented sides and bottoms, and are cleaned by licensed scavengers with odorless apparatus. We are now agitating the question of burning the garbage, and we hope by next summer to have some system of cremation in operation. The present system of its disposal, mixed with the ashes and dumped anywhere in the city where it is not positively forbidden, is the greatest sanitary fault of our city to-day. Markets are daily inspected.

During last year three horses suffering with glanders have been destroyed by order of this board. We have a register of all persons keeping cows within the city, which they can only do by permit from this board. Pigs we do not allow in city.

The public schools are in a bad sanitary condition, in so far as relates to ventilation. This matter was taken up by the Board of Health during last winter with the result that the Board of Education resolved to better ventilate the four worst schools during the present year. One of them is all completed and in good working order.

A new police station has been built and is in good sanitary condition.

The Board is about to ask the Court of Chancery for relief in the cemetery cases.

On the first of this month a new plumbing and building code went into effect. A plumbing and building inspector was appointed to act under the direction of the Health Inspector. The plumbing code was based upon the model recommended by the State Board of Health. We consider it the greatest step in advance since the adoption of our present sanitary code. Under it we have complete control of all plumbing work done, and under the building section

we control the construction of all tenements and public buildings of every description.

The placard system is continued in cases of scarlet fever, diphtheria and small-pox, united with a personal supervision of these cases by officers of the board. We also require all premises in which these diseases may have existed to be fumigated and disinfected by the proper official of this board. Since the adoption of our present system the number of cases of scarlet fever and diphtheria has diminished about seventy per cent.

Our appropriation is $3,500 annually, and hereafter in fees under the plumber and building ordinance we expect to receive about $1,500 more.

During the last year we have had more than our usual number of deaths from pertussis, diarrhœal diseases, and pulmonary diseases. At the present time typhoid fever is very prevalent, more so than in some years, but of a mild type.

(Signed) J. L. SEAL, M. D.,
Medical Inspector.

POMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

D. A. Wheeler, Erskine; Martin Drew, Midvale; John F. Sisco, Bloomingdale; Lemuel Van Ness, Pompton.

(Signed) MARTIN DREW,
Chairman.

WAYNE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

G. G. Jeffries, Chairman, Mountain View; David F. Duncan, Paterson; Peter J. Doremus, Paterson; James D. Berdan, Secretary, Paterson.

The water of Wayne township is supplied by well, and is very good.

There is no drainage except low grounds, which are ditched. The cellars are generally dry. There are no sewers.

We have no public grounds.

The houses generally have cellars, which are used for the storage of vegetables. There are no houses with more than two families.

There are no sewers or cesspools.

There have been no prevalent diseases during the year. The assessor does not inquire as to losses of animals and contagious diseases.

The slaughter-houses are kept in good condition, and we have heard no complaints.

We have five school-houses that are in good condition. There are two churches.

We have no almshouse or hospitals.

We have no fire-guards or escapes.

There is one public cemetery and several private ones.

We have no public health laws or regulations.

We keep a record of births, marriages, and deaths.

We have no quarantine or care over contagious diseases.

We have no sanitary expenses.

The dwellings are heated by coal or wood fires, and ventilated by doors and windows.

There have been no prevalent diseases during the year.

(Signed) JAMES D. BERDAN,
Secretary.

WEST MILFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joseph Henion, Echo Lake; Oscar F. Smith, West Milford; David Vanderhoff, Newfoundland; Theodore Coursen, M. D.; Joseph H. Sehulster Assessor.

We have no prevalent disease to report.

SALEM COUNTY.

LOWER ALLOWAY'S CREEK

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John M. Pancoast, Hancock's Bridge; Dr. W. S. Smith, Hancock's Bridge; James Hood. Canton; F. B. Harris, M. D., Canton; Mark T. Hilliard, Assessor, Hancock's Bridge.

MANNINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

David S. Fogg, Chairman, Salem; D. M. C. Hinchman, Salem; Woodruff Pettit, Salem; Wm. H. Acton, Secretary, Salem.

OLDMANS TOWNSAIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel Stanley, Pedricktown; Frank Gaventa, Pedricktown; Jacob J. Hunt, Auburn; James B. Ware, Pedricktown; Harry Johnson, Pedricktown. Samuel G. Hartman, Assessor.

PENNSGROVE.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. David Moore, Pennsgrove; Sam'l. C. Springer, Pennsgrove; John M. Beirs, Pennsgrove; Albert Straughn, Pennsgrove; Samuel P. Ward, Inspector, Pennsgrove.

There are no prevalent disease and no sickness of any amount. Many of our cellars contain water, which is due to poor drainage.

AMOS MORRIS.
Secretary.

QUINTON TOWNSHIP.

John F. Anderson. Chairman; Wm. Potuck; John G. Fowser; Uz. Ayres; Wm. Good, M, D.

SALEM.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Zaccheus B. Sickler, Salem; Clinton Bowen, Salem; Robert D. Swain, Salem; Josiah Wistar, Salem. C. M. Shenon, City Physician. William Carney, Health Inspector.

Since the date of our last annual report the health of our city has been good. No epidemic diseases have prevailed.

Although our supply of drinking water continues the same as in former years, namely, from private wells, there have been but very few cases of typhoid fever as compared with the two previous years, although the rainfall for the present year has been almost unprecedented.

To remedy, in part at least, the unsatisfactory character of the water supplied to our citizens from Laurel Run (the public water supply) and which has been alluded to in former reports, it has been proposed to provide large filters, such as are used with good results in some cities; but as it would involve considerable expense nothing has as yet been done in that direction.

The introduction of water pipes into private dwellings and the increased number of bath rooms with water closets as an attendant, seems to demand a system of public sewers to effectually carry off the waste, so as not to endanger the health of the citizens; and the subject claiming the attention of our City Council, early in the summer a committee was appointed to ascertain what system was best adapted to this place (the surface being very flat and level) with the probable cost. This has resulted in having a line of sewers laid in one of our principal streets, and with which several house connections have already been made. The sewering of this street was probably hastened by the very unsatisfactory sanitary condition of the county prison, which is located on this street. The attention of this board having been called to the bad condition of the cesspools connected with this prison, we visited it, and after a thorough inspection, notified the Board of Chosen Freeholders that the evils must be remedied, which could only be done by constructing a sewer, through which the refuse could pass to the creek, so that a considerable portion of the expense of the above mentioned sewer was borne by the county. It is working satisfactorily so far, and we hope at no distant day, the whole city will be provided with sewers.

It is not designed to drain the surface or storm water through the sewers, and we have continued during the past summer, as heretofore, to have the street gutters flushed and thoroughly cleansed once or twice in each week.

As mentioned in former reports we have city ordinances regulating the construction and cleaning out of outhouses, which are but seldom constructed with deep vaults.

The only diseases among animals which we have to note, were some cases of splenic fever, which appeared in the summer or early autumn, among a small herd of cattle belonging to a dealer, and which had been purchased by him at the stock yards in Philadelphia. Three or four of them died; a post mortem examination of one of which was made by Dr. Miller, V. S., which fully revealed the character of the disease. The remaining animals were strictly quarantined for a suitable time, so the disease was prevented from spreading.

We have had no trouble with slaughter houses since their removal was effected to points more distant from the built up portions of the city.

The number of new manufactories remain about the same as at last report; and so far as known are not prejudicial to the public health.

The sanitary condition of our public buildings has been satisfactory, with the exceptions already voted; though complaints are made of the insufficient ventilation of the court room, to which the attention of the Board of Chosen Freeholders has been called.

The condition of the different cemeteries is much the same as previously noted, and is satisfactory: and the record of vital statistics has been actually kept by the City Recorder as provided by law.

There appearing to be some difficulty in draining the lots in a portion of the low lying districts of the city, the Board of Health had a large wooden drain constructed and laid on a line of the rear ends of the lots between two of the streets, so as to drain both sides. This has worked very satisfactorily, carrying the refuse into a ditch leading to the creek. This and the frequent cleansing of the street gutters, constitute the principal sanitary measures undertaken by the Board; the sewer already spoken of, having been laid under the direction of a committee appointed by City Council.

By Order of the Board of Health,

(Signed) JOSIAH WISTAR,
Secretary.

SOMERSET COUNTY.

BEDMINSTER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH OFFICERS.

Ralph Davenport, Chairman, Pluckemin; Erastus Randall, Bedminster; Wm. Logan, Peapack; John Auble, Secretary, Peapack; E. F. Farron, Physician, Peapack.

There has been but little sickness in our township during the past year. The Board of Health has not been called upon, and having travelled over the township and visited every house, I can say that I do not think it was necessary, except in one instance, when a pool of stagnant water was left standing some days near several dwellings, but the owner attended to it when his attention was called to it. The houses generally have cellars, and I think that they are too generally used for storing vegetables.

Our slaughter-houses are well kept, and not near enough to dwellings to cause annoyance.

There have been a number of cases of meningitis among horses in this township, nearly all of which proved fatal.

(Signed) JOHN AUBLE,
Secretary.

BRANCHBURG TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. N. Van Liew, Neshanic Station; Adonis Nelson, M. D., Neshanic Station; C. V. D. Corle, Assessor, Neshanic Station; Wm. H. Doliver, South Branch; Theo. Starner, North Branch.

The local Board of Health of Branchburg township is not, as yet, well organized. Too little interest is manifested by the Board as to the sanitary condition of the township. I think if each township had a health inspector appointed who, for a small recompense, was required to make a sanitary survey of the township about twice a year we would then be able to get a more correct knowledge regarding the sanitary status of the township and, thereby knowing where the defects existed, we would be able to do something toward correcting them. During the past year there has been less

sickness than usual in the township. We have been free from epidemics. There have been a few cases of whooping-cough and parotitis, but the cases were confined to two or three families and did not spread. Fewer cases of gastro-intestinal diseases have been reported during the summer than we have been used to having. One nuisance, in the shape of a pig-sty, was brought to the notice of the Board, which was immediately attended to and the evil corrected.

(Signed) C. V. D. CORLE,
Assessor.

BRIDGEWATER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. A. P. Hunt, Somerville; A. H. Brokaw, Somerville; James D thony, Raritan; B. F. Little, Bound Brook; Oliver P. Vosseller, Somerville.

Somerville and Raritan get water from the Raritan river; Bound Brook from a stream known as Chimney Rock stream or brook.

No public sewers, all private. Most of the cellars have good drainage. No swamps near to cause any malaria of any amount.

Some houses have basements. All, or most of them, have cellars. All used to store vegetables for their use. Do not know how many tenement houses have more than two families.

Do not know how far sewers are used. Cesspools are mostly bricked up on the sides, and bottoms left open. Emptied by being carted away.

(Signed) O. P. VOSSELLER,
Secretary.

FRANKLIN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Peter W. Garretson, Weston; Joseph Christopher, East Millstone; L. J. Snydam, Franklin Park; P. Eugene Nevius, East Millstone.

The Board has not been called upon to act in any case during the year. We have no special report to make.

(Signed) P. EUGENE NEVIUS,
Secretary.

HILLSBOROUGH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Peter Sutphen, Chairman, Hillsborough P. O.; George Miller, Somerville; Adam Hummer, Assessor, Millstone; W. H. Merrell, M. D., Secretary, South Branch.

There being no towns or large villages in our township there is little of interest to note. Health has been good during the past year; there has been no epidemic. The Board was once called upon to abate a nuisance resulting from a badly-kept hotel privy.

(Signed) W. H. MERRELL,
Secretary.

MONTGOMERY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Cornelius B. Cruser, Chairman, Plainville; Thomas Skillman, Skillman; Isaac Williamson, Rocky Hill; A. B. Mosher, M. D., Griggstown; William Oppie, Assessor, Harlingen. William Oppie, Secretary.

The Board of Health has nothing in particular to report this year. We have not been called out since my last report. The general health of the township has been good and no epidemic has occurred.

(Signed) WILLIAM OPPIE,
Secretary.

WARREN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Joel Codington, Martinville; Peter J. Zegio, M, D., Warrenville; J. J. Lang, Warrenville, Peter Bower, Warrenville, John D. Bornmann, Warrenville, Committee. Joel Codington, Health Inspector.

Our township is a hilly farming district, generally healtvery hy, there being no contagious diseases. Refuse matter disposed of as is general among farmers. General health has been good.

(Signed) JOEL CODINGTON,
Health Inspector.

SUSSEX COUNTY.

ANDOVER TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George O. Young, Andover; Joseph P. Longcor, Andover; Levi N. Space, Newton; G. C. Cook, Assessor, Andover; J. C. Clark, M. D., Andover.

BYRAM TOWNSHIP.

NAMES AND POST OFFICE ADRESS OF MEMBERS AND HEALTH INSPECTOR.

Samuel T. Smith, Chairman, Waterloo; Daton Lawrence. Stanhope; David Stone, Andover; Dr C. K. Davison, Inspector, Stanhope; D. W. Goble, Assessor, Andover.

Water supply from wells and springs mostly impregnated with iron.

Drainage natural and rapid.

Roads good for mountain districts.

Houses generally have basements which are stored with vegetables and but very few with two families.

Very few cesspools and those are made with cobble stones; no sewers.

We had three cases of scarlet fever. The family came here from Morris county and were sick with the fever when they came hear and our township physician took prompt measures and confined them to the one house until they all recovered and moved away; no other cases and no prevalent diseases this year; no diseases of animals.

Slaughter houses kept clean and neat.

No factories but two blast furnaces.

No prevalent diseases only those noted above.

Our local board do not keep a record as they should do, I have tried to induce them to keep such a record.

(Signed) DANIEL W. GABLE,
Assessor.

FRANKFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR

Oscar Northrop, Augusta; J. Cole Price, Branchville; Jacob A. Coursen, Rranchville; George Phillips, Assessor, Branchville; Dr. Joseph Hedges, Branchville.

GREEN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William C. Gray, Huntsburgh; David B. Stackhouse, Andover; G. Irving Lang, Tranquility; Daniel B. Stackhouse, Chairman.

HAMPTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEATH INSPECTOR.

Moses Ackerson, Assessor, Halsey; Theodore Harding, Newton; John S. Coursen, Newton; Andrew J. Williams, Pleasant Valley.

We have nothing to report.

(Signed) MOSES ACKERSON,
Assessor.

SPARTA TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Sidney S. Byram, Sparta; Joseph T. Dolan, Ogdensburgh; Charles H. Beatty, Sparta.

(Signed) JOHN MCMICKLE,
Assessor.

WALPACK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Philip S. Rosenkrans, Flatbrookville; John B. Fuller, Flatbrookville; Emmet H. Bell, Walpack Centre; J. W. Bunnell, Assessor, Walpack Centre.

Our water supply is derived from wells, springs and running streams, and has this year been more than abundant. Principally hard water of a limestone nature.

Drainage natural. Cellars dry. Very little swampy land. No sewers. No malaria.

Houses all have cellars, which are largely used in winter for storing vegetables.

No houses with more than one family.

No prevalent diseases of the year.

No loss of animals by contagious diseases.

No slaughter house in the township.

We have no regularly constituted Board of Health in the township, the town committee never have organized as such.

(Signed) J. W. BUNNELL,
Assessor.

WANTAGE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Jno. Coykendall, Deckertown; S. M. Parcell, Deckertown; Jacob Swartwont, Deckertown.

Our medical advisor has recently left town, and there has been none appointed, as yet, to take his place.

(Signed) N. HALL,
Assessor.

VERNON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Carlos Allen, Vernon P. O.; A. S. Blanchard, Assessor, Vernon P. O.; Nicholas Farber, Vernon P. O.; Stephen C. White, McAffee P. O.; Lewis Martin, Glenwood.

UNION COUNTY.

CLARK TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Chairman, Wm. H. Enders; Max Reifee, John A. Haliday; Medical Member, Dr. W. E. Cladek; Assessor, F. P. Bullman.

In the township of Clark there is nothing to report but what has already been reported in previous year.

No prevalent diseases. No complaints as to nuisances. Very little sickness, and that mostly chills and fever and Pneumonia. Ten births, twelve deaths.

(Signed) F. P. BULLMAN.
Assessor.

ELIZABETH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John W. Whelan, President (City Treasurer), Elizabeth; Wm. A. M. Mack, M. D., 36 Third street, Elizabeth; E. B. Grier, City Physician, 23 Broad street, Elizabeth; E. L. P. Coleman, Secretary, City Hall, Elizabeth; Wm. Birnie, Jr., 210 West Jersey street, Elizabeth; John C. Donahue, 28 First street, Elizabeth; E. G. Putnam, City Hall, Health Inspector.

Same as last year, excepting number of buildings supplied with water, which have increased to 3,372.

Gas, electricity, and napthuline.

Removed by scavengers to almshouse farm, outside city limits.

A few cases of glanders and pleuro-pneumonia.

Seven public schools and buildings, and one public high-school, occupying a fine brown-stone mansion, presented to the city by Mr. Joseph Battin, besides quite a large number of private schools.

Number of cases of contagious or infected diseases reported: diphtheria, 78; scarlet fever, 146; measles, 251; whooping-cough, 11; chickenpox, 6; varioloid, 1.

Quarantine as well as vaccination enforced on all public-school children.

Under the new scavenger system, viz., contract given to one party, the city has been much better served than in years past; still there are many complaints, but they are getting less every day. The subject of cleansing Elizabeth river is being agitated by the Board of Trade, but lack of funds is an obstacle yet to be overcome. The Board of Health have urged the necessity of sewers in several of the streets in the lower wards, but thus far have not succeeded, except in a few cases. Several applications are now before City Council, and have been referred to Sewer Committee, where they seem to remain inactive. In the absence of any public crematory

for garbage, (or any hope of having any), I am advising all to have a private one for themseves, which can be procured at small expense. Some will invest in them, and we hope they will be generally adopted.

(Signed) E. G. PUTNAM,
Health Inspector.

FANWOOD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Geo. Kyte, Scotch Plains; L. W. Miller, Scotch Plains; Wm. Terry, Plainfield; John Robson, Scotch Plains; F. W. Westcott, M. D., Scotch Plains.

LINDEN BOROUGH.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALLH INSPECTOR.

Alexander R. Corbet, Linden; Ferdinand Blancke, Linden; Edward Gulager, Linden; John A. Etheridge Linden; M. C. Lowdon, Linden. Victor Mravlag, M. D., Medical Advisor, Elizabeth. M. C. Lowden, Health Inspector.

The past year within the incorporate limits of the borough with two exceptions has been one of very fair conditions in a sanitary sense.

There have been very few cases of malaria. There were five cases of scarlet fever, three of which were fatal, the disease existing in two families, which by the prompt and energetic action of the parents in using the necessary disinfectants was kept from spreading.

There has been no disease of any kind existing among the cattle at the dairies.

(Signed) M. C. LOWDON,
Health Inspector.

LINDEN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John H. Metz. President, Tremble Point; William B. Marsh, Tremble Point; Thomas W. Leonard, Roselle; Phillip Shangle, Roselle; John F. Spinning,

Roselle ; Benjamin Tucker, Linden ; George A. Benwell, Linden ; William S. Rose, Linden ; Dr. Henry C. Pierson, M. D., Roselle.

PLAINFIELD CITY.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

George W. Rockfellow, President, Plainfield; Stephen A. Ginna, Plainfield; Lemuel W. Serrell, Plainfield; Geo. W. Endicott, M. D., Plainfield; Oliver B. Leonard, Plainfield, Secretary; M. Marvin Dunham, Health Inspector, Plainfield

The work of this Board the past twelve months has been directed in the line of precautionary action, endeavoring to prevent the existence of accustomed nuisances and thereby promote healthfulness by averting the causes of preventable disease.

The quiet and steady efforts of the Health Inspector in his constant examination of the sanitary condition of premises and his personal requisition for removal of all deleterious substances from houses and yards, have resulted in continued cleanliness and a fair degree of exemption from sickness. There have been five hundred and nine personal inspections from house to house, and one hundred and sixty-three notices served for the removal of nuisances. No epidemics have existed nor any prevalent disease, there having been reported on an average less than one case a week of sickness of a communicable character.

In the city there are 1980 dwelling houses. The corporate limits cover an area of 3,500 acres. More than half the population, about 6,000 people, occupy less than one-fourth of this territory, being the more thickly settled part of Plainfield. The dwellings are usually built with cellars, which are dry, and but few tenement houses exist for more than two families.

The garbage collections have been performed with only partial satisfaction, which the Board expect the coming year to greatly improve. An effort has been made to have occupants of houses provide suitable water tight receptacles for holding kitchen refuse, so as to keep it separate from ashes and rubbish. Housekeepers generally have not yet accustomed themselves to a systematic method of caring for these things that the sanitary code requires. But progress is being made in this direction.

Perhaps no more imperative duty manifests itself to the Board in its regard for the health of the citizens than the absolute necessity of watching strictly the condition of the numerous cesspools and privy vaults within our jurisdiction. The contents of these underground receptacles (which are usually built of stones loosely laid up with open bottom,) are cleaned out and removed by licensed scavengers only. The difficulty of a proper disposal of the emptying is a source of annoyance and dissatisfaction. During the year 796 cesspools and privy vaults have been emptied and cleaned. Especial attention has been given to these important matters for a two fold purpose; that of avoiding the excessive collection of such unhealthy substances which pollute the atmosphere and of preventing their contamination of drinking water in shallow wells near by.

In addition to a constant examination of these underground dangers, a close inspection has been kept of the surface nuisances such as ashes, rubbish, &c. A free use of disinfectants has been made in all cases, whether private refuse, heaps or public dumping grounds have been under consideration and treatment.

The water supply of Plainfield is entirely from wells, mostly tubular driven twenty-five to thirty-five feet in the subterranean gravel, and a few extending into the underlying rock. Occasionally open wells are used, but very seldom. Only four cases of impure drinking water, have been reported, the worst one a shallow well, having for its cause of contamination, the leakage of a street gas main. The effectual remedy was the sinking of the well tube about ten feet further. The City Council is considering the propriety of introducing an artificial supply of water. Plans and general specifications have been submitted by several competing engineers. Before the next annual report is made, it is expected a system of model water works will be in satisfactory operation in Plainfield.

The drainage of the city is altogether of a surface nature. The lay of the land is such that most of the rainfall is carried off by the street grades into Green Brook and Cedar Brook. Extravagant and erroneous reports were circulated this summer of the injury done to property in Plainfield by the heavy rains and giving way of dams in the vicinity. In nearly every instance the damage sustained, arose from people encroaching upon the natural bed of the brook or placing obstructions in the way of the swollen current of the stream. The two water courses have a sufficient descent to

carry off readily any amount of surface drainage, if property owners along their banks would refrain from narrowing the channels and otherwise restricting the natural flow of the water.

There are no sewers of any extent, one in New street, about 2100 feet long, assists in collecting surface water only from an area of several acres. Another in North avenue and Peace street, (1800 feet long) is the receptacle for sewerage matter as well as rainfall. Both discharge into Green Brook. The subject of public sewers for general purposes, has received considerable discussion and examination. A plan has been proposed, which seems the only feasible one for a level area like Plainfield, where there is no tide outlet. It is a dual system of purification of the sewerage and its intermittent filteration through properly graded and underdrained land allowing ihe effulent to pass off into Green Broek, within the city limits.

There has been a prompt and thorough return of vital statistics, the registration of which by the secretary shows for the twelve months ending October 1, 1880, the following recapitulation; marriages solemnized 98; births attended 214, (being 97 males and 117 females;) deaths occuring 185—being 59 of 5 years and under, 69 from 5 to 60 years and 57 of 60 years and over; still births 5.

(Signed) OLIVER B. LEONARD,
Secretary.

RAHWAY.

I have nothing new to report from our local Board this year. Our membership and officers are the same as last year.

(Signed) CHAS. H. LAMBERT,
Secretary.

SUMMIT TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Parker W. Page. Chairman, Summit; Dr. Wm. H. Risk, Physician, Summit; Stephen R. Mallen, Assessor, Summit; George Manley, Summit; John H. Pheasant, Summit. J. J. Lane, Health Inspector and Acting Secretary.

Water supplied by wells and cisterns of private owners. On January 1, 1890, expect to have water supplied by mains laid through town by the Commonwealth Water Company, of Newark.

Cesspools of private owners. Water is level. No swamps or malaria. No sewers.

Houses have cellars for storage of coal, wood, etc. Five tenement houses.

Cesspools are cemented, and emptied by public scavenger wagon for the purpose.

Slaughter houses are not permitted in township limits.

(Signed) J. H. LANE,
Health Inspector.

UNION TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

James B. Woodruff, Roselle, Union county; William A. Allen, Hilton, Essex county; John Leonard, Union, Union county; D. Hobart Sayre, Union. Union county.

Have the pleasure of reporting that in this township there has been less sickness this year than usual. The unusual rain fall has been annoying, and created fears of contamination from surface water polluting wells and other sources of water supply, but no sickness is known to have been caused thereby.

There has not been a single complaint brought to the notice of the Board of any nuisance, and but few notices of contagious diseases. Of the latter, none called for any action by the Board, as the parties interested took all proper precaution to prevent the spread of contagion.

(Signed) D. HOBART SAYRE,
Secretary.

WARREN COUNTY.

FRELINGHUYSEN.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

F. Rorback, M. D., Johnsonsburg; D. J. Howell, Johnsonsburg, D. C. Howell, Johnsonsburg, John V. Allen, Pauling, Township Committee; N. D. Vasbinder, Johnsonsburg, Assessor.

GREENWICH TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

William Shipman, President, Philipsburg; R. G. Stone, Stewartsville; R. I. Smith, Bloomsbury; Enos Beatty, M. D., Stewartsville. William Sherrer, Secretary.

Nothing special to report.

(Signed) WILLIAM SHERRER,
Secretary.

HACKETTSTOWN TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Dr. J. S. Cook, Hackettstown; Dr. Theo. Crane; Hackettstown; Dr. A. E. Martin. Hackettstown; Wm. M. Everett, Hackettstown; Wm. F. Shields, Hackettstown; Charles N. Wade, Hackettstown; Charles J. Reese, Hackettstown. J. M. Everett, Health Inspecter, Hackettstown.

We have a population of 3,500.

Our water supply is pure spring water, which rises on Schooley's mountain, and is brought to the town by pipe. Every one uses it as there are no wells. Last year it was thoroughly cleaned and repaired at an expense of $1,000. The reservoir is so arranged that no riley water comes through the pipe.

Have no sewers; all drainage is natural.

Our streets are good, yet we expect to have them repaired with crushed stone next year.

Have some stone and some brick houses; most of them are frame, 2½ stories high. A few of the tenement-houses have more than one family.

Our streets are lighted by electricity; also most of our stores, and all the churches.

Our markets are kept in good condition.

No disease of animals.

The slaughter-houses are kept cleaned.

Have a silk mill, which is running all the time, employing about forty worthy young folks. Sanitary condition good.

Schools are being repaired; cesspools being built, and a new boiler is being placed in position for heating purposes.

Have one policeman.

The seminary is the only building which has fire escapes.

Have had no prevalent disease this year.

(Signed) THOMAS NOLAN,
Town Clerk.

HARMONY TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Roderic Vannatta, Roxbury; J. W. DeWitt, Harmony; Robert Kinney, Harmony; A. K. Cole, Montana. J. D. DeWitt, Health Inspector, Harmony.

The water supply is from cisterns and springs.

The drainage is natural.

The houses generally have cellars, which are largely used for storage of vegetables.

Very few houses are occupied by more than one family.

There are no slaughter houses or manufactories.

The school houses, except one, are new and comfortable.

There are no almshouses or hospitals.

There are four cemeteries; all in good condition and well cared for.

We have had no contagious diseases. Some hooping cough, which has been epidemic in a mild form.

Vaccination is very much neglected.

No sanitary expenses.

Dwellings are heated by stoves, and lighted by kerosene oil.

(Signed) J. D. DEWITT, M. D.,
Health Inspector.

INDEPENDENCE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEATLH INSPECTOR.

W. J. Barker, Vienna; Andrew Seimanton, Vienna; Andrew J. Ayers, Hackettstown; John Merrell, Assessor, Danville.

There is no change in description of property or local affairs in this township for the year 1889.

The Board of Health have not been called together during the

year. There has not been any prevalent disease or epidemic in this township.

(Signed) JOHN MERRELL,
Assessor.

HOPE TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Miller, M. D., Secretary, Hope; Edgar C Howell, Hope; George G, Depue, Mount Hermon; John N. Parks, Hope; Alvin A. Van Horr, Assessor, Hope.

KNOWLTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. B. Moore, Columbia; Samuel Bogart, Delaware Station; Jeremiah Hiles, Knowlton; E. Dietrick, Columbia; Robert Bond, M. D., Knowlton.

Water supplied from well and springs principally. Some cistern water used. The water is mostly hard.

No regular system of drainage. The cellars of many of the houses are wet and unfitted for use. There are a few swamps, but malaria is not very frequent.

Houses generally have cellars,where vegetables are stored during the winter. No tenement houses.

Sewers not used. Cesspools built with open bottoms or sides.

Has been no epidemic among animals in the past year, at least I have heard of none. I presume the assessor makes the necessary inquiries.

There are no slaughter houses in the township.

Typhoid fever has been quite prevalent in this and adjoining township during the past summer. It has not been very violent in character, or fatal in termination.

(Signed) ROBERT BOND, M. D.,
Township Physician.

LOPATCONG TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Robert D. Melroy, Chairman, Phillipsburg; Edwin H. Paulus, Phillipsburg; George G. DeWitt, Phillipsburg; Jeremiah Yeisley, Secretary, Phillipsburg, P. O. Box, 439; Lewis D. Bieber, Physician, Phillipsburg.

There has been no change in the township since my last report as regards to its topography, drainage, etc. There have been no contagious diseases. No complaints have been made to the Board of any violation of the laws, and I think the people are beginning to appreciate the working of the health laws in their endeavors to conform with them. On the whole this past year has been one remarkable for freedom from disease of all kind, for which we are devoutly thankful.

(Signed) JEREMIAH YEISLEY,
Secretary.

MANSFIELD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

E. S. Apgar, Stephensburg; Nicholas Martenis, Port Murray; Robert M. Thomas, Port Murray ; James Beaty, Assessor, Stephensburg.

This township is supplied from springs and wells.

No drainage except natural.

No disease among animals.

One slaughter house kept clean and in good order.

Warren county poor farm is in township and from outward appearance is kept clean and in good order, by the steward, Mr. Hance. There has been no prevalent disease or epidemic during the year.

(Signed) JAMES BEATY,
Assessor.

OXFORD TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Lommason, Belvidere; John H. Hildebrandt, Belvidere; George A.

Wildrick, Oxford; Charles Wiseburn, Oxford; L. B. Hoagland, M. D., Oxford. No regularly appointed Health Inspector.

The water supply is mainly from wells and cisterns. Some parts of the town of Oxford furnished by water from mountain springs, by means of iron pipes. Water never discolored. Soft. No iron or peculiar taste. The same at all seasons of the year. No sewerage can possibly get into spring. About one-half of population of township depend on wells; one-fourth on cisterns, and remaining one-fourth on springs for water supply.

No regular system of drainage and sewerage. As a rule cellars are dry. Some parts of town of Oxford Furnace cellars are wet, especially houses owned by the Oxford I. and N. Co. These houses are many of them built on swampy ground.

About 400 or 500 acres of swamp land have been cleared and drained near the town of Oxford Furnace, but drainage is insufficient and about one-half of the area reclaimed is flooded with water during heavy rains, and as a consequence malaria is quite prevalent among us.

Houses generally have cellars. Only one family in a house, except in rare instances.

Have no sewers. Uncemented cesspools; generally a hole dug and walled up with loose stone. Generally not cleaned until too full for use then a new hole is dug and the house moved. Old hole then generally covered with dirt, after contents have been treated with lime, etc.

Have had no contagious diseases. All the doctors in the township agree that the past year has been the most healthy for many past.

(Signed) L. B. HOAGLAND, M. D.,
Secretary,
CHARLES WISIBURN,
Assessor.

PHILLIPSBURG.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Charles McClary, President, Phillipsburg; Dr. Brakely, Clerk, Phillipsburg; Dr. Jacoby, Town Physician, Phillipsburg; Isaac Miller, Phillipsburg; George

Flemmings, Phillipsburg; Wilson Carey, Phillipsburg. Samuel B. Burwell, Phillipsburg, Health Inspector.

Phillipsburg is situated on the banks of the Delaware river; population between 10,000 and 11,000; climate is temperate.

It is very hilly.

Water-works, supplied from a large spring, connected also with the Delaware river.

Good drainage; two sewers recently constructed.

The streets are in fair condition.

Tenant-houses are well kept up.

Gas and coal oil used.

No public markets.

Some hog cholera has existed.

Good police and two lockups.

Diptheria and scarlet fever have prevailed during the year.

(Signed) SAMUEL B. BURWELL,
Inspector.

POHATCONC TOWNIHIP

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

J. A. Boyer, Secretary, Finesville; Chas. Shaner, President, Springtown; Davies Frace, Shimers; Jacob S. Wider, Finesville; Nathan Case, M. D., Health Inspector.

Pohatcong township lies on the Musconnetcong and Delaware rivers, with Greenwich on its east and Lopatcong on its north. Climate is healthful. Population about 1,000.

Our water supply is from wells, cisterns, and springs.

No drainage.

No pnblic grounds.

Houses mostly frame, two and a half stories.

No markets.

No diseases among animals.

No slaughter-houses.

Two paper mills; four stores.

Four schools; two churches.

One cemetery.

No prevalent diseases during the past year.

(Signed) J. A. BOYER,
Secretary.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

Wm. M. Stiles, M. D., President, Washington; John Cushing, Secretary, Washington; John Hornbaker, Washington; Geo. Dawes, Washington; Geo. Campbell, Washington; Levi Bowlby, Washington. F. P. McKinstry, M. D., Health Inspector, Washington.

We have nothing of special interest to report in regard to the work of the Board of Health during the past year.

There has been no epidemic and very few cases of contagious diseases.

The Board has been instrumental in abating a number of minor nuisances.

Our citizens generally are disposed to aid the Board in its work and to comply with our demands.

(Signed) F. P. MCKINSTRY, M. D.
Assessor.

WASHINGTON TOWNSHIP.

NAMES AND POST OFFICE ADDRESS OF MEMBERS AND HEALTH INSPECTOR.

John Castner, Changewater; Peter Weller, Changewater; Wm. Apgar, Port Colden; Wm. Miller, Hampton, Inspector.

Washington township has not made any progress in the matter of water supply or drainage, having cisterns mainly as the water supply; drainage allowed to run on open ground or in an old barrel sunken in ground. Houses invarably have cellars. Very few basements. The cellars are very often used as storage for vegetables for winter supply. The past year has been unusually healthy,

free for the most part from usual prevailing diseases. One case of typhoid fever was reported about September 1st, have heard of no other up to date.

(Signed) WM. MILLER,
Secretary.

LAWS AND CIRCULARS.

LAWS OF 1889.

Chapter XV.—A Supplement to and act entitled "An act to establish in this State boards of health and a bureau of vital statistics, and to define their respective powers and duties," approved March thirty-first, one thousand eight hundred and eighty seven.

Chapter XXIV.—An act to protect the title of veterinary surgeons and to regulate the practice of veterinary medicine and surgery in New Jersey.

Chapter LIV.—A supplement to an act entitled "An act to provide for drainage and sewage in densely populated townships in which there is a public water supply," approved March fourth, one thousand eight hundred and eighty-four, and the various amendments thereto.

Chapter XCII.—A further Supplement to the act entitled "An act concerning marriages, births, and deaths," approved March twenty-seventh, one thousand eight hundred and seventy-four.

Chapter XCIII.—Supplement to an act entitled "Supplement to an act entitled 'An act to provide for drainage where the same is necessary to the public health,' approved March twenty-fourth, one thousand eight hundred and eighty-one," and which said supplement was approved April twenty-third, one thousand eight hundred and eighty-eight.

Chapter CXXV.—A Further Supplement to an act entitled "An act providing for sewerage in and by adjoining cities, towns, and townships," approved April twenty-first, one thousand eight hundred and eighty-seven.

Chapter CXLVIII.—An act to provide for street and sewerage improvements in the cities of this State, without increase of municipal indebtedness therefor.

Chapter CL.—A Supplement to an act entitled "An act to provide for sewerage and drainage by incorporated camp-meeting associations or seaside resorts," approved March fifth, one thousand eight hundred and seventy-eight.

Chapter CLXVI.—A Further Supplement to an act entitled "An act to regulate the practice of medicine and surgery," approved March twelfth, one thousand eight hundred and eighty, and the supplement thereto, approved March twenty-second, one thousand eight hundred and eighty-three.

Chapter CCXLV.—A Further Supplement to an act entitled "An act to authorize cities to construct sewers and drains and to provide for the payment of the costs thereof," approved March eighth, one thousand eight hundred and eighty-two.

Chapter CCLVI.—A Further Supplement to 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 thirty-first, one thousand eight hundred and eighty-seven.

Chapter CCLXVIII.—An Act to amend an act entitled "An act to authorize the incorporation of rural cemetery associations and regulate cemeteries" [Revision], approved April ninth, one thousand eight hundred and seventy-five.

Chapter CCLXIX.—An Amendment to an act entitled "An act to authorize the incorporation of rural cemetery associations and regulate cemeteries" [Revision], approved April ninth, one thousand eight hundred and seventy-five, and the supplement thereto,

approved March twenty-fifth, one thousand eight hundred and eighty-five.

LAWS GOVERNING BOARDS OF HEALTH.

The principal laws governing Boards of Health are to be found in Circular LX, Circular LXV and Circular LXVI of this Board. As usual we give a list of all laws passed by the last Legislature relating to subjects in any way collateral to the work of health boards. Two laws of especial importance were passed. The first is that of Chapter XV, Laws of 1889, and is as follows:

CHAPTER XV.

A Supplement to an act entitled "An act to establish in this State Boards of Health and a Bureau of Vital Statistics, and to define their respective powers and duties," approved March thirty first, one thousand eight hundred and eighty-seven.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That local boards of health in densely populated townships, in which there is a public water supply, shall, in addition to the powers enumerated in the act to which this is a supplement, have power to pass, alter or amend ordinances and make rules or regulations within their respective jurisdictions.

I. 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 said boards for inspection and approval, and to require all master and foreman plumbers and all building contractors to register their names and addresses at the office of said board.

II. To secure the sanitary condition of all buildings, public and private.

2. And be it enacted, That any such Board of Health may, by resolution, delegate any portion of its powers to any member of the board, or to any officer thereof, to be exercised only when the board is not in session, and any notice by any member of the board,

or by any officer thereof, shall be noticed by the board, and the person served therewith shall be bound thereby.

3. And be it enacted, That this act shall take effect immediately.

Approved February 25, 1889.

The next is chapter 256, laws of 1889, and reads thus:

CHAPTER CCLVI.

A Further Supplement to 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 thirty-first, one thousand eight hundred and eighty-seven.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That all local boards of health shall, in addition to the powers now vested in them, have power to pass or amend ordinances and rules within their respective jurisdictions; 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 for each vehicle or conveyance; to prohibit unlicensed persons from engaging in said business, and to require all vehicles and conveyances used in said business to be approved by the local board of health of the jurisdiction in which the same may be used.

2. And be it enacted, That each license granted under the provisions of the foregoing section shall continue for the term of one year from the date of granting the same; provided, that if any person licensed as aforesaid, or any of his employes, servant's or agents shall violate any ordinance or rule of said board in cleaning any cesspool or privy, or in removing the contents thereof, such license may, in the discretion of the board which granted the same, be revoked by said board.

3. And be it enacted, That all local boards of health, except township boards of health, which now have or may hereafter pass an ordinance or ordinances, udder the power now conferred by law, requiring that the plan of the plumbing or drainage system to be constructed in any building within their respective jurisdictions, shall be filed in the office of the board of health, shall have the power to charge a fee not exceeding two dollars, to be paid by the owner or other person filing said plan to the said board of health on filing said plan.

4. And be it enacted, That this act shall take effect immediately. Approved May 9, 1889.

The latter law is construed to include scavering in general but might be aided by a more explicit amendment. It can be said that we now have a legislative code of health laws as perfect as furnished by any other state of the Union. There may be need of occasional addition, but the chief duty is to protect the present system from careless amendment or unnecessary addition. This is all the more important because the constitutionality of most of the present laws has been affirmed by the higher courts.

LAWS RELATING TO HEALTH; OR, INCIDENTAL THERETO.

(Passed by the Legislature of 1889.)

An important law was passed by the last Legislature, regarding the marriage of Minors. It affords greater security to parents, and to those who perform the ceremony, and serves as a caution against hasty marriages. It is as follows:

CHAPTER XCII.

A Further Supplement to the act entitled "an act concerning marriages, births and deaths," approved March twenty-seventh, one thousand eight hundred and seventy-four.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the third section of the act to which this is a supplement be and the same is hereby amended to read as follows:

3. And be it enacted, That no justice of the peace, minister of the gospel, or other person having, or pretending to have, authority to join persons together in the holy bonds of matrimony, shall marry any male under the age of twenty-one years, or female under the age of eighteen years, unless the parent or parents, guardian or

guardians, or person or persons under whose care and government such minor or minors shall be, be present and give consent thereto. or until the minor applying to be married, whether male or female, shall have produced a certificate of consent, in writing, under the hand of the parent or parents, guardian or guardians, or if such minor so applying to be married have no parent or guardian, then under the hand of the person or persons under whose care and government he or she may at that time be, and if any certificate be produced as aforesaid, the same shall be proved to be genuine by the oath or affirmation of at least one person, of full age and discretion, who was present at the signing of the same, and affixed his or her name as a witness thereto, which oath or affirmation may be administered by any justice of the peace, minister of the gospel, or other person authorized to solemnize marriages as aforesaid, and shall be entered upon the back of said certificate of consent; and if the person called upon to solemnize any marriage shall suspect that any male applying to be married is under the age of twenty-one years, or that any female applying to be married is under the age of eighteen years, and no consent of the parent or parents, guardian or guardians, or person or persons under whose care and government such male or female may be, shall be obtained as hereinbefore directed, he shall administer to such male or female, or both, as the case may require, an oath or affirmation that such male is of the full age of twenty-one years, and that such female is of the full age of eighteen years, which oath or affirmation shall be entered upon the back of the certificate of marriage required by law to be made by the person solemnizing such marriage, and shall be his justification should the parties so married, or either of them, deceive him as to his or her age.

2. And be it enacted, That the fifth section of the act to which this is a supplement be and the same is hereby amended to read as follows:

5. And be it enacted, That every justice of the peace, minister of the gospel, or other person having, or pretending to have, authority to join persons in marriage, who shall marry any minor or minors by virtue of a certificate of consent had and proved as above directed, shall register the same, or cause it to be registered, in a book by him to be kept for the purpose of registering marriages, and shall attach the original certificate of consent to the certificate

of marriage by him required to be made, and shall transmit the same, with said certificate of marriage, to the officer to whom by law he is required to transmit the certificate of marriage, to the end that the same may be forwarded to and filed with the State bureau of vital statistics.

3. And be it enacted, That this act shall take effect on the first day of May, one thousand eight hundred and eighty-nine.

Approved April 1st, 1889.

The following list gives reference to all laws especially relating to Public Health or Incidental Hints, as passed by the Legislature of 1889:

Thus far LXX circulars have been issued by the board covering almost every subject of practical sanitary administration. Many of them had reference to some special period or service, and so have not needed report. In other cases two or three circulars have been combined into one with such addition as the progress of knowledge made necessary.

The circulars now kept on hand by the board for distribution are as follows:

Circular VII. As to the protection of bathers.
XIX. Schedules for institutional sanitary injury.
XXVII. As to sanitary instruction and training in schools (1).
XXVIII. Sanitary school circular (2).
XXIX. As to charitable and penal institutions.
XXX. As to sanitary survey and topography.
XXXVII. School and health circular (3).
XXXIX. To local Boards of Health (what they may do).
XL. Health of operatives (1).
XLI. Health counsels for working people (2).
XLII. As to petroleum, kerosene, etc.
XLIV. Prevention of small pox, scarlet fever, diphtheria, etc., as to vaccination.
XLV. Circular as to cholera.
XLVI. October circular with annual report blank.
XLVII. Prevention of serious injuries to the mind, the eyes, the ears.

Circular L. Combined circulars as to contagious diseases of animals.

LII. Plan of sanitary inspection of houses and premises.

LIII. Pure drinking water. How to secure it.

LV. October circular with annual report blank.

LVI. Sanitary inspection of school houses (inspection blank.)

LVII. To the physicians of the State, as to typhoid fever and diphtheria.

LIX. Laws relating to adulteration of foods and drugs and to petroleum.

LX. Health law of 1888 and references to other laws.

LXI. Care of household wastes.

LXII. Drainage for health.

LXIII. Farmers' homes and their perils.

LXIV. Disinfectants and how to use them.

LXV. Construction, plumbing, ventilation and sewerage of buildings (plumbing ordinances).

LXVI. Laws as to vital statistics (marriages, births and deaths).

LXVII. To funeral directors and all having in charge the care and burial of the dead.

LXVIII. To local boards of health (spring circular).

LXIX. Meat supply. How to guard it.

LXX. As to health laws, inspector, etc. (occasional health bulletin.)

The last three have been issued this year and are as follows:

CIRCULAR LXVIII.

OF THE

STATE BOARD OF HEALTH OF NEW JERSEY.

TO LOCAL BOARDS OF HEALTH.

It is both a privilege and a responsibility to be a member of a Local Board of Health; a privilege because it enables you to do

much to prevent disease, and a responsibility because we have the evidence that neglect on the part of local boards has often caused a greater prevalence of sickness and the spread of epidemics. We find now and then a board that sees nothing to do. And then, again, a board in a locality very similar that does do much in removing the causes of disease or in diminishing the number of cases that occur.

This State has plain, excellent and ample laws, giving large powers to Local Boards of Health for preventing or abating nuisances, and in other ways guarding and promoting the health of the people.

In Circular XXXIX we have indicated the many ways in which these Boards can be useful.

City, township and borough boards are formed in accord with the methods prescribed in the law as to such boards. Township boards consist of the township committee, the assessors and such physicians as may have been selected. While the township board can act without a medical member, it is always important to have one. If no one is chosen by the local board, the State Board generally exercises its right to place one upon it.

While the law by its terms forms the local board, it is best that it should organize as such and keep some record of its work. In our IX Report, page 283, is to be found a code of ordinances, which will serve as a model for these boards.

It is always best for townships to pass ordinances as to health, since then the people understand what is required, and it is easier at once to collect a fine for disobedience of an ordinance than it is to abate a nuisance and then collect the expense from the offending party. This board will give full information as to how to pass and carry out ordinances, or will send, without expense, a Health Inspector to give any needed directions.

Many of the townships, as well as the cities, need a Health Inspector, care being taken that he not only helps to abate evils to health, but to prevent them. In all villages there should be inspection of premises. An Inspector should always give a brief, written report of the visits he has made and of the work he has done. The law makes provision for his payment.

While the membership of a Board of Health is of the nature of that of a Board of School Trustees, it is proper that all expenses

and all extra services of any member of such boards should be paid for.

Experience is constantly illustrating how necessary such boards are and how their importance is recognized, especially in times of epidemic.

Each spring the Health Board should carefully consider any causes injurious or hazardous to health, and the need of examination as to the condition of houses or neighborhoods. We have cases where Assessors, interested in the public health and having informed themselves as to sanitary matters, have been of great service by their inquiries and advice as they go around to make their assessments.

In cities the boards need to be fully informed as to the existing evils, and to apply the law as to the inspection and plumbing of buildings.

Both in city and country great attention needs to be given as to cases of diptheria and typhoid fever, as well as to other communicable diseases. Prompt isolation of cases of diptheria, scarlet fever, etc., and intelligent inspection would do much to prevent the spread of these diseases in schools and families, and thereby prevent sickness and death.

We always send our reports to the Assessor for the use of the board, and are glad to send Circulars or Reports as far as we can to other members of the board.

Those who read the printed matter that is furnished will not be in doubt as to what is asked of them in proper guard of the public health.

Often much good is done by the distribution of the Circulars of this board among the people. We thus not only ask your aid in this good work of caring for the health of the people of your community, but commend it to you as a matter in which the State has placed you as overseers, in a position to be of great service.

EZRA M. HUNT, M. D.,

Secretary of State Board of Health of New Jersey.

We also reprint Circular LXIX as it has several changes.

CIRCULAR LXIX.

NEW JERSEY STATE BOARD OF HEALTH.

MEAT, POULTRY, GAME AND FISH AS FOODS, AND HOW TO JUDGE OF THEIR QUALITY.

The value of this class of foods is recognized by most, and it enters very largely into the dietary of the people. While believed to be indispensible for the best working life, there are many who use meat to excess. It is to be remembered that the same material is found in beans, peas and other vegetables, and that it is possible without it, in some form or other, to supply all necessary food.

So important an article of food, however, must be guarded as to its quality with the greatest care.

The slaughter of cattle, sheep and swine should be where there can be skilled inspection.

Public abbattoirs are of great service in this regard. Cities could easily have regulations and inspectors, so that no meat could be sold that had not been inspected at time of killing. Market inspection can not take the place of this. Yet markets need inspectors also, in order to secure the proper condition of meat at the time it is offered for sale.

Meat of poor quality or that is from diseased animals, even if it does not cause any disease, has a reduced food value. Sometimes it occasions fever, loss of appetite, diarrhœa, or skin eruptions and boils.

Of recent years the relations of animal and human diseases have been more fully established, and many are now recognized as communicable to mankind. About fifty human ailments are claimed to have, under possible circumstances, an animal source. In other cases the similarity is very marked. All such facts show that as we depend so largely upon flesh as a food supply, we should provide to secure a healthy quality of it. In visiting foreign abattoirs and markets we found, as a rule, much greater care exercised than in this State.

Dr. Francis Vacher, the medical officer of health for Birkenhead, opposite Liverpool, has been long identified with such inspection, and, as we know from personal visitation with him, has given great attention to the subject of meat supply. The rest of this circular will give, in condensed form and with slight changes and additions, the directions he has given as to the examination of Live Animals, Carcases, Meat, Fish, etc.

MEAT.

Good meat is firm and elastic to the touch, moist but not wet, and except in the case of pork, veal and lamb, bright red in color. It has also, if well-fed, a somewhat marbled appearance from small layers of fat in the muscles. It has a fresh, not disagreeable smell. To test this, an iron or wooden skewer should be thrust into the centre and rapidly withdrawn and smelt. The meat-juice should slightly redden litmus paper, showing that it is faintly acid. The fat should contain no watery juice or jelly, and should be free from blood stains; the suet fat should be hard and white. In salt meat the brine should not be sour.

CARCASES.

A sound, healthy carcase should be well-set as soon as it is thoroughly cool; it should also be well-bled, no part of it being purple, brown, or speckled. One side or quarter should not be darker than the rest. It should not be bruised, nor bile-stained, and not markedly attenuated. The muscle on being pressed with the fingers should not "pit," as this would indicate the presence of water, and should not "crackle," as this would indicate the presence of air.

In place where carcases are inspected the offal also (that is the head, feet, hide, and all the internal parts except the kidneys*) should be submitted for inspection. The mouth and tongue should be free from blisters and blotches, the hoofs should be firmly

*The head, feet, and skin of a pig form part of the carcase; the offal being only the internal parts, less the kidneys.

attached to the feet, the hide should be free from sores and pimples. The lungs should be of a bright pink color and spongy, free from cavities, pus (matter), or worms. A portion cut off should float in water. The heart should be free from bile-staining blotches. The liver should be of a rich brown color, should not break down easily under pressure, should be free from abscesses (collections of matter) and from flukes. The spleen or melt should be of a dark color inside, grey on the outside, thin and long, and sharp at the edges. The stomachs should not be inflamed, the lining should not readily rub off, and should not smell of drugs. The bowels should have a smooth, uninflamed lining, and should be free from blotches or ulcers (surface sores).

LIVE ANIMALS.

It will not often happen that a sanitary official is called upon to examine live animals. However, he may sometimes have to do so a short time previous to their slaughter. The animal should be well nourished, able to rise without difficulty and so walk without lameness. Its coat should be in good condition, its skin supple, and without sores, scabs or boils. Its eyes should be bright, its mouth and nostrils moist but free from discharge. It should breathe easily, almost noiselessly, and its breath should be without odor. It should not shiver or give any indication of being in pain.

MEAT UNFIT FOR FOOD.

In examining meat it should be borne in mind that there are three conditions owing to which it may be unfit for food, viz.:

1. It may be partially decomposed through having been kept too long.

2. It may be derived from an animal which has died a natural death, or only been slaughtered when in a dying state.

3. It may be derived from an animal affected with a disease, either communicable or in some other way injurious to man, or from a poisoned animal.

1. *Partial decomposition* is shown mainly by the characteristic smell. The meat, too, loses its elasticity, is soft, and tears readily. On cutting, the resistance offered to the knife varies, some parts being softer than others. The cut surface often swells from a kind

of fermentation or "heating." The outside is pale and livid, at a later stage greenish. Litmus paper is not reddened, but remains neutral, or indicates the juices are alkaline.

2. *Meat from animals which have not been killed or only killed when moribund*, is dark in color, often purple. The meat sets badly, is full of blood, neutral or alkaline, and readily decomposes. The flaying and dressing of such animals is usually done under unfavorable circumstances, and often by no expert hands, so that the carcase looks hacked and blood-stained and untidy.

3. *Meat from animals affected with disease and thus injurious to man.*—The detection and seizing of such meat is one of the most trying duties of sanitary officers. Determining whether meat is sound or decomposing, or whether it is well bled or has the blood in it, are comparatively simple matters, and not beyond the intelligence of most housewives; but judging whether meat is from a diseased animal, the nature of the disease, and whether it affords warrant for the seizing of the meat will tax the officer's capacity to the full. There are three things he should do to prepare himself for this work: first, he must acquire the necessary knowledge; next, he must train himself to observe closely; and, thirdly, he must cultivate the judicial faculty so as to be able to interpret rightly what he sees.

DISEASES OF ANIMALS WHICH RENDER MEAT UNFIT FOR HUMAN FOOD.

What then are the diseases ordinally met with or likely to occur in home-bred or imported animals which should be regarded as rendering the meat unfit for the food of man?

In *oxen* and *sheep:* Cattle-plague, epizootic pleuro-pneumonia, anthrax and anthracoid diseases, tuberculosis and sheep-pox.

In *swine:* Typhoid fever, epizootic pleuro-pneumonitis, anthrax or anthracoid diseases,* quinsy, and two diseases known by the presence of parasitic worms, cysticeri and trichinæ.

*Some able authorities deny the existence of true anthrax in swine. Whether they do so rightly or wrongly may depend on what they mean by true anthrax. This is no place for giving a scientific definition or arguing a vexed question in pathology. That swine are subbject to a disease closely resembling anthrax no one will dispute.

Besides these there are other diseases which depreciate the quality of the meat, render portions of the carcase unfit for food of man, or in their later stages unfit the whole carcase for food of man. These may be set down as foot-and-mouth disease, hoof-rot, pearl disease or tuberculosis, dropsy, liver-fluke.

Of these five, foot-and-mouth disease is the only one which affects swine almost as extensively as sheep or oxen. Liver-fluke is mainly a sheep disease, and hoof-rot almost entirely so.

PLEURO-PNEUMONIA.

Epizootic pleuro-pneumonia, otherwise called lung-plague, is of most importance as a disease of oxen. The only thing noticeable about the meat is that it usually looks dark and ill-bled. The lining of the chest will probably be thickened and roughened, and also the covering membrane of the lungs. The principal changes are in the lungs themselves. Early in the disease the color of the lungs is in great part grey, with red or purple patches or spots, and the lungs are less spongy. Later, the lungs are darker in color, and growing solid, like liver. At this stage the lungs will sink in water, and the weight is much increased—from 7 to 8 lbs. to 30 lbs. or more.

The most obvious symptoms in the live animals are the labored breathing and the evidence of pain. There is often a large quantity of water in the chest, quite sufficient to distend it to an extent certain to attract notice.

In the pig, besides the change in color and density of the lungs, the intestine is often inflamed and marked with dull patches, and parts of the skin are reddened, especially under the belly.

ANTHRAX.

There are three forms of anthrax and anthrax-like diseases. In one, probably the least common, large boils are the most obvious symptom, and will be recognized without difficulty. In another form of the disease, called *black-quarter* or black-leg, one of the forequarters or hindquarters is dark in color and more or less swelled. This also, is easily recognized. Although the disease appears to be restricted to one-quarter, the whole carcase

should be seized. A third form of the disease is *splenic fever*, probably the same as Texas fever. The meat is darker than it should be, and the whole carcase in bile-stained. The liver is nearly always enlarged and somewhat softened, and the lungs are generally inflamed. But the most characteristic symptom is the enlargement of the spleen—the increase in an ox being from about 3 lbs. to 7 lbs. or 10 lbs. Note, also, the rounded edges of a spleen thus affected. The meat is often dropsical, and water is frequently poured out between the lobes of fat in which the kidneys are imbedded.

An ox or sheep affected with the disease is dull and very thirsty, often sore to the touch, and breathes uneasily. If it has black-quarter it will be lame, and the swelled part may crackle on pressure. Sometimes splenic fever takes the form of apoplexy, and the animal may fall down and die almost without warning. What is called *braxy* in sheep is splenic apoplexy. The meat is remarkably dark and sometimes dropsical, and the spleen is increased in weight from 2 or 3 oz. to 5 or 6 oz., or more. When attacked the sheep staggers, stretches out his head, and breathes rapidly.

The carcase of a pig affected with anthracic disease is livid or red over much of the surface, and the meat is sodden and darker in color. There may be dark or blood-colored blotches on the intestines or heart. The spleen is enlarged, as in the case of the ox and sheep. The disease may affect the pig as apoplexy.

SHEEP-POX.

Sheep-pox is a disease not often seen in animals submitted for inspection. The eruption, when first it comes out, resembles flea bites. These become solid pimples, in which a clear fluid soon forms, and then the fluid changes into pus. The pustules are larger than in the human disease, and they sometimes run together. The eruption may appear in the mouth. In the lungs may be found little collections of matter. The wool comes off readily. In the early stage the disease might not be recognized flea-bites being the only obvious symptom. Later, the flesh becomes soft, pale and dropsical. After pus has been formed there can be no mistaking the disease. Except in the early stage of sheep-pox the meat has a disagreeable odor.

JOINT-ILL OR JOINT FELON.

Animals affected with acute rheumatism—joint-ill or joint-felon as it is called—will commonly attract attention by their lameness or their inability to rise. The joint or joints so affected contain a clear fluid; sometimes there is pus in or around diseased joints. Abscesses (collections of pus) may form at some distance from the joints attacked. The meat is often dropsical. If the animal has been unable to get up for some time, the side on which he lay will look red and inflamed.

PLEURO PNEUMONITIS OF SWINE,

otherwise called Hog-cholera or Swine Plague, does not necessarily produce any marked changes in the meat. The skin, however, rarely escapes affording some indication of disease. There is general or patchy redness (red soldier), or there are large livid blotches (blue disease,) or there is an eruption resembling small-pox, pus being secreted and crusts forming, as in human small-pox. In cases where the pig is "soldiered," the redness is not limited to the skin, but the fat beneath is reddened right down to the flesh. The intestines are often inflamed and marked with red spots, and characteristic spots appear in the large gut (chitlings), and less frequently in the small gut. These vary in size, from mere points to three-quarters of an inch across. In the ulcers ochre-colored crusts form, convex or cup-shaped, and these in time fall out. The lungs are commonly congested, and may be in part solidified. These are the main symptoms, but there may be intestinal ulcers without lung disease, and with little discoloration of the skin; and, on the other hand, there may be a very pronounced skin eruption, and scarcely any traces of the disease elsewhere. Butchers sometimes rub salt along the edges of the reddened fat to remove the color, but an edge so treated can be easily removed with a knife. Of course when the skin eruption is so marked as to resemble bad small-pox, it is not probable that the carcase would be brought into the market. The meat is unfit for food.

In life the main symptoms of this disease are the skin eruption, diarrhœa, and difficult breathing or coughing.

QUINSY IN SWINE.

Quinsy in swine, known also as "strangles," is characterized by swelling in the neck and sore throat. The swelling may extend into the forequarters. The throat is dropsical, and sometimes part of the inside mortifies. The skin around the throat will be red or livid, and there may be an eruption in the mouth. The main symptoms during life are the swelling, labored breathing, and the refusing of food.

WORMS AFFECTING SWINE.

Of the two kinds of worms to be looked for in pork, the larger, *cysticerci*, are much more common and easily detected. They look like little bladders of water, and occur in the flesh between the fibers and often on the surface. The bladder is egg-shaped, and generally from one-eighth to three-eighths of an inch in length. Specimens from the same animal usually vary in size but slightly. The bladder is semi-transparent, containing a clear fluid and what looks like a little white ball. Transfer one of the bladders to a slip of glass, prick it with the point of a knife, and press another piece of glass on the top. Examine this with an ordinary pocket-lens, and observe the head or sucker of the *cysticercus*, surrounded with a circlet of hooks. Once seen there is no possibility of mistaking it. Pork infested with these worms is called measly, owing to the curious appearance of the flesh on section Quite young pigs may manifest the disease; indeed, they are probabably specially susceptible. When pork is a little dry from exposure to air, the bladders may shrink so as to be hardly seen. In such a case a small portion should be soaked in water. The salt in salted pork tends also to dry up the bladders. In examining a live pig to see if he is measled, search should be made beneath the tongue, when often the little bladders can be felt or seen. The bladders may also be found in the loose folds under the tail. Swine affected with this disease are often swelled around the shoulders, but commonly there is no marked external sign indicative of the disease.

The second kind of worms infecting pork, *trichinæ*, can be seen on close inspection. The meat looks speckled. The little white

specks seen come out clearer if a very thin shaving of the pork be placed on a glass slip and soaked for a short time in a weak solution of caustic potash. The bladder or shell containing the worm is not placed between the flesh fibers, but actually in a fiber, causing a lemon-shaped swelling. If the glass slip be held up to the light and examined with a powerful pocket-lens, the coiled up worm, fine as a hair, will be seen. If the inspecting officer has access to a microscope, of course this (using a one-eighth objective) will define the parasite better. Sometimes the white specks feel gritty from the presence of carbonate of lime, &c. Swine affected with this disease may present no noticeable symptoms during life. To test them a morsel of flesh is sometimes removed from under the tongue, and a section examined with a lens.

HOOF-ROT IN SHEEP.

Hoof-rot, which is a not uncommon disease among sheep, may in some cases be mistaken for foot-and-mouth disease. It consists in inflammation of the soft parts of the foot, and may lead to shedding of the hoof or even to disease of the bones of the foot. Usually a thick chessy matter collects over the affected skin; sometimes small blisters or pimples may be seen. The flesh looks wholesome, and is so. Except in rare instances, when the inflammation extends into the carcase, all may be passed except the feet. An animal affected with the disease is lame, and losses condition.

TUBERCULOSIS, PEARL DISEASE, OR "GRAPES."

Pearl disease, called also tuberculosis consumption, or (among butchers and dealer) "the grapes," is a common disease of oxen, and less frequently of sheep. The little round tumors, or "pearls," hardly seen when commencing, but growing to the size of a pigeon's egg, occur on the inside of the walls of the chest and on the surface of the lungs. Sometimes the glands about the neck, or the glands in connection with the intestines, are enlarged. On cutting open one of the pearls, its contents are found to be a thick chessy matter, either of the same consistence throughout, or the center may be softened or gritty.

The cheesy matter cream-colored, grey, or yellowish. Portions of the matter may be deposited in the liver. In life there are not always superficial signs to indicate that an animal is suffering from this disease. The animal probably has a cough, but this is not necessarily due to pearl disease; and there may be no appreciable loss of condition. The disease is very common, especially among the occupants of town cowhouses. When the disease is declared, and there are distinct cavities in the lungs and pus in the glands, and much waisting and dropsy, the whole carcase should be regarded as unfit for human food.

Dropsy is not, properly speaking, a disease, but a symptom of many diseases. It may be due to disease of the heart, liver, or kidneys, and to other causes. Sometime the water is limited to the chest or abdomen, and in such cases it does not warrant the condemning of the carcase. When, however, the water is poured out into the muscles and between them, making the flesh sodden and wet, the carcase may be seized as unwholesome. Such meat keeps badly, and has occasionally a faint urinous smell.

"ROT" IN SHEEP.

The most widespread of sheep diseases due to parasites is that popularly known as "the rot." The cause of the disease is the presence in the bile-ducts of the liver of flukes—little animals in shape like a sole. Though flukes are not infrequently found in oxen, they do not occur ordinarily in such numbers as to produce serious disease. The fluke is furnished with a sucker by which it attaches itself. This parasite when once seen will always be recognized. It usually measures from an inch to an inch and a half in length, and is about three-eighths of an inch wide. Flukes are often so closely packed in the bile-ducts as to block them up, and the pressure of them causes the ducts to stretch or burst, portions of the liver being broken down or destroyed. The symptoms of the disease presented by the carcase are jaundice (bile staining), dropsy and emaciation. These three indications that the carcase is really "rotted" undoubtedly warrant its seizure as unsound; but the presence of a few flukes in the liver does not of itself prejudice the carcase, and affords no sufficient reason for seizing it. Even in cases where there is some jaundice and

falling off in condition, the carcase may pass. When seen alive it will be noticed that the animal is sluggish in its movements, yellow in the eyes, is thin or swelled with dropsy, and its wool easily comes out.

It is well here to mention a parasite occasionally found in the lungs of sheep, calves and oxen—the *filaria*. It is a thin worm from half an inch to three inches in length. Inflammation of the lungs, resulting from the presence of these worms, or from cold, is not a serious disease from the meat inspector's point of view, and does not prejudice the flesh of the carcase. The common and fatal disease, *sheep scab*, usually disfigures the carcase so much that it is not offered for sale.

CARCASES OF PARTURIENT ANIMALS.

Carcases of animals which have been slaughtered immediately before, during or after calving or lambing are frequently submitted for inspection. There is certainly no reason for condemning these indiscriminately. If there are indications of apoplexy or milk-fever (*i. e.* the carcase ill-set, meat pale or livid and wet to the touch, etc.,) it is safe to make the seizure. When, however, the slaughtering is due to some complication in connection with calving or lambing, the case is different. There has been uncontrollable bleeding, the calf-bed has come down and cannot be retained in position, or the calf has become jammed and cannot be extricated, &c.; in such casualties there is nothing to prejudice the meat, and if the animal has been properly killed and bled it may be passed. The same rule holds good with reference to other accidents; a blow or a fall, choking, the paunch being packed, &c.

CARCASES OF POISONED ANIMALS.

Flesh manifesting no indications of disease may be unwholesome owing to the animal from which it was derived having been poisoned. In such a case the intestines will not improbably be inflamed throughout (of a bright red color and with red spots). The stomach, especially the first stomach, should be examined for signs of inflammation, and carefully searched for traces of

bryony, meadow saffron, yew leaves, &c. Carcases of animals maliciously poisoned may also be brought to market. Here the poisoning would probably be a mineral irritant, producing more marked inflammation of the stomach and intestines.

IMMATURE VEAL OR "BOB VEAL," ETC.

It is generally held that immature veal is unwholesome, and yet it is somewhat difficult to state the precise age at which veal becomes mature. A calf born in good flesh and health and old enough to have fully established its new circulation, to be rid of all previous intestinal contents, and to have fed for two weeks, is generally passed in foreign markets. Decision should rest on the appearance of the carcase rather than on any assumed age. To prevent, however, the use of "slink meat," or calves or lambs cast prematurely or dying during birth, there should be a limit of age; but the examiner should not pass poor veal at any age.

POULTRY, GAME AND FISH.

POULTRY.

Good poultry should be firm to the touch, pink or yellowish in color, should be fairly plump, and have a strong skin. It has a fresh, not disagreeable smell. Stale poultry loses its firmness, becomes bluish in color, green over the crop and abdomen, the skin readily breaks, and the bird has a disagreeable odor.

Poultry suffer much from roup, characterized by an offensive discharge from the nostrils and eyes, from gapes, (worms in the windpipe), from intestinal worms, from so-called diptheria, and many other diseases; but if the bird has been properly killed it may be passed. The only serious disease of poultry there is reason to believe may prejudice the flesh, so as to make it unfit for food of man, is *fowl cholera*. However, there is little evidence of the disease on birds carefully prepared for the market. The flesh is somewhat redder than naturally, the liver probably softer and the heart speckled with red or dark spots often inside and out. If the intestines can be seen they will be inflamed, with red spots or livid patches. Domestic fowls, ducks, turkeys, geese and pigeons are all subject to the disease. Poultry affected with this malady

unless in cases when it proves very rapidly fatal, exhibit characteristic signs of suffering. Their feathers are bristling, their wings droop, they sway from side to side, drag their legs, eat nothing and drink much. The comb is flaccid and livid. There is diarrhœa, at first glairy, then foamy, and towards the end often streaked with blood.

GAME.

Game is, with few exceptions, rarely exposed for sale in a fresh condition. Most kinds of game are liable to a cholera undistinguishable from that affecting poultry, aud to many fatal diseases appearing as epidemics among them ; but there are no characteristic signs whereby the subjects of any of those diseases may be known should they find their way into the market. Intestinal worms are also often found in the bodies of game, but they do not prejudice the flesh.

FISH.

The freshness of fish is indicated by its being firm and stiff. In really prime condition, if held out in a horizontal position by the hand, it will remain rigid. Any drooping of the tail shows that it is not quite fresh, and, indeed, the extent of this drooping may not unfairly be taken as a measure of want of freshness in the fish. The fish hawked about the streets is often what the shops have failed to sell, and much of it is very limp. However, before an officer is justified in seizing fish, it must be a stage beyond being merely unfresh. If the fish besides being limp is actually softened in parts, and if it has a distinctly disagreeable odor, there is sufficient evidence of commencing decomposition to warrant seizure.

It is claimed by some that meat kept long by means of ice or refrigerators, undergoes change more rapidly and is subject to some peculiar accidents of decomposition, but the facts stated have not been accepted as established.

It is known that salted meats, ham and other smoked meat and canned meats sometimes occasion sickness, but the law of their action is not fully understood. No such cases should escape the careful attention and analysis of Health Boards. We thus draw

the attention of the public and of all dealers to the need of legal and skilled oversight of the sale of all flesh used as food.

Copies of this and other Circulars of the State Board of Health may be had on application.

EZRA M. HUNT, M. D.,
Secretary.

CIRCULAR LXX.

NEW JERSEY STATE BOARD OF HEALTH.

[OCCASIONAL BULLETIN SERIES.]

OUR LOCAL HEALTH BOARDS.

These are the powers. Our laws, while giving large and sufficient duties to the State Board, place the responsibility for the health of the respective communities with the local Boards.

They are given ample powers for necessary uses. It has been one of the most important functions of the State Board to elaborate laws requisite for wise and efficient sanitary administration, and to advise their adoption by the State. These various laws we shall notice hereafter.

We desire also to impress upon local Health Boards their privileges and their duties independent of the mere enforcement of law. The masses are not well informed as to the modes of preserving health. So long as our surroundings or our habits do not make us sick, or so long as we do not attribute sickness to them, we always incline to regard them as right and best. The first instinct of most families is to defend the healthfulness of their own homes. It is even wonderful how the owner of a pig-sty or some other nuisance will claim it to be harmless when the near neighbors are constantly annoyed by it.

There is a process of education, and citizens are becoming more and more intelligent as to the prerequisites to health. Even where the majority cannot be convinced, there are in almost every community a sufficient number who, when they come to realize the importance of sanitary administration, are influential in its support.

WHAT HEALTH BOARDS CAN DO.

Health Boards should regard the education of public opinion as one of their most important functions. In English towns it is common for physicians, engineers, and others to unite in a course of plain lectures to the people. Although attendance may not be large, the truth thus gets circulation. The columns of the local paper are often used to advantage. We know of several localities in this State that have been greatly benefited in health matters by the aid of the press. The various circulars and reports of the State Board are at the command of the local Boards, and will be sent direct if names and post-office addresses are furnished us. Circular XXXIX of this Board has various other suggestions as to the duties and privileges of local Boards.

OUR HEALTH LAWS.

The State has a code or system of Health Laws not surpassed by any State of the Union. They are the result of careful study and analysis, of a knowledge of the enactments of other countries and States, and of careful consultation on the part of lawyers, physicians, sanitarians, and legislators. There will no doubt be reason for occasional additions, but the greatest risk is that of injuring the harmony of the system by some amendment suggested by superficial knowledge or personal interest. Almost every year some law is proposed which shows a lack of information as to what is already on the statute book, or as to the real effect of the modification. Many of these are withdrawn on explanation. Others need the guard of local Boards, lest they should become enacted. Not only have the present laws been found facile and effective, but most of them have been before the Supreme Court or the Court of Errors and Appeals, and so have the highest sanction. The Central Law is that found in Chapter LXVIII, laws of 1887, and to be found with notes in Circular LX of the State Board.

Next in importance to it is the law as to Vital Statistics, to be found in Chapter XXXIX, laws of 1888, and in Circular LXVI of the Board.

Inasmuch as there cannot be healthy people without healthy homes, the next law in importance is the Plumbing Law, to be found in Chapter LVI, Laws of 1888, and in Circular LXV of the board.

In addition to these, the laws as to drainage, as to adulteration of foods and drugs, as to kerosene, as to the diseases of animals, etc., and many others which are referred to by title in Circular LX, need the attention of all boards.

While there are many cases where legal advice may be required, and while Health Boards will sometimes be defeated by reason of errors of judgment or by oversight of technical methods of procedure, we believe that those who will carefully read these laws and the notes accompanying, will seldom be in doubt as to modes of procedure. All boards should pass carefully-drawn ordinances, of which samples will be furnished from this office. As a rule, a fine of the person not abating a nuisance is better than for the board to proceed to abate and afterwards collect. Often a resort to Chancery is the quickest and most effective way.

LAWS AS TO VITAL STATISTICS.

As a rule, boards do not realize how essential vital statistics are in any guardianship of the public health. They tell where disease is occurring, what its character is, and whether it is mostly affecting children or adults. The health officer who carefully and frequently looks over the record gets valuable information. It is true that in small communities this is not so appparent, but the returns are no less important for the State and as indicating what is local, although it takes longer time to arrive at results. It is also true that the number of yearly deaths is not the chief or only indication as to the health of a locality, but it is one very important item to be compared with other facts. Returns of births and marriages are necessary, because without these we do not know enough of ages and of the material with which sickness has to deal.

It is enough to say that the necessity of these returns is con-

ceded in all countries where there is State or municipal care of the public health. While the general study of them must necessarily be at a central office, each city should know how many deaths occur each year in each ward and from what causes. Cases that have been before the higher courts, fully attest the right of States to require returns as to these social and vital facts.

NOTIFICATION OF CONTAGIOUS DISEASES.

It is now admitted by all sanitarians and by all physicians who have familiarized themselves with the conditions for sanitary administration, that there must be a system of early modification as to contagious diseases. About fifty towns in England have of their own motion and in local acts obtained power to require the notification of infectious diseases. In July of the present year (1889) the government introduced into parliament a "Notification of Diseases Bill," as a general measure. The London *Lancet* thus comments upon it:

"The introduction by the government of the Notification of Diseases Bill is only what everyone who has observed the signs of the times must have expected. Whatever liberty may mean in political and democratic parlance, it is becoming increasingly evident that it does not mean personal freedom in matters of disease. A man may say, 'I have a right to have small-pox in my house if I please, and to keep the fact a secret to myself. My house is my castle, and if I like to harbor scarlet fever in it, whose business is that but my own?' But any man who reasons so will soon find himself contradicted by the law of a democratic parliament. Nor is parliament acting hastily in this matter. On the contrary, it is acting slowly, timidly, and somewhat feebly—as, alas! is its wont. It does not propose by its own direct action to restrict the liberty of communities, but it gives leave to such communities to restrict their own liberty. It formulates a general act for this purpose, and says, 'Use it, adopt it, if you like.' To show how slow parliament is, it is only necessary to say that it has already been anticipated by about fifty towns which have of their own motion and in local acts obtained power to require the notification of infectious diseases. There can be no doubt, therefore, that the State is quickly coming to believe that

amongst it many rights is the right, even at the cost of invading the privacy of homes, being informed of the existence of every case of important infectious disease. Even in the medical profession, where, as we know, there is considerable difference of opinion as to the best way of acquiring this information, there is no doubt as to the right of the State to ask for it where it sees fit. The assertion of this right, and the general recognition of it by all classes of the people, is a very noticeable fact. It is another restriction of personal liberty for the good of the whole community, which, after all, is the essence and glory of civilization. It may occasion friction at first, but it will gradually be accepted by all as working for the good of all. We cannot imagine a long delay in the general acceptance of the principle that a community has a right to protect itself from an infected person, and to impose duties and restrictions on that person, and on those within his influence, or the area of his infection—whether it be by notification, or isolation, or vaccination, or any other measure that the community in its judgment thinks essential to its own protection."

Without such notification, health authorities cannot have the early knowledge of communicable diseases necessary to their limitation. The only questions that can arise are: How far and to what degree is this essential? By whom shall the notification be made? What shall be the conditions thereof?

While the right of the State or municipality to require it, for public good, is admitted, it is to be regarded as a special exercise of legal command, and as such to be made with thoughtful consideration. While it is not a matter to be left to private judgment, it should be such as to commend itself to the medical man who desires the limitation of infectuous diseases. We think—

I. It should not be required in sparse populations, except when the peril is greater than in ordinary separated buildings, or when the disease shows a tendency to prevail.

II. It should be required in all cities or compact villages.

III. It should not apply to all communicable diseases. It is, for instance, impracticable or needless to attempt to apply it to whooping cough or mumps.

IV. The notification should be only to some one designated, member or inspector of the Board of Health, and not used as public information.

V. It should be by the medical attendant, and should only give name and locality. Only the physician can certify to the nature of the case, and he should have to give only such particulars as are necessary to identify the case. If he chooses to indicate whether or not a speedy visit from the inspector is desirable, or that he will himself secure all necessary protection, he may so do. Such is the custom in Edinboro.

VI. He should receive some compensation. The duty asked of him is wholly different from that when he is asked to report a birth or a death. The beginning or the ending of a life is in its nature special, and he who is in charge at the event has a natural obligation, if required by law, to acquaint the authorities with the fact. The recognition of such a profession involves the duty of such returns in such way as the State, in its best wisdom, may designate. The idea that a law cannot compel a man to do anything it does not pay him for doing has never had any legal standing. To require such reports in the practice of enlightened nations, and such have been the rulings of all courts.

Not so as to reporting the fact of a patient sick with a communicable disease. It is not necessarily a matter of life or death. It is asking a service having no relation as a legal record, and not in itself announcing an event like that of life and death.

The bill to which we have alluded allows about fifty cents for a report. Our own law allows twenty-five cents. We regard this as reasonable.

An article by Mr. Bayles, of Orange, New Jersey, and formerly President of the New York City Board of Health, so fully considers this matter in the 12th Report of the Board, that we only need to refer to it for futher details.

LAW AS TO CESSPOOLS, VAULTS, GARBAGE, ETC.

The recent law, chapter CCLVI, Laws of 1889, authorizing Local Boards of Health to license and receive fees for collection of the contents of cesspools and vaults is important, as it allows this matter to be regulated as it can be only by a system of permits, while in some places it may be done by the individual householder under regulation. Experience shows it is generally better

to be done by the licensed scavenger. The law is generally construed to apply also to garbage and all scavenger work.

OTHER LAWS.

Laws as to drainage are important in localities where the surface soil is wet or swampy.

The laws as to animal diseases recognize that local boards have some relation to these. They should always be inquired into in order to know whether they are contagious, or if of a class communicable to mankind. While we have as yet no laws regulating the keeping of cattle, city boards can decide when the keeping of animals within city limits is a nuisance; also local cases of nuisance can be dealt with by any board. No man has a right to use his property to the risk and detriment of his neighbor's health.

The laws as to petroleum or kerosene are such that guard should be had as to sales, and any accident should be investigated.

The board is always ready to answer questions as to various other laws having a bearing on the public health.

Local Boards of Health should be familiar with existing laws so as to execute them when there is need and so as to guard them well, lest careless or crude legislation should embarrass them.

Members of Boards, their attorneys and the Recorders of Vital Statistics are the natural guardians of these laws.

It is well to consult the State Board as to all legislation relating to the public health.

HEALTH INSPECTORS.

No more important officers form a part of the government of a city. The same may be said of towns, villages and many country districts. In England and other countries so important is the service that men are educated for it—receive degrees as do engineers, physicians, &c.

While we have not attained to this we must have that ideal before us. At Princeton College, at Rutgers, at Stevens' Institute, facilities for short courses can be secured.

Some of our most experienced Inspectors have grasped the idea of the importance of the work and of the training needed, and

have done much to acquaint themselves with their duties. While the compensation is still low, except in three or four of our cities, it will increase with the competency of Inspectors and a greater realization of their necessity.

The Inspector who thinks he knows, when he does not; who is all dictatory and never persuasive; who regards the detection and removal of a stench all there is in it; who makes only verbal reports, and who never can find time to attend the annual meeting of the New Jersey Sanitary Association, or to meet with other Inspectors of more skill and experience, is himself often of the nature of a nuisance. Others, who may be plain, unlettered men, but who have applied themselves diligently to observe and to do their duty, merit and receive our appreciation. Every Health Inspector should be a close observer and be familiar with the actual carrying out of the best methods of cleanliness and disinfection. He should know the chief defects of every house of the city. He should be able to detect bad plumbing, or poor water supply, or gas leakage, or the condition of sewers and cesspools. He should know how many depend on wells and how they are located. He should inspect, with some such book as is furnished by the board. He should be familiar with some such guide as Wilson's Handbook of Hygiene; should take some sanitary journal, and have on hand the Health Laws and Circulars, and be familiar with the reports of the State Board. These all are to be studied—not merely read. We have some good intances of how Health Inspectors have become intelligent in their work and are recognized by physicians and by many citizens as of great service. Let them be paid good salaries and be held to rigid service. If ever using their vocation in ward politics they should be discharged. They have a special service which makes it as improper for them to electioneer in a tenement house as it is for a doctor to discuss elections by the bedside. May good Inspectors multiply and be appreciated for the excellent service they undertake.

Boards of Health and Inspectors should include in their work at least a yearly sanitary inspection of prisons, jails, almshouses, railroad stations, cemeteries, and some factories.

We subjoin as specimens two recent examinations of summer hotels by Dr. Mitchell, of Asbury Park:

E. M. Hunt, M. D., Secretary New Jersey State Board of Health:

SIR.—I have to-day inspected a hotel at Ocean Beach, Monmouth county. A new drainage system has just been completed for the hotel. It is constructed as follows:

Stationary wash bowls have been placed in one hundred and six (106) of the one hundred and ten (110) rooms in the hotel. Each wash bowl is connected by a one-inch lead pipe, with a galvanized iron pipe on the outside of the building. No traps are placed under any of the bowls. The lead pipe is joined to the galvanized sheet-iron pipe by a putty joint. The galvanized iron pipe is three inches square, with soldered joints. It is made of sheet metal. There is one line of this sheet metal pipe for each row of rooms on each story, making six lines of pipe for each of the two wings of the building. These sheet metal pipes are conducted to a cesspool. The cesspool is ten feet wide, twenty-six feet long, and fifteen feet deep (10x26x15). It is located about ten feet west of the hotel. It is floored over with loose jointed boards, and over it is built a house. This house is one story high, and is used as the laundry. Six persons were at work in the laundry at the time of my visit. Four stationary wash trays are located in the laundry. Their waste pipes descend straight through the floor (without trap) into the cesspool. A large slop hopper also pierces laundry floor. Innumerable holes in the floor admit free exit for all gases which seek to leave the cesspool. The servant's dining room adjoins the laundry, and it is entered by a door leading from the laundry. An ice-house for meats, etc, about 8x10, adjoins the servant's dining room and laundry. The waste water from the ice-house is carried through a three-inch tin pipe, about two feet long, directly into the cesspool. There is no trap on this pipe. A steam pump is placed in the laundry for use in emptying the cesspool. The cesspool is pumped out every second night. The contents are discharged into the ocean in front of the hotel. The ice-box in the carving room is connected by a tin pipe directly into one of the sheet metal drain pipes. Another refrigerator is located in the basement. In this ice box the milk is stored. The waste from this ice-box falls upon the ground from a pipe in the bottom of the box. There is no trap on this pipe. The ground surface is about one foot below the drip pips.

The water closets are west of the hotel, and between the hotel and the cesspool. In the first story apartment there are three urinals, without traps, and four pan water closets. On the second floor there are two wash-out closets.

The water supply of the hotel is now taken from an artesian

well which has recently been bored. Three servants' bed rooms in the basement—reached through a doorway from the gents' water closet—are damp and musty, and unfit for human habitation.

Very respectfully,

HENRY MITCHELL, D. I.

July 9th, 1889.

NEW JERSEY STATE BOARD OF HEALTH,
INSPECTION DEPARTMENT,
ASBURY PARK, July 9th, 1889.

DEAR SIR.—An inspection of your hotel shows that the drainage system of the building is constructed in a manner which imperils the health and life of every inmate of the establishment. Every one of the one hundred and six (106) bed rooms, in which is fixed a stationary wash-bowl, is now receiving dangerous gases directly from the drains. The putty between lead waste pipes and sheet-iron drains are also leaking dangerous gases beneath nearly every window of the house. These conditions, and numerous other sanitary defects, render the hotel unsafe for human occupancy.

Yours truly,

HENRY MITCHELL, D. I.

To E. M. Hunt, M. D., Secretary New Jersey State Board of Health:

SIR.—July 17th, 1889, I visited S. and O. The sewage from the S. sewer is still flowing out upon the sand on the ocean beach, and the nuisance caused thereby is in nowise abated. Since my visit to this place, July 9th, 1889, a wooden trunk, one foot square, has been constructed. It begins at the broken tile pipe, at the westerly end of the iron terminus of the sewer outlet, and extends about seventy or eighty feet toward the sea. This trunk is loosely put together, and its joints leak throughout its whole length. Its calibre is not sufficient to carry the sewage, and its easterly end is obstructed by sand. The whole of the sewage discharged is therefore going upon the sand.

This misguided attempt to abate the nuisance due to the outfall upon the sand of sewage, has therefore proved to have been a useless expenditure. Had the wooden trunk been made of plank instead of boards, and had its capacity been 2′ x 1′ instead of 1′ x 1′, the purpose aimed at would undoubtedly have been accomplished, *i. e.*, temporary overcoming of offensive odors.

Permanent and safe disposal for the sewage of S. can never be attained by the present system, for the following reasons:

1. The capacity of the main sewer is too small to carry the fluids which it receives. This fact is demonstrated by the frequent backing-up into premises, which has frequently occurred.

2. The sewage is discharged directly into the sea, and the tide arrests the flow, and prevents rapid outfall.

3. The terminus of the sewer is not far enough from shore to obviate choking with sand.

4. No ventilation is provided for the main sewer, and gases are forced landward by each rise in tide.

In Wall township I inspected the water supply and drainage of a number of hotels. The water supply of A. is from two wells. The water from one of them is offensive to the sense of smell, and the two wells are only about 25′ apart. I believe that both of them are polluted, for wash fluids have for years been cast upon the ground all about them. The privy vault stands as when last described. It emits exceedingly offensive odors, which are wafted into the windows of the hotel. It is about 25′ from one wing of the hotel and 15′ from another. It is covered by a two-story privy. It is a nuisance to the occupants of all of the rear rooms of the hotel.

The B. hotel has an unsafe water supply, and its privy vault is a nuisance. The miserable sheet iron trough which was constructed several years ago, and placed beneath the seats in the privy, has been taken out because it was an abomination too unendurable for guests, and the old method of direct deposit for excrement has been re-established. The vault is large; about 25′ from the hotel, and it is adjoined by a basement room which is used as a bakery for the hotel. During the westerly winds, such as prevailed when I inspected the premises, the odors from the vault pervade the whole of the hotel.

The water supply is from a dug well situated about 22′ from the privy vault. The water is offensive to smell, and I believe the great demand upon the well causes filthy fluids which leak from the privy vault to enter the well. Another well on the south side of the hotel is less offensive, and it is now used for drinking.

The B. House has three surface wells, made by driving 1½″ pipes about 12′ or 14′ into the ground. Two of them are beneath the building. Sinks are placed under the pumps of these wells, and the waste pipes both go into a wooden drain 6″ square. This box is about 30′ or 35′ in length, and is entirely within the laundry and beneath the hotel. It discharges into a six inch tile drain which terminates in a cesspool on the ocean beach. The cesspool is unventilated, save by the drain. The wooden box and the tile drain have an open and leaky junction, and gases of a most offensive sort escape from all parts of the box and from the opening in

the tile drain. The junction of wood drain and tile drain is under the south porch of the hotel. Nine wash trays in the laundry also discharge into the same kind of box drain, which is (like the other) above the floor. A slop hopper in one corner of the laundry is made of brick, and it overflows into a tile pipe which is connected with the six-inch tile pipe above referred to. No traps of any sort could be found on these premises. I am of the opinion that all of the three wells are polluted by escaping slops and kitchen fluids.

Very respectfully,

HENRY MITCHELL, D. I.

July 18, 1889.

THE ANNUAL REPORT FROM LOCAL BOARDS.

This is due in October. It should give the facts according to schedule, if not already reported. Areas of townships and cities should be given in acres or square miles as far as possible. The report should state, with some detail, what the Board has done during the past year. Also whether the Board has passed a series of ordinances after the model in the 9th Report or in some other form.

Particular cases of nuisance or sickness should be reported. The number of house-to-house inspections should be given. These should be on file so that the Local Board or our Inspectors can refer to them. Be prompt in returning this report. All should be in by November 15th, and most before the close of October. Be careful to give the name and Post Office address of every member of the Board and of the Health Inspectors.

OCCASIONAL HEALTH BULLETINS.

A few of the State Boards of Health publish a monthly pamphlet or bulletin made up of local matters and various news items. We have for the past two years examined many of these. The State Board has carefully considered the propriety of such a publication. It does not at present believe it of sufficient importance to justify the expense. Several of the Sanitary Journals are better than it could be, and some one of these should be taken by many of our Local Boards. The Annual Report and various Circulars, together with correspondence and visitation, enable us to communicate sufficiently with the Boards. Excep-

tions to this may occur, and then the occasional Bulletin answers our purpose. Where Local Boards are inefficient, personal pleading with them, or the Report of a State Inspector published in the local press, will do all that can be done by more extended circulation of our complaint. Administrative methods are best learned through the annual reports of the State and Local Boards, and through visitation of localities. He who wishes to be intelligent in health matters now has abundant opportunity. The Board is ready at any time to furnish information, to distribute its Circulars and Reports, and in complicated cases to order special inspection.

VARIOUS ITEMS.

The agency of low forms of vegetable life known as microphytes, bacteria, bacilli, etc., in producing changes in organic materials and causing the phenomena of disease, is fully recognized. But it is not so easy to determine which are harmless, which are injurious, which are specific and which common, or whether they produce results directly, mechanically or through their chemical compounds.

Be sure of your facts. Announce nothing as settled until these have been studied in great numbers, both by the laboratorian and the clinician, and remember that conclusions from facts involve quite a different process from observations of facts. Many observe more accurately than they make inferences.

Dr. Ballard, in a recent government report, speaks of diarrhœa as not a mere intestinal disturbance, "but a general disease of a specific character, to which a distinct and specific name other than diarrhœa ought to be attached." Cholera infantum, dysentery, etc., have so long been regarded in this country.

The ability of one form of bacteria to produce different forms of disease is now being discussed. "There seems to be experimental ground for the belief that some forms at least of diphtheria and erysipelas, and some forms of phlegmonous inflammation are phases of the inflammatory process having one at least of these prominent etiological factors in common, namely, the inciting species of bacteria.

Over 100,000 persons availed themselves of the public baths of Philadelphia for July, 1889.

The summer freshets of 1889 have shown that there are many mill-dams that so obstruct drainage or overflow lands or peril the inhabitants of adjacent towns as that they should cease to exist.

Several of our Health Boards, under our drainage laws are succeeding in removing or in preventing the erection of mill-dams.

In addition to the good work done by such boards as the ones of Newark, Paterson, Trenton, Asbury Park, etc., those of Rutherford, Englewood, Ocean Grove, Plainfield and a few others have recently come to realize the great importance and the beneficent results of their work.

J. Mecray, Jr., M. D., of Cape May City, acts as inspector for the local boards in that part of the State.

Besides attention to the calls of local boards and to the organization and direction of boards as to ordinances, Inspector Dr. A. Clark Hunt is preparing for the next report a description of the sewer systems of the State. Inspector Henry Mitchell has recently inspected several health resorts.

The almshouses, jails and prisons of the State are showing some improvement, as the result of inspections.

One of the Brothers Hare has said that "the essential character of no theory or institution is adequately expressed in its inaugurators, since they made the institution, while it is the institution that makes the next generation of its administrators. This, if rightly understood, announced a great truth. Those who inaugurate a system or institution naturally make it the expression of their theory or idea of what such an institution should be. If they are not ideal, but practical men, and have the opportunity to watch the working of their system and skill to discern the modifications needed, the system becomes the transcipt not only of its inaugurators but of experience. The next generation of administrators have the advantage of all that has gone before, and ought to be able to make it the accumulated result of the labors and practical skill of all identified with it. We sometimes outline the future of the New Jersey Board of Health when its original members shall have passed from service. In falling into capable hands, it will develop new directions of increased usefulness, and recog-

nize the founders as only the builders of foundations admitting of grand and useful superstructure through all the generations.

Copies of this and other circulars of the State Board of Health may be had on application.

EZRA M. HUNT, M. D.,
Secretary.

CIRCULAR LIX.

OF THE

STATE BOARD OF HEALTH OF NEW JERSEY.

LAWS AND REGULATIONS RELATING TO THE ADULTERATION OF FOODS OR DRUGS, AND TO PETROLEUM.

The Legislature of this State has seen fit to pass laws to protect the people from articles of food and drugs that are not what they profess to be, or that are injurious to the public health.

Also, on account of the number of accidents arising from imperfectly prepared petroleum oils, as used for lighting purposes, it has defined the standard of purity required for these.

The general law to prevent the adulteration of food and drugs is contained in Chapter CCXVII, Laws of 1881, and in the supplement thereto, Chapter CXXXIX, Laws of 1883.

The special laws as to the adulteration of milk are to be found Chapter LXXXII, Laws of 1882; Chapter CLXXXV, Laws of 1883; Chapter XC, Laws of 1884; Chapter CLXXXV, Laws of 1885; Chapter CLXXXVI, Laws of 1886, Chapter II, Laws of 1887.

The special law as to oleomargarine or other imitation of dairy products is to be found Chapter LXXXIV, Laws of 1886, and Chapter CL, Laws of 1887.

The laws as to illuminating petroleum oils are those found

Chapter CLXVIII, Laws of 1882, and Chapter XCVII, Laws of 1883. (Send for Circular XLII of this Board.)

The laws as to the adulteration of food or drugs have been passed more as commercial regulations than with special reference to the public health; yet they cannot be viewed wholly as for protection against commercial frauds. Either by carelessness, ignorance or intent, substances may be added or changes occur which render the article dangerous to health.

The laws as to oleomargarine or other dairy products, and as to milk, are executed by the Dairy Commissioner, Wm. K. Newton, M. D., of Paterson. This Board has the appointment of the Commissioner, and he makes a statement or report to the Board once a year. This Board has no relation to the work done. He appoints his own Chemists, Inspectors or assistants, pays all expenses from a special appropriation, and makes his cheif report directly to the Legislature.

It is different as to the general laws relating to the adulteration of foods and drugs. Three different sets of officers have relation to these laws.

I. The State Board of Health "fixes the limits of variability permissible in any article of food or drug or compound the standard of which is not established by any national pharmacopœia," and can adopt various regulations as to it. It has power to appoint Chemists and Inspectors to act under its direction, and to proceed directly against those violating the act. Since, however, there are special provisions and a special officer for two chief adulterations and some co-ordinate powers as to all adulterations, this Board seeks to deal, not with commercial frauds but with adulterations directly injurious to health.

II. Any Inspector or other officer of any Local Board of Health has power, as thus given:

"8. And be it enacted, That any analyst or inspectors appointed by the State Board of Health, and any inspector or other officer of any Local Board of Health, shall have power to inspect any article of food, or drugs, wherever exposed for sale, or offered, or held for sale, or whether in transit or otherwise; and if, upon inspection of such food or drugs, the same shall be found adulterated within the meaning of this act or the act to which this act is a supplement, the said inspector or other officers aforesaid, shall

have power and may prohibit the sale or disposal of said articles until decision shall be rendered by the court, justice of the peace, recorder or police justice before whom the defendant may be brought."

It is best in these cases that the analyses be made by some one of the Chemists which have been designated by the State Board of Health.

III. The State Dairy Commissioner has the following relation to the act:

CHAPTER CXXVI, LAWS OF 1887.

A Supplement to an act entitled "An act to prevent the adulteration of food or drugs," approved March twenty-fifth, one thousand eight hundred and eighty-one.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the State Dairy Commissioner is hereby directed and empowered to aid in the enforcement of the provisions of the act to which this is a supplement; and said commissioner and his assistants duly commissioned shall be and are hereby made Inspectors under the act to which this act is a supplement; the expense of enforcing said act shall be paid out of the appropriation already made for the use of said dairy commissioner for the enforcement of the act of March twenty-second, one thousand eight hundred and eighty-six, entitled "An act to prevent deception in the sale of oleomargarine, butterine or any imitation of dairy products, and to preserve the public health."

2. And be it enacted, That this act take effect immediately.

Approved April 11th, 1887.

While he is "empowered to aid," it is also evident that some of his powers are co-ordinate, rather than under direction of the board.

The law makes himself and his assistants Inspectors under the act, and the expense of his part of the enforcement of the act is regulated by him and drawn from the appropriation of the oleomargarine law. The chief relation of the board is that it defines the limits of variability in articles and determines any article of food exempted from the law, and it has to designate the Analysts or Chemists to whom all samples are to be referred.

In the performance of the duties of this board in relation to the law, the following are the rules which the State Board of Health has adopted for the government of Inspectors and Analysts under the law:

RULES.

DUTIES OF INSPECTORS.

1. The Inspector is to buy samples of food or drugs, and to seal each sample in the presence of a witness if prosecution is intended.

2. The Inspector must affix to each sample a label bearing the number as authorized for that purpose.

3. Under no circumstance is the Inspector to inform the Analyst as to the source of the sample before the analysis shall have been completed.

4. Inspectors are to keep a record of each sample as follows:

(1) Number of sample.
(2) Date and time of purchase.
(3) Name of witness to sealing.
(4) Name and address of seller.
(5) Name and address of producer, manufacturer or wholesaler, when known, with marks on original package.
(6) Name of Analyst and date of sending.
(7) How sent to Analyst.

5. If the seller desires a portion of the sample the Inspector is to deliver it under seal. The duplicate sample left with seller should have a label containing the same marks as are affixed to the portion taken by the Inspector.

6. The Inspector is to deliver the sample to the Analyst, taking his receipt for the same, or he may send it by registered mail, express or special messenger.

DUTIES OF THE ANALYSTS.

1. The Chemist or Analyst is to analyze the samples immediately upon the receipt thereof.

2. Samples, with the exception of milk and similar perishable articles, are to be divided by the Analyst and a portion sealed up,

and a copy of the original label affixed, or the original package preserved, after removing sufficient for analysis, for three months.

3. Should the result of an analysis be disputed in any case in which analysis has been ordered by the State Board of Health, the defendant or person selling the sample in question, or his attorney, may appeal to said board through its secretary, and said secretary shall then require another chemist to repeat the analysis, using a duplicate portion of the original sample. But when such an appeal shall be made, a sum of money sufficient to cover the expenses of the second analysis shall be deposited with the Secretary of the State Board of Health; which sum shall be paid to the analyst designated, as required above, to make said second analysis, in case the analysis shall be found to agree with the first in all essential particulars. But in case the sample has been procured by the dairy commissioner, or inspectors appointed by him, any such appeal shall be to the dairy commissioner, and the money deposit for the second analysis be made with him, subject to the conditions above stated.

4. In the case of all articles having a standard of purity fixed by any of the laws of the State, the certificate of the analyst should show the relation of the article in question to that standard.

5. Each analyst should keep a record book in which should be entered notes as follows:

(1) From whom the sample is received.
(2) Date, time and manner of receiving the sample.
(3) Marks on package, sealed or not.
(4) Results of analysis in detail.

6. At the completion of the analysis, a certificate in the form given below shall be forwarded to the Board of Health if the analysis had been ordered through it, or to the dairy commissioner if ordered through him.

CERTIFICATE.

To whom it may concern:

I, ...a chemist appointed by the State Board of Health of New Jersey, under the provisions of an act entitled "An act to prevent the adulteration of food and drugs," approved March 25th, 1881, do hereby certify that I received from.....on the.....day of....., 18....., a sample of..... ....., sealed as required by the rules of said Board, and bearing the following marks to wit: ....

I carefully mixed said sample and have analyzed the same, and hereby certify and declare the results of my analysis to be as follows: ....[*Signature.*]

7. Samples sent to analysts are to be retained for the space of three months.

EXCEPTIONS REGARDED BY THE BOARD OF HEALTH AS RECOGNIZED BY THE LAW.

Mustard—Compounds of mustard, with rice flour, starch or flour, may be sold if each package is marked "Compounded Mustard," and if not more than 25 per cent. of such substances are added to the ground mustard. The words "compounded mustard" shall be printed on each package in clear letters, not smaller than great primer.

Coffee—Mixtures of coffee, with chickory, rye, wheat, peas or other cereals, may be sold if each package is marked "Coffee Mixture," provided that said mixture shall contain at least 25 per cent. of true coffee. The words "coffee mixture" shall be printed on each package in clear letters, not smaller than great primer.

Syrups—When mixed with glucose, syrups may be sold if the purchaser is informed at the time of the purchase that said syrup is mixed with glucose or grape sugar.

Condensed Milk—Condensed milk shall contain at least 8.50 per cent. of fat.

Vinegar—Vinegar shall contain at least 4.50 per cent. of absolute acetic acid. Vinegar other than pure cider vinegar may be sold if the purchaser is informed at the time of purchase that the article is not cider vinegar.

Milk shall contain the amount of solids required by law.

Canned Goods shall not contain any poisonous metal.

Pickles shall not contain any metal.

Baking Powders—The market is flooded with large quantities of inferior baking powders, and as these are sold largely to working people, and are used by these people as substitutes for yeast, it is necessary, in order that light bread be made, that these powders have proper leavening power. This power the cheaper powders do not have, many of them giving off very little carbonic gas. These cheap and imperfect baking powders contain alum or phosphate, and are so crudely compounded that a residue is left in the bread or biscuit after baking. The public are warned against these, and in their suppression will be faithfully aided.

The purpose of the State Board of Health in the future will be, as in the past, to watch and investigate any suspected adulterations affecting the public health, to suppress the same and to acquaint the public, through the reports of the State Board, with the more frequent and injurious adulterations, except those of milk and oleomargerine, which are committed to a special commissioner. To adulterations which are only commercial frauds, although these need suppression, the Board of Health has no relation.

The Analysts or Chemists who have been selected under the law as to the adulterations of foods or drugs to make examinations when required, are Prof. A. R. Leeds, of Hoboken; Prof. H. B. Cornwall, of Princeton; Shippen Wallace, of Burlington, and Wm. K. Newton, M.D., of Paterson. These are at the command of the Dairy Commissioner for the examination of foods and drugs. They may be employed by him singly, or he may employ any one of them on terms which he may arrange.

There is no council or Committee of Analysts or Chemists, but

each Chemist is employed either by this Board or the Dairy Commissioner, as he is needed.

Under the milk law for analyses of milk, the same Chemists, together with August Drescher and H. B. Baldwin, of Newark, were appointed.

In addition, the act as to a State Laboratory, approved April, 1888, provides "that the Chemist or Chemists of the State Agricultural Experiment Station shall analyze all samples of milk, butter or other farm products, or the imitations thereof that may be sent to said Station by the State Dairy Commissioner.

Any communications as to water supply should be addressed to the State Board of Health.

The special attention of Local Boards is drawn to the law as to kerosene (Circular XLII), since it is now easy by proper local oversight to prevent the sale of dangerous oils.

It is the desire of this Board fully to co-operate with all authorities as to the laws referred to in this Circular, so far as practicable and expedient, and so far as they fall under our jurisdiction or advisement.

For copies of Circulars, address

EZRA M. HUNT, M. D., *Secretary*,

February, 1889. TRENTON, N. J.

MEDICAL REGISTRY.

The law makes it the duty of every person settling in this State for the practice of medicine and surgery, to file a copy of his diploma, or in case of twenty years' practice in any one locality in this State, a certificate thereof, in the office of the County Clerk. The diploma is not merely any writing or certificate which may be given, but must be from a chartered medical college. The law is founded upon the right of the public to know that those who claim capacity for the treatment of disease, should be able to show some evidence thereof. The State really owes it to itself somehow, to protect its citizens more fully from the imperfect knowledge and lack of skill of many, who, although graduated from inferior institutions, are not fitted for their work. Since the law at present reaches only to the requirement of registry, this must be fully complied with, and proper examination made of diplomas presented. The following are the lists furnished by County Clerks for the past year. County Clerks, when receiving copy of diploma, should enter upon it the P. O. address of the person.

ATLANTIC COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D
Cordell, Eugene Fauntelery	Atlantic City..	Mar. 5, '89	Baltimore.....	July 12, '89
Cleveland, Arthur Horton.	" "	May 1, '89	University of Pennsylvania	Aug. 10, '89
Carpenter, J. Thomas.....	" "	" "	" "	" "
Griswold, William.....	Absecon	Apr. 15, '86	Homeopathic, Jersey City..	Jan. 12, '89
Garsides, W. B.....	Atlantic City..	Mar. 1, '68	" "	July 10, '89
Gadd, S. Wesley.....	" "	May 1, '89	University of Pennsylvania	July 30, '89
Hunsberger, J. Newton...	" "	" "	" "	June 8, '89
Rush, Leamen.....	" "	Apr. 2, '82	Jefferson, Philadelphia.....	July 2, '89
Pennington, Byron C.....	" "	Mar. 21, '81	" "	June 3, '89
Reed, Eugene L.....	" "	1884	University of Pennsylvania	Nov. 30, '88
Thompson, Jesse B.....	" "	May 1, '88	" "	Jan. 11, '89
Thatcher, Jesse William...	Ocean City.....	.....	Hahneman College, Phila..	July 10, '89

BERGEN COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Clark, Edward Wright	Tenafly	May 12, '87	Col. Phys. & Surg. N. Y.	Jan. 23, '89
McFadden, George Howard	Hackensack	Mar. 11, '89	Bellevue Hosp. Med. College	Mar. 19, '89
Otto, John M.				May 29, '89
Van Winkle, Jacob O.	Hackensack	May 12, '87	Col. Phys. & Surg., N. Y.	" 28, '89
Ackerman, William P.	"	Mar. '70	Bellevue Hosp. Med. College	Aug. 17, '89
Cosine, Garret	"	" 1, '68	" " " "	" 13, '89
Hazzen, Elijah B. G.	New York City	June 28, '89	Med. & Sur. Col. Jersey City	Oct. 14, '89
King, C. M. Murriel M.	" " "	Sep. 27, '89	Dru. Bau. of N. Y., Buffalo	" 7, '89
Muller, John	Carlstadt	Oct. 11, '87	L. Is. Hosp. Coll. Brooklyn	" 24, '89
Pfingsten, Gustav	New York City	June 28, '89	Med. & Sur. Col., Jersey City	" 7, '89

BURLINGTON COUNTY.

Cassady, John Bradnex	Burlington	April, '89	Pennsylvania Med. College.	Apr. 6, '89
Balcon, Lafayette	"	Apr. 16, '64	Buffalo Medical University.	May 31, '89
Bancroft, Augustine A.	"	Apr. 27, '69	Hahneman College, Phila.	" " "
Follett, William M.	Transient	Mar. 1, '73	Electrical Med. Col., N. Y.	
McFarland, Burr W.	Vincentown	April, '89	Jefferson Med. Col., Phila.	Feb. 8, '89
Still, Joseph C.	Mount Holly		Affidavit filed May 27, 1889.	
Ironside, Allen S.	Florence.	Apr. 4, '89	Hahneman	Apr. 5, '89
Lippincott, Thomas S.	Pemberton	Mar. 15, '88	Baltimore Phys. Sur.	Aug. 30, '89
Lane, Lewis S.	"	Apr. 4, '88	Jefferson Medical College.	Sept. 11, '89
Martin, William.	Rancocas		" " "	Apr. 15, '89
Parrish, William	Burlington	Apr. 3, '85	University of Marlyand	Apr. 23, '89
Hilliard, Franklin W.	Mount Holly		Affidavit filed.	Apr. 13, '89

CAMDEN COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Denvey, R. P.		June 20, '70	Elec. Med. Coll. of Pa.	Dec. 27, '87
Palmer, W. L.		Mar. 29, '84	Jefferson Medical College	" 30, '87
Green, J. A.		Sept. — '66	Electric Medical College	Jan. 23, '88
Masston, A. J.		May 9, '76	" " "	" 25, '88
Damon, S. J.	Camden	Dec. 1, '76	Amer. Health Coll., Cin. O	Feb. 8, '88
Hylton, John Dunbar	Palmyra	Mar. 14, '66	University of Pa.	" 14, '88
Gibbs, Godfrey		" — '84	Jeff. Med. Coll., Phila.	Mar. 5, '88
Fortiner, Byron E.		" 1, '88	Penn. Coll. of Den. Surg.	" 7, '88
Loper, Augustus		May 20, '80	Coll. Phys. & Surg., Ontario	" 9, '88
Soper, Lymand W.	Gloucester City	" 22, '80	Electric, Cincinnati, O.	" "
Delap, W. L.		Mar. 31, '86	Hahnemann Med. College	" 28, '88
Adamsen, Hans		April 4, '88	Jefferson Med. College	April 16, '88
Lewis, Benjamin Sykes		" "	" " "	" 26, '88
Hill, E. Hart		" 6, '88	Hahnemann Med. College	May 2, '88
Miller, Edwin H.		May 1, '88	University of Pennsylvania	" 3, '88
Macfarland, B. W.		April 4, '88	Jefferson Medical College	" 7, '88
Lane, J. Lewis		" 4, '88	" " "	" "
Sharp, Lewis L.		" 6, '88	Hahn. Med. Coll., Phila.	" 17, '88
King, Joseph H.		June 25, '67	Electric Med. Coll., Phila.	" 21, '88
Pursell, John C.		—— — '82	Jefferson Medical College	June 15, '88
Lamback, Frederick, Jr.		May 2, '87	University of Pennsylvania	" 21, '88
Smith, Samuel Bryan		April 6, '88	Hahn. Med. Col., Phila.	" "
Hinds, W. Hugh		May 22, '78	American Health College	" 27, '88
Murray, J. M.		Mar. 10, '76	U. P. A. (621 N. 2d St.)	July 11, '88
Baer, J. S.		April 4, '88	Jefferson Medical College	" 14, '88
Hume, Chas.		Mar. 4, '82	Missouri Medical College	" 16, '88
Jennings, W. B.		April 4, '88	Jefferson Medical College	" 18, '88
Work, R. A.		Nov. 27, '80	American Health College	Aug. 4, '88
Tucker, Edward J.		Mar. 6, '85	University of New York	" 10, '88
Bean, F. A.		—— — '55	Metropolitan Med. Coll. N. Y	Sept. 18, '88
Braymer, Orange Whitney		April 4, '88	Jefferson Medical College	" 22, '88
McGill, Edw. K.	Collingswood	Mar. 10, '80	Hahnemann Medical College	Oct. 4, '88
Flower, R. C.		" — '81	Amer. Health Coll., Cin., O.	" 16, '88
Barnart, Newton H.		April 6, '88	Hahnemann Medical College	" 22, '88
Emick, M. Luther		" 4, '88	Jefferson Medical College	Dec. 3, '88
Wright, A.	Berlin	Mar. 6, '74	Hahnemann Medical College	" 19, '88
Bray, W. T.	Camden	April 5, '87	Jefferson Medical College	Feb. 1, '89
Ashcraft, Samuel Fisler		" 4, '87	" " "	" 7, '89
Bower, E. E.		May 1, '88	University of Pennsylvania	" 18, '89
Slocum, Herricuin A.		Mar. 24, '79	" " "	Mar. 8, '89
Longshorn, Hannah E.		Dec. 30, '51	Pennsylvania Med. College	" 21, '89
Scott, John M.		Mar. 23, '89	McGill Medical College	" 23, '89
Beckman, O. H.		" 29, '84	Jefferson Medical College	" 27, '89
Williams, W. C.		Mar. 8, '77	Hahnemann Medical College	April 6, '89
Jennings, Charles H.	Merchantville	April 3, '89	Jefferson Medical College	" 9, '89
Moslander, Wm. S.		" 4, '89	Hahnemann Medical College	" "
Nueneman, M. A.		Mar. 25, '81	Penn Medical College Phila.	" 10, '89
George, James A.		April 4, '89	Hahnemann Medical College	" 11, '89
Fraser, Jas. Mitchell		Nov. 27, '87	McGill University Montreal	" 12, '89
Makuer, George Hudson		April 3, '89	Jefferson Medical College	" 15, '89
Stearns, Moses		Mar. 20, '89	Baltimore Universityof Md.	" "
Tomlinson, John		" 15, '85	Baltimore Medical College	" 19, '89
Gener, Edwin H.		April 4, '89	Hahnemann Medical College	" 22, '89
Wallace, Clarance J.	Camden	" "	" " "	" 27, '89
Kensinger, Wm. H.		" 3, '89	Jefferson Medical College	May 7, '89
Goodwin, Eugene B.		May 1, '88	University of Pennsylvania	" 8, '89
Horning, Frank L.		" 1, '89	" " "	" 27, '89
Balcom, Lafayette		Feb. 16, '64	University of Buffalo	June 3, '89
Shivers, B. H.		April 6, '88	Hannemann Medical College	" 6, '89
Osmun, Wm. F. H.		" 3, '89	Jefferson Medical College	July 12, '89
Martin, William		" "	Jefferson Medical College	" 26, '89
Danuom, Emma A.		June 26, '89	Phila. Univ. of Med. & Surg.	Aug. 7, '89
Richie, G. F.		April 3, '89	Jefferson Medical College	Oct. 9, '89
Eaton, Frederick M.		" 24, '89	Hahnemann Medical College	" 14, '89
Phillips, Horace		May 1, '89	University of Pennsylvania	" 26, '89

CAPE MAY COUNTY.

Hand, Zelapheard	Cape May C. H.	Mar. 1, '89 In Latin	Penna. Col. Dent. Surg.	June 22, '89
Thatcher, Jesse Williams	3500 Hamilton st., Phila.	supposed Mar. 10, '70	Hahnemann Med. Col., Phil.	June 28, '89

CUMBERLAND COUNTY.

NAME OF PHYSICIAN.	P.O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D
Balcom, Lafayette		Feb. 16, '64	Buffalo Medical University.	June 7, '89
Bancroft, Augustinus A		Feb. 27, '69	Hahnemann College, Phila.	" "
Day, S. T	Port Norris	Apr. 8, '89	Academia Fenal Mariæ	May 7, '89
Dunlap, Mary J	Vineland		'86 College of Medicine, Phila.	Aug. 15, '89
Hansel Adolph	"	May 22, '88	Freidburg Col., Germany	Feb. 5, '89
Howard, Emory E	Rosenhayn	June 4, '84	University of Vermont	Mar. 20, '89
Lyon, Melvern S	Millville	Apr. 4, '89	Hahneman Med. Col., Phil.	May 24, '89
Taylor, A. C	Vineland	Ap. 6, '50	University of Pennsylvania	Oct. 12, '89

ESSEX COUNTY.

Belz, Wilhelmina M. U	Nov. 7, '88	College of Midwifery	Dec. 31, '88	
Bailey, William Otto	Mar. 12, '89	Univ. Med. College, N. Y.	Mar. 18, '89	
Balcom, Lafayette	Feb. 16, '64	University of Buffalo	April 5, '89	
Bancroft, Augustinus A	" 27, '69	Homeopathic Med. Coll., Pa	" "	
Baldwin, Mary H. E	" 14, '78	Eclectic Med. Coll., N. Y.	May 29, '89	
Crawley, AddieB., now Dake	Mar. 24, '86	Ho. Med. Coll., Clev'd, O.	" 9, '89	
Case, Levi W	" 12, '80	Coll. of Phys. & Surg., N. Y.	June 14, '89	
Collins, James W	" 23, '63	Bellevue Hos. Med. College	Oct. 16, '89	
Calabress, Bern., Physician	" 10, '61	University of Naples, Italy	Nov. 6, '89	
Calabress, Bern., Surgeon	June 16, '62	" " "	" "	
Dawnie, Elizabeth K	" 20, '88	Tr. Sch. for Nurses, Newark	Jan. 28, '89	
Francis, Ricardas Pearce	" 24, '88	Harvard Medical College	Feb. 16, '89	
Frings, Charles H	Dec. 21, '57	Keil Med. Univ., Germany	" 18, '89	
Fetter, Naunahum	Sept. 30, '81	Kam. Pad. Univ., Austria	June 26, '89	
Felts, Cethe C	April 2, '86	Hahnemann Med. Coll., Pa.	July 13, '89	
Goldberg, Leo Gustave	May 24, '87	Univ. of Heidelberg, Germ.	Feb. 14, '89	
Galloway, Alonzo	April 12, '88	Druidic Ban., Buffalo, N. Y.	June 23, '89	
Guggenheim, Max	Mar. 29, '89	Tullo Mas., Vertsberg, Ger.	Oct. 21, '89	
Hadley, Charles H	June 1, '81	Boston University, Mass.	Nov. 30, '88	
Happe, Catharine	Dec. 29, '88	Col. Coll. of Mid., N. Y.	Feb. 11, '89	
Holmes, William Lane	Mar. 11, '89	Bellevue Hosp. Med. Coll.	Sept. 9, '89	
Jordan, Philip J	May 28, '72	New York Medical College	April 19, '89	
Lane, Frank B	June 1, '86	Elec. Med. Coll., Cin., O.	May 29, '89	
McFarland, David W	Mar. 6, '85	University City of N. York	Jan. 4, '89	
Maussette, Maria M	June 20, '88	Tr. Sch. for Nurses, Newark	" 28, '89	
Maghee, James M	May 12, '87	Coll. Phys. & Surg., N. Y.	Mar. 2, '89	
Morrison, Caldwell	" 14, '89	Home. Med. Coll., N. Y.	July. 6, '89	
Mahler, Wilhelmina	" 24, '89	Coll. Mid., Heidelberg, G.	" 16, '89	
McDowell, George W. A. B.	April 15, '86	Home. Med. Coll., N. Y.	Aug. 2, '89	
Nelden, Andrew Linn	May 18, '82	" " " "	Nov. 28, '89	
Newton, Richard C	Mar. 1, '77	Coll. Phys. & Surg., N. Y.	Dec. 5, '89	
Parker, Charles Benjamin	" 11, '89	Bellevue Hosp. Med. Coll.	Apr. 1, '89	
Rodemann, William Chas.	" "	" " " "	Mar. 13, '89	
Rusby, Henry S	May 13, '84	University of New York	April 2, '89	
Ripley, Charles D	June 13, '89	Coll. Phys. & Surg., N. Y.	June 27, '89	
Starkweather, Charles F	Oct. 16, '66	Berk. Med. Coll., Mass.	Feb. 7, '89	
Shick, William Franklin	May 1, '88	University of Pennsylvania	May 10, '89	
Whitney, Albert B	Mar. 17, '63	Penn Medical University	Feb. 11, '89	
White, Henry D	May 12, '87	Coll. Phys. & Surg., N. Y.	May 4, '89	
Webner, Frederick	June 13, '89	" " " (Col.)	June 15, '89	
Wegner, Augusta S	July 31, '88	Coll. of Midwifery	" 17, '89	
Weiner, Alfred	June 13, '89	Columbia College, N. Y.	" 21, '89	
White, William H		Affidavit of 20 yrs. practice	July 27, '89	

GLOUCESTER COUNTY.

Lefevere, Adrinetta L		1889	Women's Med. Col., Phila.	May 31, '89	
Parker, T. E	Woodbury	"	Hahnemann College, "	Nov. 8, '89	

HUDSON COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Aden, Fremont		Mar. 9, '85	N. Y. College of Dentistry	April 28, '89
Brokhaus, Maria H.		April 23, '89	N. Y. Med. A. for Women	April 26, '89
Balcom, Lafayette		Feb. 23, '64	University of Buffalo	May 10, '89
Bancroft, Augustus A.		Feb. 27, '69	Penn. Homeo. Med. Col.	May 10, '89
Bowen, Horace		May 14, '89	N. Y. Homeo. Med. Col.	June 15, '89
Brownell, Carl De Wolf		Mar. 9, '88	University of New York	June 17, '89
Barnes, Charles A.		Feb. 8, '30	Maine Medical College	Oct. 16, '89
Broughton, Mark A.		June 28, '89	Med. & Surg. Col. of N. J.	Aug. 15, '89
" "		Mar. 6, '81	Eclectic Med. Col. of N. Y	Dec. 4, '89
Clausen, Bernard		April, '68	N. Y. Homeo. Med. Col.	Mar. 11, '89
Connell, John		May 14, '89	N. Y. Homeo. Med. Col.	June 5, '89
Culver, William			Affidavit 20 years practice	Aug. 21, '89
Davis James (Jacobum)		Feb. 8, '83	Eclectic Med. Col. of Maine	May 15, '89
Drossner, Morris		Mar. 19, '63	Univ. of Greifswald, Ger.	May 20, '89
Dennis, Leban		Mar. 8, '66	Col. of Phy. & Sur., N. Y.	July 26, '89
Davies, John H.		June 28, '89	Med. & Sur. Col. of N. J.	Oct. 8, '89
Elmore, William T.		Nov. 20, '88	Dartmouth Col., New H.	July 19, '89
Fopeano, Joseph E.		Mar. 14, '89	Long Island Col. & Hos.	April 4, '89
Faison William F.		June 27, '88	University of Virginia	June 17, '89
Finerty, Joseph W.		May 14, '89	Homeo. Med. Col. of N. Y	Sept. 11, '89
Graham John H.		Mar. 3, '88	St. Louis Col. of Phy. & S.	Feb. 7, '86
Gotwols, Alfred L.		June 7, '88	Amer. Ec. Med. Col. of O.	July 23, '89
Gray Daniel T.		Mar. 5, '52	University of New York	July 26, '89
Gray James E.		Mar. 6, '85	University of New York	Dec. 4, '89
Hazzan, Elias B. G.		June 28, '89	Med. & Sur. Col. of N. J.	Aug. 6, '89
Hill, Christopher D.		June 27, '88	University of Virginia	Dec. 20, '89
Kahn, Arthur		June 11, '86	Fred. William U. of Berlin	Sept. 16, '89
Kirchgessner, Emil		June 28, '89	Med. & Surg. Col of N. J.	Sept. 18, '89
Lange, Oscar		Mar. 4, '89	University of New York	Mar. 22, '89
La Vance, George W.		Mar. 11, '89	Bellevue Hos. Med. Col.	Aug. 13, '89
Lawrence Elijah W.		April 28, '63	Uni. of Med. & Sur., Phil.	Oct. 4, '89
Montmarquet, Joseph D.		June 13, '89	Col. of Ph. & Sur. of N. Y	June 14, '89
Lean, John J. M.		April 22, '88	Halifax Med. Col., NS.	Oct. 26, '89
Opdyke, Charles P.		May 14, '89	N. Y. Hom. M. Col. & H.	April 22, '89
Potter, George E.		June 1, '80	Amer. Ec. Inst. of Cin.	June 1, '89
Pfenning, August C.		June 13, '89	Col. of Phy. & Sur., N. Y.	June 18, '89
Pindar, David B.		June 13, '89	Col. of Phy. & Sur., N. Y.	Aug. 6, '89
Pfingsten, Gustav		June 28, '89	Med. & Surg. Col. of N. J.	Aug. 6, '89
Sanborn, Noah		Sept. 12, '61	Dartmouth College, N. H.	Mar. 29, '89
Smith, Hulda G.		Feb. 3, '78	N. Y. Medical College	June 6, '89
Smith, George R.		June 28, '89	Med. & Surg. Col. of N. J.	Oct. 8, '89
West, John E.		Mar. 1, '67	Medical College of Ohio	Feb. 9, '89
Wolfstion, Louis		Mar. 14, '89	Long I. Med. Col & Hos	Mar. 28, '89
Walter, A. P.		Mar. 4, '84	Med. & Surg. Col., Bal.	Aug. 29, '89
Wilkinson, Walter		Oct. 11, '89	Bel. Hos. Med. Col., N. Y.	Nov. 4, '89

HUNTERDON COUNTY.

Fahr, John Wm.	Milford	April 5, '87	Jefferson Med. Col., Phila.	July 2, '89
Johnson, Thomas	Whitehouse		(affidavit filed)	Aug. 9, '89
Nixon, Warford L.	Riegelsville	April 3, '89	Jefferson Med. Col., Phila.	May 4, '89
Swift, George Parsons	Lambertville	Feb. 28, '77	University of Boston, Mass.	May 21, '89

MERCER COUNTY.

Abbott, Josephus B.	Trenton	'87	Philadelphia, Pa.	Mar. 13, '89
Balcom, La Fayette		Feb., '61		" 23, '89
Wilbur, William L.			University of Pennsylvania	Apr. 10, '89
Silver, George Addison		'81		" 18, '89
Norton, H. G.			University of Pennsylvania	" 27, '89
Sches, W. J.			" "	May 14, '89
Emke, W. J.	Trenton		University of Michigan	July 19, '89
Satterthwait, Laura H.	"	'88	Pennsylvania	Sept. 9, '89

MIDDLESEX COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCATION.	WHEN COPY WAS DEP'D.
Bancroft, Augustine		Feb. 27, '69	Homœ'ic Med. Col., Phila.	April 18, '89
Balcom, Lafayette		" 23, '64	University of Buffalo, N. Y.	" "
Brough, Frank T.	New Brunswick	June 13, '89	College Med. & Sur., N. Y.	June 14, '89
Dana, Edward B.		" 13, '89	Col. of Phy. & Surg., N. Y.	" 11, '89
Schario, Mary L. J.	Sayreville	" 20, '89	College of Midwifery, N. Y.	" 12, '89
VanDyke, C. D. W.		Feb. 4, '79	Albany Medical College	May 2, '89
Miller, Chas. N.		May 14, '83	Bellevue Hospital Med. Col.	April 2, '89
McKenzie, Jr., W. V.		" 13, '84	Columbia College	July 25, '89
Mass, Chas. T.	New Brunswick	Mar. 31, '86	Univ'ity of the City of N. Y.	Aug. 15, '89
Miller, Elijah		May 1, '86	University of Pennsylvania	Sept. 7, '89

MONMOUTH COUNTY.

Brewer, Joseph S.		Mch. 15, '82	Bellevue Med. Col. N. Y.	June 12, '89
Booth, Joseph A.		" 4, '89	University of New York	" 26, '89
Bowen, George W.		" 12, '72	University of Pennsylvania	July 5, '89
Ballentine, Allen D.	Asbury Park	" 31, '86	Hahneman Medical College.	Aug. 15, '89
Currie, Margaretta C.	Ocean Grove	" 6, '81	U. S. Medical College, N. Y.	July 13, '89
Fortiner, George R.	Asbury Park	Sept.. '87	Hahneman Medical College.	" 26, '89
Fortiner, Ida F.	"	Mch. 7, '89	Penna. Medical University.	" " "
Hendrickson, Henry A.		" 4, '89	New York University	Mch. 19, '89
Houghton, Hezekiah S.	Monm'th Beach	" 15, '86	Bellevue Hos. Med. College	June 18, '89
Howell, Elmer E.		Apr. 10, '89	Jefferson Medical College	July 3, '89
Hasbrouck, Stephen	Ocean Beach	Mch. 1, '86	N. Y. Hosmer Medical Col.	" 6, '89
Keough, John G.		June 13, '89	Columbia College	Oct. 1, '89
Maynard, Jacob G.		Mch. 29, '50	University of Pennsylvania	May 10, '89
Price, F. C.		Feb. 28, '79	Medical College of Ohio	Mch. 13, '89
Smith, Robert Morton		Mch. 13, '89	Col. Phy. & Surg., Baltim'e	May 27, '89
Sands, J. Seldon		" 31, '82	Jefferson College	June 6, '89
Souville, Mathias		{ Ap. 11, '80	Uni'y Varsouvia, Poland	
		{ Oct. 18, '84	Syracuse University	{ July 6, '89
Thompson, George S.	Asbury Park	Oct. 29, '78	Dartmouth College	June 11, 89
Williamson, Alexander		Mch. 14, '78	University of Pennsylvania	April 25, '89
Warner, David	Asbury Park	" 20, '62	Bellevue Medical College	July 22, '89
Yard, P. W.		" 4, '89	University of New York	" 2, '89

MORRIS COTNTY.

Adsit, N. H.	Succasunna	Mar. 15, '86	Col. of Phy. & Sur. Mary'd	Nov. 26, '88
Burr, Chauncey Rea	Morristown	June 27, '88	Harvard University	Apr. 10, '89
Burns, S. W.	Chester	May 2, '87	University of Pennsylvania	" 12, '89
Crawford, Daniel M.	Mt. Olive	Mar., 1886	University State of N. Y.	Oct. 13, '88
Foster, George H.	Rockaway	" 18, '89	Bellevue Hos. Med College	May 31, '89
Hay, Charles M.	Morris Plains	May 1, '88	University of Pennsylvania	Dec. 11, '88
Mial, L. L.	Morris Plains	" 2, '87	" "	Oct. 31, '88
Smith, Wm. A.	Boonton		By affidavit 20 years' prac.	Nov. 24, '89

OCEAN COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA.	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Weeks, Carlisle B.....	Forked River..	Mar. '80	Jefferson Med. Col., Phil..	Jan. 10, '89
Sinclair, Benjamin F.....	Lakewood.....	Dec. 7, '88	N. Y. Col. of Magnetics...	Feb. 2, '89
Allen, Howard.....	New Egypt....	Mar. 13, '89	Med. & Chir. Col., Bal....	Mar. 26, '89
Kirk, Irvin W.....	Manchester....	Mar. 30, '89	" " "	April 3, '89
Carlisle, Robert James.....	Bay Head.....	Mar. 13, '84	Bell. Hos. Med. Col. N. Y.,	June 20, '89
Price, William Henry.....	Island Heights.	May 1, '89	University of Pennsylvania	June 29, '89

PASSAIC COUNTY.

Bowden, David Thomas....	Paterson.....	Oct. 8, '86	University of Maryland....	Apr. 11, '89
Brockway, Almond Crandell	"	Mch. 4, '89	University of New York...	May 23, '89
Brown, James Alexander..	"	June 13, '89	Col'a Col. & Phy. & Sur. N. Y	June 17, '89
Bancroft, Augustus A.....	"	Feb. 27, '89	Homœopathic Med. Col.. Pa	Sept. 18, '89
Cunningham, Wm. Patrick	Passaic Bridge,	Mch. 14, '87	Bellevue Hospital Med. Col.	Nov. 10, '88
Craig, Charles.....	Paterson.....	Sept. 21, '82	Detroit Medical Col., Mich.	Jan. 23, '89
Demarest, Frederick F. C.	"	Mch. 12, '88	Bellevue Hospital Med. Col.	" 28, '89
Dunning, Charles.....	Passaic	May 12, '87	Columbia Medical College..	Feb. 6, '89
Fisher, George.....	Paterson.....	Jan. 16, '89	Wurtz'g Bav. Acad. Jul. Max	July 9, '89
Gladwin, Daniel W.....	"	April 16, '86	American Health College...	May 17, '89
Guggenheim, Max.....	"	May 19, '87	Med. Col. Univ'y Wurt'g Ger	Aug. 26, '89
Hadley, Jacob Francis.....	Passaic.....	Mch. 14, '89	Long Island College Hospit'l	July 24, '89
Kiersted, Christopher.....	Little Falls.....	Dec. 31, '42	Med. Society of State of N. Y	May 17, '89
McBride, Andrew Francis.	Paterson.....	June 13, '89	Col'a Col. & Phy. & Sur. N. Y	June 15, 89
Matzinger, William.....	"	May 19, '80	University of Basel, Switz'd	Oct. 28, '90
Putney, Alfred Lyman.....	Passaic.....	Mch. 1, '70	Bellevue Hospital Med. Col.	Apr. 13, '89
Sternberg, Fred'k Alexan'r	Paterson.....	" 3, '89	N. Y. Eclectic Medical Col.	" 3, '89
Smith, William A.....	"	.....	Affidavit of 25 yrs. prac. filed	Oct. 28, '89
Wemarsey, Edward H.....	West Milford ..	.....	Affidavit filed June 13, '89,..	.....
Zimmerman Charles.....	Paterson	Mch. 6, '84	Homœopathic Med. Col., Ill.	Aug. 1, '89

SOMERSET COUNTY.

Sutton, Edward.....	Somerville.....	May 10, '88	Columbia Medical College..	Mar. 26, '89
Gorton, W. H.....	North Plainfield "	12, '81	Jefferson Medical College..	May 10, '89
Phinney, Charles Fremont.	Bound Brook...	Aug. 14, '86	Vermont Medical College..	" 11, '89
Gaston, Miss M. E.....	Somerville	May 15, '88	Penn. Medical College.....	July 9, '89

SALEM COUNTY.

MacNeil, William.....	Salem.....	Feb. 24, '88	Penn. Col of Dent. Surgery	Mar. 23, '89
Barnart, Newton B.....	Woodstown	April 26, '89	Hahn. Med. College, Phila.	Sept. 28, '89
Freedom, Ellis.....	"	" 30, '89	Jefferson College, Phila....	" "
Patrick, Gulelman J.....	"	June 4, '89	University of Pennsylvania	June 4, '89
Groof, F. Humphrey.....	Pennsgrove	March '76	Terrae-Mariae, Baltimore..	Nov. 2, '89

SUSSEX COUNTY.

Hood, Bruno.....	Newton.....	May 12, '85	Univ. & M. & S. Col., N. Y	Jan. 29, '89
Armstrong, Edward C.....	Coleville.....	Mar. 4, '89	University Col. of N. Y....	May 14, '89

UNION COUNTY.

NAME OF PHYSICIAN.	P. O. ADDRESS.	DATE OF DIPLOMA	INSTITUTION CONFERRING DIPLOMA—ITS LOCALITY.	WHEN COPY WAS DEP'D.
Allis, J. A.	Plainfield	June 13, '89	Col. of Phy. & Sur., N. Y.	June 25, '89
Banker, Pierre A	Elizabeth	Mar. 12, '79	Homeo. Med. Col., N. Y.	Mar. 1, '89
Bancroft, Augustus A.	"	Feb. 27, '69	Hamlon H. Med Col., Phil.	May 1, '89
Balcom, Lafayette	"	Dec. 14, '64	University of Buff., N. Y.	May 1, '89
Francis, Joseph M.	Brooklyn	May 2, '72	Amer. Elec. Col. of Ohio.	May 11, '89
Garton, W. F.	Plainfield	Mar. 12, '81	Jefferson, Col. of Penn.	Jan. 4, '89
Green, James Sprat	Elizabeth	June 13, '89	Col. of Phy. & Sur., N. Y.	July 17, '89
Martin, Arthur Jacob	"	Mar. 11, '89	Bell. Hos. Med. Col. N. Y.	Mar. 13, '89
Terrill, Louise F.	"	April 16, '89	Col. C. of Midwifery, N. Y	July 12, '89

WARREN COUNTY.

Burd, William J.	Belvidere	—— —, '89	University of Pennsylvania	May 3, '89
Fahr, John W.	Milford	—— —, '87	Jefferson Med. Col, Phila.	July 6, '89
Miller, John	Hope	—— —, '86	University of New York.	Jan. 15, '89
Shipman, William	Shimer's P. O.	—— —, '36	Jefferson College, Phila.	Nov. 26, '89

REPORT

OF THE

BUREAU OF VITAL STATISTICS

OF THE

STATE OF NEW JERSEY

FOR THE

Statistical Year from July 1st, 1888, to July 1, 1889,

WITH CLIMATOLOGY, ETC.

By EZRA M. HUNT, M. D., D. Sc.,

Secretary and Medical Superintendent of Vital Statistics.

REPORT ON VITAL STATISTICS

BY THE MEDICAL SUPERINTENDENT OF VITAL STATISTICS.

INTRODUCTION.

The subject of vital statistics is one in which there is not much new to be said but as to which in the various tables that can be compiled and the conclusions that can be claimed therefrom, there is a wide field for the exercise of judgment and for the skillful tabulations of results. In previous reports we have so fully outlined the history, and the methods of this study that little is to be added in that direction. J. T. Billings, M. D., L.L.D., U. S. A., has recently given a course of lectures on vital and medical statistics which furnishes a valuable outline of the principles on which they rest and discusses the most approved methods for the collecting of the facts and for an intelligent use of the material secured.

We quote as follows some of the statements most important to those engaged either in furnishing the data or in dealing with it:

Those who are engaged in the collection and compilation of official mortality and vital statistics are often at first the most sceptical as to their accuracy and utility, for their attention is so frequently and forcibly drawn to errors in the individual data that they conclude that the whole mass is unreliable, and the difficulties in the way of obtaining complete and reliable figures are seen to be so great that they incline to give up the whole matter in despair. Continued study of the subject, however, shows that many valuable conclusions or suggestions can be derived from imperfect data, and that in large masses of figures the errors either tend to neutralize each other, or to produce a constant effect in one direction which can be calculated and allowed for, so that those who have had the greatest experience are most convinced of their value. It is true that, in statistics, the inferences cannot be more accurate than the data on which they are founded, but we do not look for scientific exactness from them so much as for an estimate of probabilities.

Other errors "are not so frequent as are the errors of involuntary misstatement and misrepresentation into which those not familiar with methods of collecting and tabulating statistics are so liable to fall."

The object of vital statistics is to classify and arrange the facts relating to the quality and character of human life under different circumstances, for the purpose of determining the effect upon it of each of these circumstances taken singly, or of two or more of them acting together. The results thus obtained form an important part of the scientific foundations of sociology of political economy, and of preventive medicine. It deals with masses of men and not with individuals, and its conclusions are, for the most part, applicable only to large bodies of people; yet its data are derived from individual records, and its results are accepted in many cases as a sufficient guide for individual action.

These abstracts are given out of their consecutive order as supplementary to details given in previous reports.

As illustrative of the indispensable relation between the collection of vital statistics and the study of sanitary problems we quote the following language from a recent address of Sir Edwin Chadwick, whose entire life, now over 90 years, has from an early age been devoted to the promotion of sanitary progress.

"It is no utopia that death rates in towns under the separate system of drainage have been reduced by one-half through the work of the sanitary engineer alone. It is no utopia that the death rate at Rugby, for example, which was one of the towns first treated by our first general Board of Health, was 24 in 1,000, and is now only 12. It is no utopia that at Salisbury the old death rate, which, at the beginning of the century, was as high as 40 in 1,000, is now about 16; or that at Croyden and a number of other places, death rates of 24 in 1,000 now average 15. These reductions have been effected by the system of circulation versus stagnation, which is yet to be made generally understood, to be by constant and direct supplies of water, by the removal of the fouled water through self-cleansing house drains and self-cleansing sewers, and by the removal of the refuse, fresh and undecomposed and unwasted, on to the land."

"Various experiences in this country by these factors alone, have established with such certainty that a contractor may contract with safety for the attainment of sanitary results, and by them the general death rate may yet be reduced by 10 in 1,000. Beyond the reduction of the annual death rate from the work of the sanitary

engineer, nothing is yet commonly expected or sought for. I had, however, early anticipated that the reduction of the annual death rate would be accompanied by an advance of the life rate; and I have recently obtained from the Registrar General examples of what that advance may be. I find that at Rugby the life rate has been extended to all living there, of every class, by eight years, or from thirty-three to forty-one years. At Hastings the duration of life has been advanced for males an average of five years and five months, but for females eight years and one month. At Leek it has been extended by ten years. At Croyden and Salisbury, and other places, the extension has been from six to seven years, females, as a rule, obtaining by our science the greatest share. That is to say, some eight years more of life rate, more of painless life, more of health and strength and beauty. These extensions of the life rates, as yet little known and regarded, belong, however, to all classes; both to the well to do and to the lowest. Of the wage classes, whose life rate is largely the lowest, the extension will be found to be the greatest."

Every year gives encouraging increase of correctness in the returns of marriages and deaths and some encouragement as to births. The law by which assessors can collect any that physicians or midwives have omitted and also report who was in attendance, aid much in all country districts, but in our cities no doubt many escape registration. It is true that applying certain calculations we can approximate the birth rate for purposes of comparison of mortality and natality, but it would be much better if more complete returns were secured. This we believe could be done if the law made some provision by which those who take the school census each year should also obtain a record of each birth.

From the fact that this State has a quinquennial census, taking with equal or greater accuracy than the decennial census, furnishing details as to numbers of families, etc., we are able to know actual population better than most of the States. At first it was conceived that it would suffice to be governed by these data making due local allowance for corrections which municipalities would themselves reckon for local purposes. But it has since our first decennial record been deemed best to reckon approximate populations for intermediate years. These will begin with the present report.

We have also made some change in the method of comment on the general death rate and special diseases.

THE MOUTH CAVITY AND ITS CONTAINED STRUCTURES AS RELATED TO DISEASE.

It has not escaped the attention of any practitioner, that several of the most common and serious of human diseases have earliest manifestation in the mouth and fauces. It is here that the infant with its apthæ or thrust often shows its first departure from health, and through all the years to old age it is the harbor for many a parasite. Parotitis has here its incipency, and all the varied forms of tonsilitis first exhibit inflammatory, follicular or septic symptoms not confined to one locality.

Scarlet fever, diphtheria and erysipelas and to some extent whooping cough, measles and small pox have here very early manifestations. Since we have come to know so many diseases to be derived from the lodgment of infective particles received through the nose or mouth into the buccal cavity, it is well that attention is turned to a more minute study of the anatomical and histological structure of all this region. This is all the more important because the mouth is more and more being recognized as the pandora box of the contagious diseases. Common sore throat is claimed to be transmissible to many directly exposed so as to inhale the breath. Dr. Harb-Brown is convinced of the communicability of forms of tonsilitis, and Dr. Lees, of St. Mary's Hospital, London, says: "Many ordinary catarrhs are distinctly contagious. We do not need at present to add to these the list of transmissions more fully recognized, but it is proper that we should so study the construction of the mouth, throat and adjacent membranes and organs as to know why here is the great source and repository of contagious.

As to the tonsils ordinarly so called, we no longer look upon them as useless relics, to indicate a connecting link between man and other animals or as located merely for the purpose of lubricater. The mucous membrane filled with crypts, the thickly located lympth follicles and the abundant plexus of lympthatic vessels and of vessels for blood supply show preparation for an activity of service similar to that of bodies, we designate organs. This lymphatic tissue is so abundant and the arterial supply so profuse

as to give great opportunity for minute particles of any kind to reach the blood through the lympthatic system. Dr. Hingston Fox calls them "nurseries of young cucocytes."

This lymphoid tissue arranged as follicles is so abundant as to make quite secondary the secretive function of the mucous glonds shared in common with the rest of the mucous membrane of the month.

Dr. Fox who has paid great attention to the study of the structure and function of the fancial tonsils regards their chief function to be that of absorbents, absorbing buccal secretives and elements of food passing them and if so receptive absorbents of other particles brought in contact with them. He also speaks of them as forming a part of the blood manufacturing system. No one who in practice has had occasion to study the varying forms of so called follicular and too often septic sore throat but that has recognized the students character of the lymph tissue and the peculiar and rapid charges which occur.

But in addition we have came to recognize that this or an analogous kind of lymph tissue is very abundantly distributed in other parts of this buccal county. So much so that we now have the Lingual, the Pharyngeal, and the Discrete Tonsil is not so filled with crypts it has the same general histology. The Lingual Tonsil is the name giving to the aggregation of lymph follicles at the base of the tongue of the same construction a tissue as the others. The Discrete Nochules in the Pharyngeal region show the same formation and action. Hence we have here a great outspread surface for absorption more than for secretion and in most intimate relative to the blood paths and to rapid modification of the blood.

Dr. Spicer, physician to the throat department of St. Mary's Hospital, London, has noted in addition the causes which give rise to acute sensibility and to some disorders of all this lympth structure. He refers to the extreme variations in the temperature, humidity and purity of air as breathed by house dwellers to the common mouth breathing, to septic particles, bad teeth, foul breath, etc., as causes of lympth follicle irritation and hypertophy throughout the whole area under consideration, including the mucous lining of the nostrils.

Thus the lympth apparatus which so lines the mouth and is especially abundant about the fauces, becomes deranged as to its

secretions which catch the floating septic materials, give them a culture fluid such as causes local diseases or at once posses them through these absorbents into the general system.

A mouth unhealthy from any cause is the great hot bed for the vast multitude of specific diseases. We have here an extended apparatus for absorption as well as secretion. A bad state of the secretion seems in addition a soil in which infective particles are started into activity. Some have local trouble as well as the after effects of absorption.

"There can be little doubt that the tonsils are the sites where the poison of scarlitina, measles and diphtheria usually enter the system since they are the first and most constantly and often alone visibly affected and the lymphated glands in direct communication with them most marked soonest and most frequently involved." Spicer says that he has found follicular tonsilitis well marked in the crypts of the lingual tonsil. But the faucial tonsils are chiefly affected because more readily brought in contact with parhitis which enter through the mouth or nose. Many like Bretonnean, Certels, Loeffler, Empis, Kellogg, Avery, etc. contend that some or all of the more common microphytic diseases are first local, and that the degree of constitutional symptoms defends somewhat upon general infection from the iocal lesion and subsequent septic charges and absorption. In the incipiency of these diseases and where there is local sepsis we have always believed local treatment to be of essential importance. At the same time substances which are antiseptic or resistful of septic charges and supporting to the system should be rapidly introduced.

But if the mouth's fauces offer great surfaces of absorption and secretion, we need still more definitely to consider all the means by which we can render the gate of disease as well as of life, the most effective to prevent the one and promote the other.

First of all, can we do anything to promote proper secretion or to correct such disordered secretion, as of itself may give rise to unhealthy condition by local irritation and by local absorption into the system. This is made far more important from the additional belief that even where the secretions cause no serious local affection and produce no serious result by their absorption, they are receptive of untold "materies morbi," and fertilize it into more dangerous growth.

We think we can claim that it is now the persuasion of very many practitioners, and of those especially who have given special attention to septic conditions in and about the fauces, that rinsing of the mouth, strict care of the teeth, and all the means for procuring a pure sweet breath should be sedulously used, not merely as an elegance of the toilet, but as a defence against disease. It is not now our object to specify either substances or modes of use. The range is through all spices, thymol, condimented herbs, and pronounced disinfectants. While water is the chief cleanser, where life and foods are artificial we may need some artificial adjustments. As to infectious particles from without, it has also been urged that a closed mouth much diminishes the risks, since the torturous course of the nasal openings and their adapted mucous lining tends to intercept much that more readily enters by the mouth.

As urged in a former report, it is on the same ground that spittle as well as sputa is always to be regarded as a secretion to be disposed of with care.

Next, can we do anything to suspend or diminish the absorbtive power of the lymph structure or cause what is absorbed to be accompanied with restraining or corrective substances, such as will destroy the "matenas morbi," or so far affect it as to thwart its destructive activity.

In the view of a large class of practitioners this can and ought to be done.

Topical application to the throat, the frequent administration of such substances as the Tinct, Ferri Chloridum, Quinine, Potassium Chloride, etc, have these among their objects. There is difference of view as to the "modus operandi." Some think that the effect is chiefly due to protection of the surfaces of the mucous membrane; others to the corrugation which closes the openings of the lacuræ or glands; others to an effect produced on the blood and secretions unfriendly to the vigorous vitality of low forms of life.

But whatever may be the hypothesis as to the mode, no one who has carefully watched the records of treatment but that perceives that the chief means and remedies used do attempt to effect the local surfacees about the fauces and to introduce into the blood substances whose presence can be detected therein and which make it resistful of degrading changes. If the nitrate of silver solution is not employed or any other topical application, it is replaced when

a good authority directs that "six drams of perchloride of iron be dissolved in five ounces of sweetened water and the child take a dessert spoonful each hour for twelve hour, and after that diminishing the dose and prolonging the intervals." But if the case is not seen until the blood has became much affected then this local treatment is secondary or useless and while still using any medicaments that may restrain the absorption of the poison into the system, we seek to nourish and invigorate until the active but ephemeral invading life has been exhausted. So the higher life by its quality triumphs over the lower micrphytic life and those septic conditions which often result from or accompany it. It is still a very important inquiry as to how the benefit is obtained and what are the substances which will be operative.

In addition there are other aids that will suggest themselves. That at the very start if the local symptoms are acute and the secretions disturbed a cathartic is often of service. Special care must be taken as to the purity of the inbreathed air, frequent laving or rinsing of the mouth with blood fluids and the most through removal of all secretions that can be gotten rid of and the destruction of the spittle mucus or other material thus separated are also essential.

While giving due weight to all constitutional symptoms and to the need of constitutional treatment we would thus draw attention to the peculiar structure and relations of the great entrance way to the human system and ask that the possibilities of dealing with it so as to prevent disease, to arrest it at its first assault or to follow infective material rapidly with counteracting remedies be more fully investigated.

REMARKS ON MORTUARY DECENNIAL TABLES OF 12TH REPORT.

The Decennial summary of deaths from 1878 to 1888 as contained in the former report enables us to determine with approximate accuracy the number of deaths that occurred at various periods of life.

N. B. A note on page 473 is misleading, it having been misplaced from 416, as it has reference only to the Decennial Tables of Climatology.

The tables as found on pages 477 and 478 of that report as to the whole number of deaths present accurately the aggregate and

assigns each to their respective divisions by counties and cities to the amount of 228,151, the whole number of deaths being 230,709. The small difference being occasioned by supplements not received in time for full classification. As this extended to the period of ten years, it records what occurred as to deaths among a little over 11,000,000 of people, a part of it progressing in age through all this period, but being added to by births and varied by immigration and removal. While this is not the same as the tracing of the history of the same 100,000 people as Dr. Farr has done, it is valuable as fairly indicating the times at which death reaches a population progressive according to quite uniform laws. Out of 228,151 deaths the number occurring under one year was 53,494. Between the ages of one and five years 35,136 died. This gives an aggregate of deaths under five years of 88,630, or about three-eighths of the whole number of deaths; 21,974 died between the ages of 5 and 20; 69,485 died between 20 and 60; while 48,062 survived beyond 60 years of age.

While an analysis of deaths at shorter periods would be still more valuable, we thus get an idea of how many reach the productive period of life. As we turn to the record of cities of over 5,000 population we find that twenty-seven such cities represent a population of 701,428, leaving for the counties outside of cities 576,605. The deaths in these cities under one year were 35,752. Between the ages of 1 and 5, 23,645 died, giving an aggregate of deaths under 5 years of age of 59,397, out of 139,419 as the aggregate of those who died in these cities, or three-sevenths of the whole number of deaths. The difference between this three-sevenths and three-eighths in the country seems small, but this means quite a difference in the aggregate. It is also to be remembered there are a few of what might be called rural cities, such as Orange, Long Branch and Morristown. The deaths in these twenty-seven cities between 5 and 20 years of age were 13,770; between 20 and 60 years 44,325, and over 60 years of age 21,927.

For convenience of reference we herewith repeat the two condensed decennial tables:

Summary of Vital Facts from New Jersey Death Record, in Cities

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.	Total, including undefined.	Population, census of 1885.	Death-rate per 1,000.
Atlantic City	489	232	143	463	257	.....	.....	.....
Bordentown	148	98	78	313	269	.....	.....	.....
Burlington City	290	195	140	444	399	.....	.....	.....
Camden City	2,542	1,412	1,031	2,868	1,552	.....	.....	.....
Gloucester City	287	142	120	345	159	.....	.....	.....
Bridgeton	374	224	147	433	397	.....	.....	.....
Millville	379	287	183	396	280	.....	.....	.....
Newark	8,426	5,813	3,296	11,378	5,551	.....	.....	.....
Orange	720	480	262	988	427	.....	.....	.....
Bayonne	713	495	201	677	215	.....	.....	.....
Harrison	382	277	188	517	168	.....	.....	.....
Hoboken	2,355	1,578	728	2,883	838	.....	.....	.....
Jersey City	8,207	6,073	3,246	10,582	3,918	.....	.....	.....
Town of Union	524	36	200	461	191	.....	.....	.....
Chambersburg	392	200	140	393	183	.....	.....	.....
Trenton	1,522	842	549	1,910	1,204	.....	.....	.....
New Brunswick	837	488	425	1,015	749	.....	.....	.....
Perth Amboy	140	75	54	121	49	.....	.....	.....
Long Branch	68	30	24	72	46	.....	.....	.....
Morristown	226	155	102	451	396	.....	.....	.....
Passaic City	473	275	157	416	212	.....	.....	.....
Paterson	3,457	2,236	1,233	4,025	2,161	.....	.....	.....
Salem City	232	115	91	250	274	.....	.....	.....
Elizabeth	1,603	1,023	644	1,777	1,076	.....	.....	.....
Plainfield	358	193	132	388	361	.....	.....	.....
Rahway	236	143	108	404	371	.....	.....	.....
Phillipsburg	372	208	148	355	224	.....	.....	.....
Totals	35,752	23,645	13,770	44,325	21,927	.....	.....	.....

Cities are generally more unhealthy than their death-rates indicate since the population is in instead of removing the evils which distress and sicken those who remain. Hence, in many of our is a fair criterion of the health of locality, or at least should be considered for purposes of correction. question of labor and social science and art, as well as of comfort and hygiene.

# of over 5,000 Population, for Ten Years ending June 30th, 1888.

								PRINCIPAL CAUSES OF DEATH.										
Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption.	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.
....	31	....	26	2	15	68	13	284	197	101	139	118	78	126	75	33	6	18
10	19	1	20	2	7	31	5	65	161	62	64	74	35	92	66	22	3	13
20	31	2	15	2	14	112	10	141	230	124	84	104	69	124	90	32	5	19
99	385	150	238	24	72	502	19	1,243	1,342	816	769	207	264	619	342	178	20	89
8	33	....	22	5	10	57	1	134	189	73	86	45	24	70	41	13	3	15
5	54	....	26	4	15	114	10	190	257	163	113	111	48	103	91	29	2	10
8	64	....	48	18	14	125	6	224	268	148	92	71	42	75	66	33	4	11
395	800	27	1032	243	254	2,574	134	3,810	5,173	3,952	3,124	1,841	1294	2240	1419	736	73	344
14	56	....	79	22	33	161	17	321	453	394	244	150	122	142	118	61	7	38
34	50	....	38	17	20	189	12	309	210	308	262	85	59	80	69	25	7	21
52	67	....	38	9	16	113	2	180	225	175	198	45	31	75	45	24	7	21
58	168	35	174	57	65	683	43	1,239	1,070	890	962	451	288	364	297	151	38	96
381	880	254	1218	284	261	2,043	106	3,950	4,032	4,003	2,974	1,460	932	1526	1380	523	82	340
28	40	4	61	17	9	226	6	259	202	182	168	91	38	70	61	35	2	23
10	31	....	49	20	15	78	5	190	201	131	87	62	34	75	51	34	4	22
51	138	19	171	44	56	326	34	668	983	564	379	307	198	456	292	123	26	68
28	98	9	78	18	46	269	16	474	515	317	235	200	165	213	158	113	12	25
8	6	....	8	2	2	47	1	67	57	41	46	14	11	25	13	5	3	3
4	5	....	1	....	3	21	1	47	37	17	15	12	10	25	28	8	1	3
19	20	1	12	1	11	69	4	151	215	111	78	84	59	191	77	40	6	15
13	50	....	24	13	13	88	8	242	193	162	180	73	51	78	58	17	12	20
145	269	42	537	110	92	626	51	1,763	1,919	1,432	1,138	655	461	662	575	244	30	152
15	30	3	7	....	10	52	1	105	161	96	43	49	26	84	60	27	7	9
101	90	4	152	33	72	431	20	737	756	653	585	349	168	398	259	114	14	219
13	31	1	31	10	9	66	5	209	205	167	99	85	70	111	57	31	8	10
18	25	3	42	6	8	33	10	102	209	159	90	96	38	112	64	31	3	11
8	35	1	46	7	9	94	8	133	157	112	124	60	39	99	71	20	6	18
1545	3486	556	4163	970	1151	9,193	548	17,257	19,667	15,355	12,378	6,899	4654	8235	5923	2702	39	1632

many of them much decreased for four months in the year, and thousands remove themselves cities, the death-rate for June July, August and September, reckoned for the remaining population, So, health laws are a great defence to all, but especially to the working classes of cities. It is a

Summary of Vital Facts from New Jersey Death Record,

COUNTIES. Statistical Divisions.	DEATHS AT ALL AGES. Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Total, including undefined.	Population, census of 1885.	Death-rate per 1,000.
Atlantic	1,009	521	311	1,047	1,009			
Bergen	1,265	764	574	1,803	1,621			
Burlington	1,803	1,066	783	2,479	2,731			
Camden	3,588	1,954	1,398	4,080	2,535			
Cape May	313	142	109	343	487			
Cumberland	1,394	845	573	1,661	1,682			
Essex	10,368	7,066	4,110	14,066	7,656			
Gloucester	960	539	396	1,177	1,235			
Hudson	13,332	9,568	5,045	16,770	6,264			
Hunterdon	789	451	417	1,330	1,965			
Mercer	2,453	1,390	1,043	3,581	2,696			
Middlesex	2,097	1,268	997	2,726	2,143			
Monmouth	2,214	1,158	906	2,595	2,634			
Morris	1,540	1,017	807	2,543	2,383			
Ocean	405	234	184	672	624			
Passaic	4,171	2,691	1,544	4,871	2,790			
Salem	856	422	396	938	1,165			
Somerset	722	391	402	1,155	1,394			
Sussex	476	306	303	934	1,082			
Union	2,586	2,594	1,081	3,165	2,431			
Warren	1,153	749	595	1,549	1,535			
Totals	53,494	35,136	21,974	69,485	48,062			

Total deaths in the State, for ten years (including supplements), was 230,709, and the average

Rates for short periods, or which deal with small numbers, are only approximate and sometimes or balance errors which pratically disappear in large aggregates. So, five or ten years' analyses are the rest, is much more informatory as to local causes affecting health, than the total deaths. See, diarrhœal disesas, consumption, and brain and nervous diseases of children.

by Counties, for Ten Years ending June 30th, 1888.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption.	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.
11	85	12	50	16	44	163	24	563	534	288	268	235	156	312	234	88	10	45
153	133	6	156	23	47	227	29	602	783	702	432	452	241	484	322	127	24	69
82	293	19	143	26	87	405	47	913	1,265	785	513	623	314	736	568	223	37	101
137	550	161	324	31	113	676	30	1,791	1,971	1,188	1,050	737	165	984	575	239	30	143
15	51	...	35	7	20	42	5	146	159	129	86	75	31	193	101	57	3	10
27	210	1	126	28	38	353	32	683	1,011	585	433	392	200	478	330	140	20	57
529	1071	29	1237	304	347	3,093	194	4,683	6,477	5,029	3,792	2,446	1697	2,917	1,836	964	102	454
45	121	9	94	10	41	170	20	501	644	405	294	263	109	367	277	98	19	37
684	1285	356	1642	412	384	3,463	188	6,444	6,440	6,047	4,383	2,344	1538	2,442	2,027	833	144	524
61	114	2	102	19	28	215	32	332	694	453	222	447	187	606	287	156	18	65
96	255	23	269	83	102	482	71	1,162	1,781	1,033	651	627	366	1,155	574	274	49	123
125	228	12	222	43	101	572	33	1,155	1,300	879	585	506	381	619	474	232	38	92
107	183	7	146	45	102	443	32	1,183	1,309	943	549	715	394	815	592	213	40	99
161	160	1	237	40	67	386	46	697	1,066	959	492	533	290	1,101	444	188	50	110
12	85	1	22	17	21	85	12	195	382	191	132	116	65	186	149	48	9	33
216	344	42	606	129	114	571	67	2,174	2,311	1,775	1,417	850	564	365	716	298	45	190
43	136	8	44	10	34	191	28	413	589	372	188	198	116	347	212	96	18	38
70	61	3	83	22	30	201	25	353	534	415	189	302	180	455	259	122	23	48
56	91	...	86	7	20	112	18	210	461	389	159	255	106	315	166	88	12	44
197	206	9	271	58	104	689	46	1,219	1,425	1,263	900	672	346	789	480	232	35	102
57	135	11	213	25	28	269	33	502	690	613	394	343	193	493	312	113	32	71
2894	5759	712	6108	1355	1872	12,808	1012	25,921	31,826	24,383	17,629	13,131	7539	14059	10935	4829	758	2455

death-rate 19.15.

misleading, since temporary causes may have been in operation, and small numbers do not eliminate much more important than any single year. The number of deaths before twenty, in proportion to also, the number dying from zymotic diseases, and especially from fevers, croup, diptheria,

Note first number at different ages.

Besides the representation of deaths by diagram and by numbers as found in the 12th report, it is also equally if not more important to notice the aggregate and relative number of deaths from principal diseases. As before noted so far as preventive measures are concerned the study of the comparative number of deaths from various diseases in various localities is more informatory, since many of those are indices of removable or preventable causes of disease. It has been said for instance that the number of cases of typhoid fever occurring through a long series of years is a fair criterion of the sanitary administration of a city. Small-pox points not so much to the general healthfulness as to the vigilance with which vaccination is enforced.

In the total of deaths, 230,709 for the ten years, we have as prominent, the following causes in the order of their frequency:

Consumption	31,826
Diarrhœa Diseases	25 921
Acute Lung Disease	24,383
Brain of Children	17,629
Adult Brain	14,059
Heart Circulation	13,131
Croup and Diptheria	12,808
Digestive	10,935
Urinary	7,539
Scarlet Fever	6,108
Typhoid Fever	5,797
Cancer	4,829
Remittent Fever	2,894

Thus we see first of all consumption as taking the lead. Beside there are 24,383 deaths from acute lung diseases, or an aggregat of 56,209, or about one-fourth of all deaths from diseases of th lungs. These are to be divided between heredity, foul air an climated causes. Heredity itself is often the result of foul air an the exposures of ancestry thereto. The records of statistics ar constantly showing impure air to be the most fruitful cause of dis ease, an evil which, although difficult to overcome, admits of dim nution to an extent that would save thousands of valuable lives.

We are too apt to look to the suppression or prevention of ep demics as the chief sphere of sanitary administration, whereas th so-called pestilences all combined do not record an amount of d

struction equal to the steady losses by reason of lung diseases. Our decennial total of what are usually rated as the communicable diseases, viz, diptheria, 12,808; scarlet fever, 6,108; typhoid fever, 5,797; whooping cough, 1872; measles, 1,355; small pox, 712, is 38,652 Surely we have occasion to concentrate attention largely upon pulmonary diseases since they are so much in the majority. This is all the more serious because the entailment so often pasess to persons of the next or subsequent generations, and so the actual number of deaths is not the full measure of the evil wrought.

What can we do to mitigate this great evil?

Diarrhœa deaths of children (25,921) present to us the whole subject of food, water, air and general regimen as relating to all under 20 years of age, but especially during the infantile years of life. We have come to a much better understanding than formerly as to the foods adapted to childhood, but there is still great lack in home management as to the foods provided for the young, and as to the details of regimen in the treatment of infantile diarrhœa. The former reports have treated at length of this subject and pointed to the most prominent indications, while the more recent mechanical and sanitary treatises on this subject are full of information.

Diphtheria was only reported in medical nomenclature as a distinct disease in 1855. We saw some of the first cases that were recognized in this country and that was not until 1857–8. Yet by rapid strides it has stalked onward with the tread of death, until its victims more than double that former dread of childhood, scarlet fever.

As to it, it must be said that very much can be done by removing filth and dampness, by the strictest isolation, by destruction of all membrane and sputa and by early and skillful medical and sanitary management. Success in thwarting epidemics or in dealing with individual cases, depends mostly upon precision of method or what Disraeli in another connection called a "genius for details." Where there has been exposure, the valve of prophylactic medication is strongly advocated by some. Similar statements apply with equal force to scarlet fever and typhoid fever. Reference to the twelve former reports and especially to the more recent ones will show that we have gathered up the facts from year to year as to the sanitary management of those, as well as published specia circulars as to them.

CLIMATOLOGY.

As in former reports we give the data as to climate for chosen ocalities in order that the relations of disease and death thereto nay be compared.

As specified in our sixth report the choices of locality are made ·ith reference to geological structure, soil, elevation and locality.

We have been compelled from time to time to vary some of the ›oints of observation, but taken as a whole they fairly represent the ·arious portions of the State.

HUMIDITY AS AFFECTING CLIMATE AND HEALTH.

Besides the influence of the earth, of latitude and longitude, etc., s affecting climate, much depends upon the general humidity of ıe atmosphere. This does not mean that damp or rainy days re unhealthy for all persons, but it does mean that conditions of ealth and certain diseases are affected by this element of climate. Ve all recognize the oppressive and in time the debilitating effect f very warm weather when the atmosphere is very heavily and ɔveral days laden with moisture. For many lung diseases it is ɔw claimed that a very dry atmosphere is desirable. We are, owever, too apt too judge of the condition of climate as to humidy by nearness to the ocean, by fogs or by some other external or ısible sign. These are not always reliable since places near the ɔean are sometimes relatively dryer than those more distant. In ıeasuring the effect on climate we have most to do with what is nown as relative humidity, and not so much with the absolute ımidity. We quote the following brief outline of the difference and ıe effects:

"Let it be remembered," says Dr. Baldwin, "that the term relave humidity as used by meteorologists, is not the same as abso-

lute humidity. Absolute humidity determines the exact amount of vapor in the air when condensed into water; while relative humidity has relation to the amount of vapor in the air when it will be condensed after the point of *saturation is reached.* This point of saturation depends on the temperature and tension or force of vapor determined by the barometric pressure at the time of taking the observation. In relative humidity, the point of saturation is marked 100, and the figures in the column below 100 are the percentage of that quantity as existing at the time under a specific degree of temperature and tension of vapor. Therefore, the point of saturation is variable; as, for instance, when the thermometer is 50° and the barometer marks 30 inches pressure, a cubic foot of air then contains four grains and a fraction of water at the point of saturation, 100. When the temperature is 75° and the barometer the same as before, a cubic foot of the atmosphere then contains nine grains and a fraction where the air is saturated, but still marked 100. At the temperature of 100°, pressure as before, the cubic foot of air at the point of saturation will contain twenty grains and a fraction. Thus we see that the amount of moisture in the air at different temperatures varies in quantity. Therefore the percentages given of 100 and the different temperatures must also vary, so that the same figures, although they may be correct percentages of 100, do not indicate to us the absolute amount of moisture in the atmosphere, unless we know the temperature which regulates each point of saturation. Professor Henry, of the Smithsonian Institution, in an article on meteorology, says: "It is not upon the actual amount of vapor which the air contains at a given time or place that its humidity depends; but upon its greater or less degree of saturation." That air is said to be dry in which evaporation takes place rapidly from a surface of water or moistened substance. Hence, if relative humidity shows a small percentage of 100, the point of saturation in a climate where the absolute moisture is great, its effect in producing evaporation is the same as where the absolute humidity is less at the same percentage of 100, indicating saturation there."

Professor Tnydall says: "The observations of the meteorologists furnish important, though hitherto unconscious, evidence of the influence of vapor on the atmosphere. Whenever the air is dry we are liable to extremes of temperature. By day in such places

the sun's heat reaches the earth unimpeded, and renders the maximum high; by night, on the other hand, the earth's heat escapes unimpeded into space, and renders the minimum low. Hence, the difference between the maximum and the minimum is greater where the air is driest. Wherever drought reigns, we have the heat of the day forcibly contrasted with the chill of the night. In the Saraha itself, when the sun's rays cease to impinge on the burning sands, the temperature runs rapidly down to freezing, because there is no vapor overhead to check the calorific drain."

In certain conditions as to temperature a dry atmosphere may have its disadvantages as there are likely to be greater extremes of temperature between the day and the night.

CONDENSED CLIMATOLOGICAL RECORD FROM JULY 1ST, 1888 TO JULY 1ST, 1889.

STATION, PATERSON, N. J.

Latitude, 40° 55′ N.; Longitude, 74° 11′ W. Height of Barometer Cistern above Sea Level, 84 feet.

OBSERVERS—WM. FURGASON, C. E., AND PROF. A. B. WIGGIN.

YEARS.	BAROMETER. (Reduced to 32 degrees.) Max.	Min.	Mean.	THERMOMETER. Max.	Min.	Mean.	Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (dys of).	Days when Precipitation equalled 0.1.	Cloudy days.
1888.												
July				....	....	....	.....	.....	2.24	....	..	..
August				93.0	51.0	70.0	.....	.....	6.82	....	5	..
Sept'ber				82.0	41.0	61.9	.....	.....	6 90	....	8	10
October				67.0	34.0	49.3	.....	.....	4.52	....	11	7
Nov'ber				72.0	15.0	45.2	.....	.....	2.77	2	4	11
December				55.0	7.2	36.1	.....	.....	5.25	....	8	4
1889.												
January				65.0	14.0	36.6	.....	.....	4.84	2	6	8
February				51.0	0.9	27.1	.....	.....	1.98	8	7	10
March				64.0	19.0	40.7	.....	.....	1.86	4	..	10
April				77.0	36.2	51.4	.....	.....	6.07	....	..	14
May				89.0	44.0	62.7	.....	.....	2.67	....	..	..
June				89.0	55.4	69.9	.....	.....	1.43	....	..	..
For Year.				93.0	0.9	50.2	.....	.....	47.35	..	..	..

*Including melted snow.

STATION, NEWARK, N. J.

Latitude, 40° 29′ N.; Longitude, 74° 27′ W. Height of Barometer Cistern above Sea Level, —— feet.

OBSERVER, F. W. RICORD.

YEARS.	BAROMETER. (Reduced to 32 degrees.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July	30.270	29.630	30.028	93.0	56.0	72.7	.....	N. E.. S. E.	2.06	...	8	.....
August ..	30.300	29 510	29.998	92.0	52.0	73.5	.....	N. E. N. W.	5.67	...	11	.....
Sept.	30.370	29.570	30.031	80.0	42.0	64.0	.....		6.21	...	11	20
October ..	30.410	29.460	29.963	69.0	34.0	50.0	.....	N. W. S. W.	4.04	....	11	.....
Nov.	30.700	29.270	30.126	70.0	18.0	45.3	.....	W.. N. E.	4.19	....	11	.....
December	30.540	29.120	30.022	54.0	11.0	35.0	.....	N. W. S. W.	3.27	....	8	17
1889.												
January .	30.620	29.170	30.051	56 0	17.0	35.6	.....	N. W. S. W.	6.04	....	11	.....
February	30 840	29.450	30.138	48.0	5.0	27.2	.....	N. W. S. W.	2.68	....	8	.....
March. ..	30.510	29.190	29.906	63.0	26.0	40.5	.....	N. W. S. W.	3.31	....	11	.....
April	30.450	29.240	29.990	79.0	35.0	51.3	.....	N. E.. S. E.	6.24	....	9	.....
May	30.380	29.640	29.978	88.0	42.0	63.6	.....	N. E.. S. E.	2.43	....	8	.....
June	30.480	29.600	30.045	89.0	52.0	71.6	.....	S.. W.	3.04	...	10	.....
For Year.	30.700	29.120	30.021	92.0	5.0	52.5	.....	N. W. S. W.	48.58	....	117	.....

*Including melted snow.

STATION, ATLANTIC CITY, N. J.

Latitude, 39° 22′ N.; Longitude, 74° 25′ W. Height of Barometer Cistern above Sea Level, 53 feet.

OBSERVER—WM. BLYTHE, Signal Service.

YEAR.	BAROMETER. (Reduced to Sea Level)			THERMOMETER			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (dys of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July	30.23	29.66	30.026	91.0	55.0	69.6	81.8	S.W.	2.44	....	11	9
August ..	30.28	29.48	30.012	88.0	51.0	72.0	81.0	S.W.	4.30	....	11	6
Sept'ber .	30.53	29.61	30.067	80.0	37.0	64.4	85.3	N.E.	7.14	....	13	12
October ..	30.42	29.53	29,986	71.0	30.0	51.0	78.0	W, & N.W.	3.48	....	13	9
Nov'ber .	30.73	29.20	30.120	69.0	26.0	47.0	84.4	W.	2.71	....	10	14
December	30.63	29.07	30.074	53.0	12.0	36.2	80.2	W.	2.84	....	6	6
1889.												
January .	30 62	29.19	30.058	52.0	19.0	37.1	84.4	W.	4.46	....	6	7
February.	30.83	29.45	30.170	48.0	2.0	30.0	76.0	W.	2.32	....	7	8
March ...	30.51	29 27	29.910	60.0	27.0	37.0	78 0	N.E.	4.58	....	11	13
April	30.50	29 28	29.972	70.0	32.0	48.0	81.0	S.W.	2.92	....	14	12
May	30.38	29.65	29.980	89.0	41.0	58.0	84.0	S.W. N.W.	2.62	....	13	9
June.....	30.44	29.68	30.050	88.0	50.0	66.0	87.0	S.W.	3.13	....	10	8
For Year.	30 83	29.19	30.035	91.0	2.0	51.4	81.8	W, & S.W.	42.94	....	125	113

*Including melted snow.

OF THE SEASONS.

	Temperature.	*Precipitation.*
Spring,	47.7°	3.37 inches.
Summer,	69.2°	3.29 "
Autumn,	51.4°	4.44 "
Winter,	34.4°	3.21 "

STATION, NEW YORK CITY.

Latitude 40° 43′; Longitude, 70° 0′; Height of Barometer Cistern above sea level, 185 feet.

OBSERVER—E. B. DUNN, Signal Corps.

YEARS.	BAROMETER. (Reduced to sea level.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July.....	30.26	29.60	30.010	89.9	55.3	70.5	69.8	S.	1.27	0	8	7
August..	30.29	29 40	29.991	96.3	53.2	71.6	73.0	S.	6.35	0	16	3
Septrber.	30.61	29 57	30.077	84.2	40.8	62.9	78.0	N.E.	7.40	0	15	14
October..	30.43	29.49	29.980	68.7	34.9	49.2	72.4	W.	4.14	0	15	11
Nov'ber.	30.79	29.26	30.032	72.3	18.0	45.2	75.4	S.	4.81	1	12	11
Dec'ber..	30.61	29.13	30.049	56.3	8.8	34.4	74.4	S.W.	4.05	6	8	8
1889.												
Jan'y ...	30.63	29.15	30.033	58.0	17.4	36.2	76.8	W., S.W.	5.38	2	11	12
Feb'y....	30.86	29.26	30.158	50.0	2.0	26.6	76.0	W.	3.07	7	12	10
March ...	30.53	29 22	29.908	62.0	25.0	39.9	70.2	W.	4.09	6	11	15
April	30.48	29.23	29.984	80.0	34.0	50.0	70.3	N.E.	5.90	0	11	12
May	30.36	29.64	29.976	87.0	40.0	60.0	76.0	E.	3.25	0	11	8
June.....	30.46	29.61	30.034	88.0	53.0	68.8	77.9	S.E.	2.38	0	9	7
For Year.	30.860	291.30	30.018	96.3	2.0	51.3	74.2	W.	52.09	22	139	118

*Including melted snow.

OF THE SEASONS.

Temperature.		*Precipitation.*	
Spring,	50.6°	4.41	inches
Summer,	70.3°	3.33	"
Autumn,	52.4°	5.45	"
Winter,	32.4°	4.17	"

STATION, BEVERLY, N. J.

Latitude, 44° 4′ N ; Longitude, 74° 55′ W. Height of Barometer Cistern above Sea Level, 40.0 feet.

OBSERVER—C. F. RICHARDSON, State Weather Service.

YEARS.	BAROMETER. (Aneroid.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches)*	Snow (dys of)	Days when Preparation equalled to.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July	30.49	29.94	30.28	93.0	53.5	71 7	75.7	N.W.	4.61	....	11	7
August ..	30.52	29.76	30.28	94.0	48 5	72.9	78.4	S.W.	6.14	....	11	8
Sept'ber .	30.64	29.78	30 24	84.0	39.0	63.8	81.	N.W.	4.10	....	11	14
October ..	30.45	29.71	30.07	67.5	30.5	49.7	78.4	N.W.	4.00	....	15	13
Nov'ber .	30.62	29.45	30.18	75.0	17.0	45.8	79.2	N.W.	4 15	....	11	17
December	30.56	29.06	30.07	60 0	11.0	34.6	75.3	N.W	3.02	....	8	10
1889.												
January .	30.54	29.35	30.08	59.0	17.0	36.6	78.7	N.W.	4.58	....	10	10
February	30.70	29 60	30.11	50.0	1 5	27.4	76.7	N.W.	2.17	....	11	13
March ...	30.46	29.48	29.90	67.0	25.0	40.5	72.9	N.W.	3.63	....	10	14
April	30.59	29 61	30.18	82.0	30.0	52.3	71.8	N.	4.82	....	14	13
May	30.56	30.00	30 24	92.5	35.5	62.4	75.3	N.W.	5.14	....	14	9
June	30.65	29.95	30.32	91.0	48.0	69.6	78 8	S.	2 88	....	11	6
For Year.	30.70	39.06	30.70	94.0	1 5	52.2	76.9	N.W.	49.24	....	137	134

*Including melted snow.

OF THE SEASONS.

	Temperature.	*Precipitation,*
Spring,	51.7°	4.53
Summer,	71.4°	4.56
Autumn,	53.6°	4.08
Winter,	32.5°	3.26

STATION, NEW BRUNSWICK, MIDDLESEX COUNTY, N. J.

Latitude, 49°29′ N.; Longitude, 74°10′ W. Height of Barometer Cistern above Sea Level, 90 feet.

OBSERVER—E. W. MCGANN, Signal Corps.

YEARS.	BAROMETER. (Reduced to 32° and Sea Level.)			THERMOMETER.			Mean Humidity.	Prevailing Wind.	Rain (inches).*	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
1888.												
July.....	30.274	29.597	30.030	90.8	51.0	69.9	87.8	.....	3.08		9	6
August...	30.310	29.470	30.000	93.2	49.0	71.5	86.9	.....	5.58		11	8
Sept.	30.615	29.601	30.080	81.8	36.0	62.0	90.7	.....	8.66		15	14
October..	30.436	29.477	29.995	67.8	28.8	47.8	88.4	....	5.58		13	10
Nov.....	30.811	29.255	30.135	.....	.....	44.1	91.3	.....	4.37		13	11
December	30.644	28.980	30.071	56.7	7.0	33.8	86.8	.....	3.97		8	7
1889.												
January..	30.505	29.167	30.059	58.9	14.8	36.1	89.3	.....	6.42		12	9
February	30.878	29.460	30.157	70.0	0.5	26.8	85.7	.....	2.41		9	12
March....	30.540	29.291	29.938	62.0	24.0	40.1	88.0	.....	3.35		10	11
April.....	30.497	29.252	30.000	76.8	31.0	50.7	84.2	.....	5.01		14	14
May.....	30.384	29.657	30.000	88.0	36.0	61.5	89.3	.....	3.48		14	9
June	30.469	29.662	30.050	88.0	46.0	69.8	89.8	.....	3.85		9	14
For the yr	30.878	28.980	30.043	93.2	0.5	51.2	88.2	.....	55.76		137	125

*Including melted snow.

OF THE SEASONS.

Temperature.	*Precipitation.*
Spring, 50.8°	3.95 inches.
Summer, 70.4°	4.17 "
Autumn, 51.3°	6.20 "
Winter, 32.2°	4.27 "

STATION, CAPE MAY COURT HOUSE, N. J.

Latitude, 38° 56′ N.; Longitude, 74°58′ W. Height of Barometer Cistern above Sea Level, — feet.

OBSERVER—J. F. LEAMING, M. D., State Weather Service.

YEARS.	BAROMETER. (Reduced to 32 degrees.) Max.	Min.	Mean.	THERMOMETER. Max.	Min.	Mean.	Mean Humidity.	Prevailing Wind.	Rain (inches).	Snow (days of).	Days when Precipitation equalled 0.01.	Cloudy Days.
1888.												
July				91.5	54.5	71.1						
August				93.0	48.0	73.6						
Sept				82.0	42.0	65.1						
October				70.0	32.0	51.6						
Nov				72.0	27.0	48.6						
December				63.0	15.0	40.4						
1889.												
January				58.5	21.0	40.8						
February				50.5	5.0	31.4						
March				66.0	28.5	42.4						
April				76.5	32.0	51.9						
May				90.8	37.0	62.1						
June				87.0	50.0	74.3						
For the yr				93.0	5.0	54.4						

OF THE SEASONS.

Temperature.	*Precipitation.*
Spring, 52.1°	—— inches.
Summer, 73.6°	—— "
Autumn, 55.1°	—— "
Winter, 37.5°	—— "

STATION, PHILADELPHIA.

Latitude, 39° 57′; Longitude, 75° 9′. Height of Barometer Cistern above sea Sea Level, 117 feet.

OBSERVER—L. M. DEY, Signal Corps.

YEAR.	BAROMETER. (Reduced to sea level.) Max.	Min.	Mean.	THERMOMETER. Max.	Min.	Mean.	Mean Humidity.	Prevailing Wind.	Rain (Inches)*	Snow (days of.)	Days when Precipitation equalled 0.01.	Cloudy days.
1888.												
July.....	30.26	29.66	30.032	93.8	56.8	72.1	66.4	S.W., N.W	3.38	....	10	11
August ..	30.30	29.42	39.011	97.8	54.0	73.0	66.6	S.W.	5.86	....	12	8
Sept	30.56	29.64	30.079	81.6	40.5	63.6	79.0	N.E., N.W	5.73	...	13	16
October..	30.41	29.44	29.997	69.5	34.8	50.4	71.8	N.W.	3.23	....	15	12
Nov.....	30.76	29.33	30.153	75.0	18.0	45.8	76.4	N.W.	3.77	....	14	20
Dec'r....	30.64	29.03	30.092	61.0	12.0	35.8	68.8	N.W.	2.15	....	8	10
1889.												
Jan.....	30.63	29.19	30.070	59.0	18.0	37.3	72.2	W., N.W.	3.75	....	11	11
Feb'y....	30.86	29.45	30.180	51.0	2.0	28.2	68.6	N.W.	2.00	....	10	13
March ...	30.53	29.36	29.941	66.0	25.0	41.1	67.4	N.W.	2.58	....	12	15
April	30.49	29.27	29.984	78.0	34.0	51.6	68.2	N.E.	3.17	....	14	16
May	30.38	29.65	29.982	90.0	43.0	63.0	71.4	N.W.	4.32	....	15	12
June.	30.46	29.68	30.050	88.0	54.0	69.8	74.0	S.W.	3.39	....	13	15
For Year	30.860	29.030	30.048	97.0	2.0	52.6	70.9	N.W.	43.33	....	147	159

*Including melted snow.

OF THE SEASONS.

Temperature.	*Precipitation.*
Spring, 51.9°	3.36 inches
Summer, 71.6°	4.21 "
Autumn, 53.3°	4.24 "
Winter. 33.8°	2.63 "

METEOROLOGICAL SUMMARY FOR THE STATE.

July, 1888.

TEMPERATURE.—The mean temperature for July, 1888, 71.1 degrees, is only three-tenths of a degree higher than the mean for June, and is 3.4 degrees below the average determined from past records of forty-eight stations. The highest temperatures (above 90 degrees) were recorded on the 5th, 7th, 23d and 24th, and the lowest (below 50 degrees) on the 2d, 14th, 18th and 19th.

PRECIPITATION.—The average rainfall for the State, 3.40 inches, is 0.82 inches below the July average, and was unevenly distributed. The largest total for the month, 7.03 inches, is reported from Burlington county, and the least, 1.25 inches, from Morris county. One station reports a total slightly above seven inches, one over six, two over five, three over four, seven over three, nine over two, and one reports a total of less than two inches. The largest total in 24 hours, 3.78 inches, occurred at Oceanic on the 19th, and at Moorestown, 3.13 inches, on the 19th, and 20th. The most destructive thunder storm of the month occurred on the 5th, when the Pennsylvania Railroad round house near this city was blown down, burying three men in the debris, all of whom were seriously injured. A barn near Middlebush was also blown down, killing one man, who was buried with two others under the ruins. Three horses were killed by the fall of the barn, and the dwelling and other buildings were wrecked. Serious damage occurred in other portions of Middlesex county from wind, hail and lightning, especially at Middlebush and Milltown. At Asbury Park the new Roman Catholic Church was blown down. The edifice was enclosed and ready for plastering The destruction to crops was serious and widespread; whole fields of grain were destroyed.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.02; maximum observed, 30.274, on the 17th; minimum observed, 29.597, on the 11th; range for State, 0.677.

TEMPERATURE—(degrees F.)—Monthly mean, 71.2; highest monthly mean, 76.0, at Trenton; lowest monthly mean, 67.7, at Hanover; maximum, 99.0, at Lambertville, on 23d; minimum, 45.0, at Hanover and Tenafly on 14th and 18th respectively; range for State, 54.0; greatest local monthly range, 50.0, at Tenafly; least local monthly range, 32.0, at Ocean City; greatest daily range, 42.0, at Tenafly, on the 3d and 25th; least daily range, 2.0, at Oceanic, on the 9th.

PRECIPITATION.—including melted snow (in inches.)—Average for the State, 3 50; greatest, 7.03, at Moorestown; least, 1.25, at Gillette. *Wind*—Prevailing direction, northwest and southwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—1, 3, 4, 5, 7, 9, 21, 22, 19, 20, 22, 24, 27, 30, 31.—*Hail*—5th. *Solar Halos*—7th *Lunar Halos*—18 h. *Meteors*—22. *Polar Bands*—11. *Auroras*—0.

August, 1888.

TEMPERATURE.—The mean temperature for August, 1888, 72.5 degrees, is 0.5 degrees above the average determined from past records of fifty stations. The highest temperature (above 90 degrees) were recorded at all stations except one, on 4th, 5th, 7th, 8th and 16th, and the lowest, (below 50 degrees) at fifteen

stations, on the 13th, 22d, 23d, 28th, 29th, 30th and 31st. The maximum for the month, 98.0, was recorded at Tenafly and Oceanic on the 16th, and the minimum, 41 0 at Hanover on the 29th.

PRECIPITATION.—The average rainfall for the State, 6.13 inches, is 1.39 inches above the average determined from past records of fifty stations. The largest amount reported was 10.53 inches, at Plainfield, Union County, and the smallest, 2.55 inches, at Egg Harbor City, Atlantic County. Twenty-five stations report an excess and five stations a deficiency.

ATMOSPHERIC PRESSURE (in inches.)—Monthly mean, 30.00; maximum observed, 30.31, at Highland Park, on the 11th; minimum, 29.40, New York City, on the 21st; range for State, 0.91.

TEMPERATURE (degrees F.)—Monthly mean, 72.5; highest monthly mean, 77.0, at Trenton; lowest monthly mean, 68.6, at Hanover; maximum, 98.0, at Oceanic and Tenafly, on 16th; minimum, 41.0, at Hanover, on the 29th; range for State, 57.0; greatest local monthly range, 53.0, at Tenafly; least local monthly range, 29.0, at Ocean City; greatest daily range, 40.5, at Freehold, on the 30th; least daily range, 2.0, at Lambertville, on the 12th.

PRECIPITATION—including melted snow (in inches.)—Average for the State, 6.13; greatest, 10.53, at Plainfield; least, 2.55, at Egg Harbor City.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—1, 3, 4, 5, 6, 7, 8, 12, 15, 16, 17, 18, 20, 21, 23, 26, 27. *Hail*—27, at Union, Union County. *Solar Halos*—11, 16. *Lunar Halos*—10, 14, 15, 16, 20, 22, 23, 26. *Meteors*—10, 22, 25, 29. The readings of the barometer, corrected to sea-level, at Highland Park station, were as follows: August 20th—7 A. M., 30.04; 2 P. M., 30.01; 9 P. M., 30.03. August 21st—7 A. M., 29.88; 2 P. M., 29.80; 9 P. M., 29.47. The total rainfall at this station was 2.90 inches; at New York City, 3.92 inches; at Philadelphia, 2.08 inches and at Plainfield, 5.75 inches.

September, 1888.

TEMPERATURE.—The mean temperature for September, 1888, 63.1 degrees, is 2.2 below the average determined from past records of fifty-two stations. The maximum for the month, 96.0 degrees, was recorded at Toms River on the 22d, and the minimum, 30.0 degrees at Tenafly on the 30th. Range for the State, 66 0 degrees.

PRECIPITATION.—The average rainfall for the State, 7.09 inches, is 3.20 inches above the average determined from past records of forty-nine stations. The largest amount reported was 10.65 inches at Oceanic and the smallest 3.75 inches at Bridgeton. The average number of days upon which rain fell was 12.1.

ATMOSPHERIC PRESSURE—(in inches.)—Monthly mean, 30.076; maximum observed, 30.615, at Highland Park, on the 7th; minimum observed, 29.570, at New York City, on the 26th; range for State, 1,045.

TEMPERATURE (degrees F.)—Monthly mean, 63.1; highest monthly mean, 68.0, at Trenton; lowest monthly mean, 59.3, at Tenafly; maximum, 96.0, at Toms River on the 22d; minimum, 30.0, at Tenafly, on the 30th; range for State, 66.0; greatest local monthly range, 61.0, at Toms River; least local monthly range, 33 0, at Ocean City; greatest daily range, 38.5, at Freehold, on the 8th; least daily range, .00, at Ocean City, on the 6th.

PRECIPITATION—including melted snow (in inches.)—Average for the State,

7.09; greatest, 10.65, at Oceanic; least, 3.75, at Bridgeton. *Wind*—Prevailing direction, northeast.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—8, 9, 10, 12, 13, 16, 19, 20, 21, 29. *Hail*—12th, at Madison; 29th at Locktown; 30th, at South Orange. *Snow*—At Trenton, 29th and 30th. Very light at Paterson, on 7th. *Frost*—29th and 30th. *Solar Halos*—6, 10, 15. *Lunar Halos*—15, 18, 19, 20, 24, 25. *Parhelion*—Beverly, 20.

October, 1888.

TEMPERATURE.—The mean temperature for October, 1888, 49.2 degrees, is 5.2 below the average determined from past records of fifty stations. The warmest days of the month were the 1st, 2d, 5th and 6th, and the coldest the 4th, 10th, 11th, 22d, 30th and 31st.

PRECIPITATION.—The average rainfall for the State, 4.73 inches, is 1.54 inches above the average determined from past records of forty-eight stations. The average number of days upon which rain fell, 11.6.

ATMOSPHERIC PRESSURE (in inches.)—Monthly mean, 29 995; maximum observed, 30.436, at Highland Park, on the 31st; minimum observed, 29.477, at Highland Park, on the 1st; range for State, 0.959.

TEMPERATURE (degrees F.)—Monthly mean, 49.2; highest monthly mean, 54.3, at Ocean City; lowest monthly mean, 44.0, at Hanover; maximum, 76.0 at Clayton, on 1st; minimum, 25.0, at Hanover, on the 10th, 11th, 31st; range for state, 51.0; greatest local monthly range, 44 0, at Clayton; least local monthly range, 30.0, at Billingsport; greatest daily range, 34.4, at Egg Harbor City, on the 21st; least daily range, 0.5, on the 24th, at Egg Harbor City.

PRECIPITATION—including melted snow (in inches.)—Average for the State, 4.73; greatest, 7.00, at Ocean City; least, 2.97, at Freehold. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—6, 7, 11, 16, 17. *Hail*—13, 17. *Frost*—2, 3, 4, 9, 10, 11, 15, 18, 19, 20, 21, 22, 25, 26, 27, 30, 31. *Solar Halos*—5, 18, 25, 26. *Lunar Halos*—14, 15, 16, 18, 25, 26. *Meteors*—4, 7, 28, 31. *Auroras*—30th, Moorestown, Madison, Beverly and South Orange. *Polar Bands*—2d, at 6 P. M.

November, 1888.

TEMPERATURE.—The mean temperature for November, 1888, 45.8 degrees, is 3.7 degrees above the average determined from past records of fifty stations. The warmest days during the month were the 1st, 2d, 3d, 4th and 6th, and the coldest, the 21st, 22d and 23d. The lowest temperature recorded in the northern portion of the State was 8.0 degrees; in the central portion 7.0 degrees, and in the southern portion, 27 0 degrees

PRECIPITATION.—The average precipitation for the state, 3.97 inches, is 0.55 inches above the average determined from past records of forty-eight stations.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.135; maximum observed, 30.811, at Highland Park, on the 18th; minimum observed, 29.200, at Atlantic City, on the 26th; range for state, 1,611.

TEMPERATURE (degrees F).—Monthly mean, 45.8; highest monthly mean, 49.2, at Bridgeton; lowest monthly mean, 40.8, at Hanover; maximum, 77 0, at

Gillette, Tenafly and Imlaystown, on the 2d and 6th; minimum, 8.0, at Hanover, on the 23d; range for state, 69.0; greatest local monthly range, 67.0, at Tenafly; least local monthly range, 43.0, at Atlantic City; greatest daily range, 38.0, at Tenafly, on the 13th; least daily range, 1.0, at Newark, on the 25th. Mean humidity, 83.3.

PRECIPITATION—(including melted snow in inches).—Average for the state, 3.97; greatest, 5.41, at Trenton; least, 2.66, at Paterson. 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 ten, 13. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—9, 10, 19. Tenafly, Newark and Toms River. *Sleet*—25. *Snow*—23, 24, 25, 26. (No snow on the ground on 15th or last days of month). *Frost*—Frosts were numerous during the month; between the 18th and 23d, ice being formed half an inch thick *Solar Halos*—4, 10, 14. *Lunar Halos*—10, 14, 15, 17, 24. *Meteors*—1, 2, 3, 4, 6, 21, 22, 27. *Polar Bands*—17th.

December, 1888.

TEMPERATURE.—The mean temperature for December, 1888, 34.9 degrees, is 1.2 degrees above the mean for the corresponding month of 1887 and 2.4 degrees above the average determined from past records of 48 stations. The warmest days during the month were the 5th, 17th, 25th, 26th and 27th, and the coldest, the 21st, 22d and 23d. The lowest temperature recorded in the northern portion of the State was 5.0 degrees, in the central, 7.0 degrees, and in the southern portion, 15.0 degrees.

PRECIPITATION —The average precipitation for the State, 3.69 inches, is 1.60 inches below the average for the corresponding month in 1887, and 0.07 inches above the average determined from past records of forty-eight stations.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30.071; maximum observed, 30.644, at Highland Park, on the 30th; minimum observed, 28.980, at Highland Park, on the 17th; range for state, 1.664.

TEMPERATURE (degrees F.)—Monthly mean, 34.9; highest monthly mean, 40.4, at Cape May C. H.; lowest monthly mean, 31.6, at Hanover; maximum, 66.0, at Trenton, 17th; minimum, 5.0, at Hanover, on the 22d; range for State, 61.0; greatest local monthly range, 56.0, at Trenton and Tenafly; least local monthly range, 38.0, at Ocean City; greatest daily range, 40.0, at Tenafly, on the 5th; least daily range, 0.2, at Egg Harbor City, on the 18th.

PRECIPITATION—(including melted snow in inches.)—Average for the State, 3.69; greatest, 4.95, at South Orange; least, 2.05, at Clayton. Average number of days on which precipitation equaled 0.01 inch, 7.6. Average number of days on which cloudiness was 8 or more on a scale of ten, 7.8. *Wind*—Prevailing direction, northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—27th, at Imlaystown and Trenton. *Snow*—1, 4, 13, 20, 21, 28, 29. (No snow on the ground on the 15th or last day of the month. *Solar Halos*—6, 8, 13, 14, 26. *Lunar Halos*—8, 10, 11, 12, 15, 16, 17, 22, 26. *Meteors*—2, 14, 28, 30. *Auroras*—1, 26, at Clayton and Egg Harbor City. *Polar Bands*—30th, at Beverly.

January, 1889.

TEMPERATURE.—The mean temperature for January, 1889, 36.2 degrees, is 6.7 degrees above the average determined from past records of 49 stations and 10.8 degrees above the average for the corresponding month of 1888. The warmest days during the month were the 4th, 5th, 8th, 9th, 16th and 17th, and the coldest, the 2d, 15th, 19th, 20th, 22d, 23d, 24th and 30th. The lowest temperature recorded in the northern portion of the State was 8.0 degrees; in the central portion 16.0 degrees, and in the southern portion, 21.0 degrees.

PRECIPITATION.—The average precipitation for the State, 5.68 inches, is 2.04 inches above the average determined from past records of forty-nine stations, and 0.91 inches above the average for the corresponding month of 1888. Three stations, Freehold, Oceanic and Plainfield, report a total for the month exceeding eight inches; two stations, Toms River and South Orange, a total exceeding seven inches, and nine stations a total exceeding six inches. The snowfall during the month was phenomenally light; the greatest depth reported was six inches at Madison on the 20th. This station is the only one reporting snow on the ground at the close of the month (about one inch).

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30 060; maximum, observed, 30.630, at New York City and Philadelphia, on the 23d; minimum, observed, 29.150, at New York City, on the 27th; range for the State, 1,480.

TEMPERATURE (deg:ee F.)—Monthly mean, 36.2; highest monthly mean, 40.8 at Cape May C. H.; lowest monthly mean, 32.8, at Tenafly; maximum, 67.0, at Tenafly, on the 5th; minimum, 8.0, at Tenafly, on the 23d; range for State, 58 0; greatest local monthly range, 59.0 at Tenafly; least local monthly range, 33.0, at Ocean City; greatest daily range, 38.0, at Tenafly, on the 5th; least daily range, 0.0, at Moorestown and Readington on the 5th, 2d and 7th respectively. Mean humidity, 83.4.

PRECIPITATION—(including melted snow in inches).—Average for the State, 5.68; greatest, 8.78, at Oceanic; least, 3.84, at Hopewell. *Wind*—Prevailing direction, northwest and west.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—January, 9, at Beverly. *Hail*—9, at Beverly. *Sleet*—20. *Snow*—20, 21, 28, 29. *Solar Halos*—4, 11, 21, 24, 26, 29, 31. *Lunar Halos*—9, 11, 15, 17, 19, 20, 21, 23, 24, 25. *Meteors*—25. *Polar Bands*—7, 9, at Beverly.

February, 1889.

TEMPERATURE (degrees F.)—The mean temperature for February, 1889, 27.7 degrees, is 3.8 degrees below the average determined from past records of 50 stations, and 2.09 degrees below the average for the corresponding month of 1888. The warmest days during the month were the 5th, 9th, 15th, 17th, 18th and 19th, and the coldest the 4th, 23d and 24th. The lowest temperature recorded in the northern portion of the State was zero; in the central 3.0 degrees below zero. and in the southern 5 0 degrees above zero. The mean temperature of the winter season just closed 32.9, is 2 6 degrees above the mean of the winters of 1887 and 1888, and 1.7 degrees above the winter normal.

PRECIPITATION.—The average precipitation for the State, 2.49 inches, is 0 97 inches below the average determined from past records of forty-eight stations, and 1.04 inches below the average for the corresponding month of 1888.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 30 169; maximum observed, 30.876, at Highland Park, on the 24th; minimum observed, 29.260, at New York City, on the 5th; range for the State, 1.616.

TEMPERATURE (degrees F.)—Monthly mean, 27.7; highest monthly mean, 32.9, at Bridgeton; lowest monthly mean, 25.1, at Madison; maximum, 57.0, at Plainfield, on the 19th; minimum, 3.0, at Locktown, on the 24th; range for State, 60 0; greatest local monthly range, 58.0, at Plainfield; least local monthly range, 42.0, at Billingsport and New Brunswick; greatest daily range, 34 0, at Allaire, on the 5th; least daily range, 0.0, at Union, on the 18th. Mean humidity, 77 2.

PRECIPITATION—(including melted snow in inches).—Average for the State, 2 49; greatest, 3.80, at Ocean City; least, 1.65, at Hopewell. Average number of days on which precipitation equaled 0.01 inch, 8,4. Average number of days on which cloudiness was 8 or more in a scale of 10, 9.3. *Wind*—Prevailing direction, northwest and west.

MISCELLANEOUS PHENOMENA—dates observed.—*Sleet*—17, Locktown. *Snow*—1, 3, 4, 5, 6, 8, 10, 11, 12, 13, 22, 24, 25, 27, 28. *Solar Halos*—4, 8, 11, 13, 15, 21, 24, 26. *Lunar Halos*—13, 17, 26. *Meteors*—7, 14. *Auroras*—1, 3, Egg Harbor City. *Corona*—17, at Moorestown, quite brilliant at 9 P. M.

March, 1889.

TEMPERATURE (degrees F).—The mean temperature for March, 1889, 40.5 degrees, is 3.7 degrees above the average determined from past records of 49 stations, and is 7.7 degrees above the average for the corresponding month of 1888. The warmest days during the month were the 13th, 23d and 24th, and the coldest the 1st, 10th, 11th, 12th, 25th, 26th, 29th, 30th and 31st. The lowest temperature recorded in the northern portion of the State was 19.0 degrees, in the central 22.0 degrees, and in the southern 28.5 degrees.

PRECIPITATION.—The average precipitation for the State, 3.79 inches, is 0.20 inches below the average determined from past records of forty-nine stations, and is 1.92 inches below the average for the corresponding month of 1888. One station, Bridgeton, reports a total for the month exceeding six inches; five stations, Egg Harbor City, Freehold, Oceanic, Toms River and Trenton, report a total exceeding five inches, and four stations, Atlantic City, Imlaystown, Ocean City and New York, a total exceeding four inches.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29 947; maximum observed, 30.53, at New York and Philadelphia, on the 1st; minimum observed, 29.22, at New York City, on the 7th; range for the State, 1.31.

TEMPERATURE (degrees F.)—Monthly mean, 40.5; highest monthly mean, 44.4, at Hanover; lowest monthly mean, 38.5, at Tenafly; maximum, 70.0, at Tenafly, on the 23d and 24th; minimum, 19.0, at Tenafly and Paterson on the 29th and 30th respectively; range for State, 51.0; greatest local monthly range, 51.0, at Tenafly; least local monthly range 22.0, at Ocean City; greatest daily range, 44.0 at Tenafly on the 13th; least daily range, 1.0, at Imlaystown, Moorestown, Ocean City and Oceanic on the 21st. Mean humidity, 75 2.

PRECIPITATION—(including melted snow in inches).—Average for the State, 3.79; greatest, 6.49, at Bridgeton; least, 1.98, at Princeton. Average number of days on which precipitation equaled 0.01 inch, 8. Average number of days

on which cloudiness was 8 or more on a scale of 10, 12.8. *Wind*—Prevailing direction, northeast and northwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—15th. at Bridgeton; 26th, Tenafly; 27th, at Beverly, Oceanic, New York, Madison, Rancocas, Somerville, South Orange, Plainfield, Highland Park and Gillete. *Hail*—15, 28, 31. *Sleet*—31. *Snow*—7, 8, 9, 10, 20, 21, 28, 30, 31, generally melting as it fell. *Solar Halos*—1, 2, 6, 14, 22. *Lunar Halos*—9, 10, 13, 14, 15.

April, 1889.

TEMPERATURE (degrees F.)—The mean temperature for April, 1889, 51.2 degrees, is 3.3 degrees above the average for the m nth, and also for the corresponding month of 1888. The warmest days were the 19th, 20th, 21st, and the coldest, the 1st, 5th, 6th, 7th, 8th, 13th, 14th and 23d. The lowest temperature recorded in the northern portion of the State was 25.0 degrees, in the central portion, 25.0, and in the southern portion, 32.0 degrees.

PRECIPITATION.—The average precipitation for the State, 5.32 inches, is 1.85 inches above the average for the month and is 2.04 inches above the average for the corresponding month of 1888. Three stations, Hanover, Plainfield and South Orange, report a total for the month exceeding seven inches; five stations, Freehold, Madison, Newark, Tenafly and Union, a total exceeding six inches, and nine stations, Gillette, Highland Park, Hopewell, Locktown, New York, Ocean City, Oceanic, Somerville and Trenton, a total exceeding five inches.

ATMOSPHERIC PRESSURE (in inches.)—Monthly mean, 29 980; maximum observed, 30 50, at Atlantic City, on the 23d; minimum observed, 29.23, at New York City, on the 27th; range for State, 1.27.

TEMPERATURE (degrees F.)—Monthly mean, 5.12; highest monthly mean, 55.2, at Bridgeton; lowest monthly mean, 48.0, at Atlantic City; maximum, 83.0, at Tenafly, on the 21st; minimum, 25.0, at Allaire and Tenafly, on the 6th and 23d; range for State, 58.0; greatest local monthly range, 58.0, at Tenafly; least local monthly range, 37.0, at Ocean City; greatest daily range, 48.0, at Beverly, on the 11th; least daily range, 1 0, at Bridgeton and Trenton, on the 25th and 26th respectively. Mean humidity, 77 0.

PRECIPITATION — (including melted snow in inches).—Average for the State, 5.32; greatest, 7.25, at Plainfield; least, 2.92, at Atlantic City. Average number of days on which precipitation equaled 0.01 inch, 11.5. Average number of days on which cloudiness was 8 or more on a scale of 10, 13 7. *Wind*—Prevailing direction, northeast.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*, 1, 2, 3, *12, 19, *20, 22, 28. *Hail*—20th, at Madison, Freehold and Ocean City. *Frost*—5, 6, 7, 9, 11, 14, 15, 16, 22, 23, 24. *Solar Halos*—11, 15, 25 *Lunar Halos*—15, 16. *Auroras*—Madison, on 7th, at 9 p m.

*Quite general throughout the State.

May, 1889.

TEMPERATURE (degrees F.)—The mean temperature for May, 1889, 62.3 degrees, is 2 6 degrees above the average for the month, and 9.9 degrees above the average for the corresponding month of 1888. The warm periods were from the 5th to 11th, and 16th to 18th, inclusive. The highest temperature during

the month was recorded at all stations on the 10th, and ranged from 87 to 94 degrees. The first four days of the month were the coolest; several stations reporting light, harmful frosts on these dates.

PRECIPITATION.—The average precipitation for the State, 4.09 inches, is 0.35 inches above the average for the month and is 0.83 inches below the average for the corresponding month of 1888. Very little rain fell during the first nineteen days, during which time the growing crops were in a most flourishing condition in all parts of the State. The last twelve days were unusually wet and very unfavorable for farming operations. Beans, corn, tomatoes and melons have been greatly retarded, while the fruit crops, especially cherries, strawberries and apples, are reduced to one-half of the average yield. The high winds during the month caused considerable damage. The observer at "Cranmoor Farm," Tom's River, reports as follows: "On the 10th at 6 P. M. a heavy gale from the northwest, doing considerable injury to trees. Several cottages, one barn, and the freight house at Island Heights were prostrated. The storm was followed by severe thunder and lightning, (zig-zag,) killing one person and stunning several.

ATMOSPHERIC PRESSURE (in inches).—Monthly mean, 29.983; maximum observed, 30.384, at Highland Park, on the 18th; minimum observed, 29.657, at Highland Park, on the 11th; range for State, 0.727.

TEMPERATURE (degrees F.)—Monthly mean, 62.3; highest monthly mean, 67 0, at Trenton; lowest monthly mean, 58.0, at Atlantic City; maximum, 94.0, at Tenafly, on the 10th; minimum, 32.0, at Allaire, on 2d; range for State, 62.0; greatest local monthly range, 59.0, at Tenafly; least local monthly range, 40.0, at Readington; greatest daily range, 46.0, at Plainfield and Tenafly on the 5th and 9th, respectively; least daily range, 1.0, at Billingsport, Moorestown and Oceanic, on the 27th. Mean humidity, 79.3.

PRECIPITATION—(including melted snow in inches).—Average for the State, 4.09; greatest, 6.60, at Bridgeton; least, 2.43 at Newark. Average number of days on which precipitation equaled 0.01 inch, 11.6 average; number of days on which cloudiness was 8 or more on a scale of 10, 10.8. *Wind*—Prevailing direction, northwest and southwest.

MISCELLANEOUS PHENOMENA—dates observed.—*Thunder Storms*—10, 13, 14, 15, 20, 21. *Frost*—1, 2, 3, 4. *Solar Halos*—1, 14, 15, 25. *Lunar Halos*—5, 7, 15. *Auroras*—Beverly, 28, 29. *Polar Bands*—Beverly, 29.

June, 1889.

TEMPERATURE (degrees F.)—The mean temperature for June, 1889, 69.9 degeees, is 1.6 degrees above the average for the month, and 0.9 degrees below the average for the corresponding month of 1888. The highest temperature recorded was 92.0 degrees and the lowest 37.0 degrees, as against 94.0 degrees and 32.0 degrees respectively during June, 1888. The month was particularly noted for its excessive moisture, the mean humidity being 83.3 per cent.

PRECIPITATION.—The average precipitation for the State, 3.73 inches, is 0.25 inches below the average for the month, and is 1.14 inches above the average for the corresponding month of 1888. The rainfall was very unevenly distributed. Lambertville, Hunterdon county, reports a total of 6.75 inches, and Locktown, Hunterdon county, 5.92 inches, (these stations are situated near the extreme

western central edge of the State); Oceanic, Monmouth county, 5.99 inches, and Hopewell, Mercer county, 5.05 inches. Three stations report a total exceeding four inches, sixteen a total exceeding three inches, and eight exceeding a total of two inches.

During the month there were nine days on which thunder storms occurred, as against sixteen during June, 1888.

ATMOSPHERIC PRESSURE (in inches.)—Monthly mean, 30.050; maximum observed, 30.469, at Highland Park, on the 24th; minimum observed, 29.662, at Highland Park, on the 5th; range for State, 0.807.

TEMPERATURE (degrees F.)—Monthly mean, 69.9; highest monthly mean, 74.9, at Readington; lowest monthly mean, 66.0, at Atlantic City; maximum, 92 0, at Billingsport on the 17th and 21st; minimum, 37.0, at Freehold, on the 4th; range for State, 55.0; greatest local monthly range, 51.0. at Freehold and Gillette; least local monthly range 30.0, at Bridgeton and Readington; greatest daily range 41.0 at Tenafly on the 7th; least daily range, 2.0, at Newark, Paterson and New Brunswick, on 1st and 12th; mean humidity, 83.3.

PRECIPITATION (in inches).—Average for the State 3.73; greatest, 6.75, at Lambertville, least 2.39, at Tenafly. Average number of days on which precipitation equaled 0.01 inch, 9 7. Number of days on which cloudiness was 8 or more on a scale of 10, 10. *Wind*.—Prevailing direction, southwest.

MISCELLANEOUS PHENOMENA—dates observed —*Thunder Storm*—4, 5, 9, 10, 11, 12, 14, 15, 16, 17, 21, 26. *Hail*.—5, Union; 17, Egg Harbor City. *Solar Halos*.—1, 4, 5, 11, 13, 17, 18, 24, 25. *Lunar Halos*.—2, 4, 5, 7, 8, 9, 11. *Meteors*—5th (Beverly), 26th (Rancocas), quite brilliant,

Number of Marriages, Births and Deaths By Townships and Counties, and Totals for the State.

FOR THE YEAR ENDING JUNE 30, 1889.

ATLANTIC COUNTY.

	M.	B.	D.
Absecon	5	12	8
Atlantic City	170	222	267
Buena Vista	4	20	16
Egg Harbor City	20	47	27
Egg Harbor Township	27	61	69
Galloway	10	41	33
Hamilton	20	19	26
Hammonton	23	86	62
Mullica	4	6	13
Weymouth	0	12	12
	283	526	533

BERGEN COUNTY.

	M.	B.	D.
Boiling Spring	0	3	4
Englewood	37	50	76
Franklin	22	48	31
Harrington	7	39	39
Hohokus	9	47	37
Lodi	28	101	67
Midland	13	22	30
New Barbadoes	43	122	91
Orvil	15	14	10
Palisade	20	29	21
Ridgefield	25	78	60
Ridgewood	4	22	28
Saddle River	1	46	22
Union	19	61	77
Washington	15	45	41
	258	727	634

BURLINGTON COUNTY.

	M.	B.	D.
Bass River	5	26	17
Beverly	27	34	45
Bordentown	46	123	88
Burlington	87	116	143
Chester	26	75	47
Chesterfield	7	16	21
Cinnaminson	27	91	53
Delvan	10	42	22
Eastampton	4	8	5
Evesham	5	26	24
Florence	8	62	24
Little Egg Harbor	11	53	29
Lumberton	2	35	10
Mansfield	8	46	28
Medford	10	16	32
Mount Laurel	0	26	17
New Hanover	14	27	38
Northampton	73	134	79
Pemberton	20	13	48
Randolph	4	12	3
Shamong	0	8	9
Southampton	9	25	29
Springfield	5	25	13
Washington	2	12	3
Westampton	1	4	5
Willingboro	5	10	9
Woodland	1	0	4
	417	1,065	843

CAMDEN COUNTY.

	M.	B.	D.
Camden City*	4,452	1,139	1,159
Centre	5	42	47
Delaware	0	20	7
Gloucester City	85	157	141
Gloucester	11	66	79
Haddon	37	95	63
Stockton	42	116	125
Waterford	14	60	40
Winslow	9	38	30
	4,655	1,733	1,69

*Marriages of non-residents, 3,609.

CAPE MAY COUNTY.

	M.	B.	D.
Cape May City	27	50	35
Dennis	21	53	42
Lower	11	45	43
Middle	16	53	33
Upper	22	18	34
	97	219	187

CUMBERLAND COUNTY.

	M.	B.	D
Bridgeton	103	294	165
Commercial	18	61	23
Deerfield	18	32	28
Downe	18	26	20
Fairfield	7	45	26
Greenwich	3	23	13
Hopewell	7	37	35
Landis	75	148	134
Lawrence	20	34	31
Maurice River	13	48	28
Millville	95	270	131
Stoe Creek	6	25	7
	383	1,043	641

ESSEX COUNTY.

	M.	B.	D
Belleville	25	69	77
Bloomfield	44	195	104
Caldwell	15	44	30
Clinton	13	62	38
East Orange	103	226	154
Franklin	8	23	21
Livingston	8	21	19
Millburn	9	43	23
Montclair	46	159	95
Newark	1,593	4,920	4,253
Orange	175	469	385
South Orange	19	69	62
West Orange	16	44	49
	2,074	6,344	5,310

GLOUCESTER COUNTY.

	M.	B.	D.
Clayton	20	31	40
Deptford	8	37	29
East Deptford	0	3	2
East Greenwich	9	14	21
Franklin	16	52	40
Glassboro	27	85	46
Greenwich	5	34	20
Harrison	8	26	27
Logan	10	22	17
Mantua	5	30	27
Monroe	17	45	42
South Harrison	1	20	7
Washington	14	20	19
West Deptford	7	25	8
Woodbury	56	102	38
Woolwich	16	70	32
	219	617	415

HUDSON COUNTY.

	M.	B.	D.
Bayonne	82	369	389
Guttenberg	12	54	40
Harrison	27	268	209
Hoboken	515	1, 281	1, 102
Jersey City	1, 180	3, 143	4, 065
Kearny	28	129	129
North Bergen	25	58	215
Town of Union	140	182	206
Union	8	46	46
Weehawken	3	31	35
West Hoboken	79	282	205
	2, 099	5, 843	6, 641

HUNTERDON COUNTY.

	M.	B.	D.
Alexandria	4	17	13
Bethlehem	9	22	38
Clinton	13	51	24
Delaware	16	44	39
East Amwell	8	12	13
Franklin	10	20	14
Frenchtown,	26	18	15
High Bridge	13	39	21
Holland	18	30	19
Kingwood	4	16	13
Lambertville	54	83	64
Lebanon	20	55	32
Raritan	17	48	45
Readington	21	37	42
Tewksbury	19	48	28
Union	12	13	9
West Amwell	1	9	11
	265	562	437

MERCER COUNTY.

	M	B.	D.
East Windsor	31	45	34
Ewing	6	7	92
Hamilton	14	34	75
Hopewell	37	57	45
Lawrence	2	16	16
Princeton	33	75	59
*Trenton	625	988	756
Washington,	0	16	10
West Middlesex	7	20	16
	755	1, 258	1, 103

*Marriages of non-residents, 101.

MIDDLESEX COUNTY.

	M.	B.	D.
Cranbury	14	35	20
East Brunswick	24	80	61
Madison	1	21	17
Monroe	10	32	38
New Brunswick	136	412	386
North Brunswick	13	23	20
Perth Amboy	65	177	186
Piscataway	16	69	51
Raritan	25	55	38
Sayreville	32	53	36
South Amboy	19	70	89
South Brunswick	16	48	48
Woodbridge	12	81	59
	383	1,156	1,049

MONMOUTH COUNTY.

	M.	B.	D.
Atlantic	8	23	20
Eatontown	5	39	38
Freehold	51	87	86
Holmdel	8	15	19
Howell	23	52	38
Long Branch	78	149	72
Manalapan	21	27	29
Marlboro	8	22	28
Matawan	26	56	53
Middletown	36	88	97
Millstone	16	32	21
Neptune	77	131	143
Ocean	14	20	36
Raritan	28	107	87
Shrewsbury	84	108	100
Upper Freehold	29	65	49
Wall	52	75	69
	564	1,096	985

MORRIS COUNTY.

	M.	B.	D.
Boonton	19	33	48
Chatham	31	91	65
Chester	10	39	36
Hanover	15	54	135
Jefferson	7	12	18
Mendham	14	20	28
Montville	9	6	20
Morristown	58	184	213
Mount Olive	13	36	15
Passaic	9	25	31
Pequannock	11	55	29
Randolph	59	163	98
Rockaway	31	129	102
Roxbury	18	83	35
Washington	10	50	26
	314	980	899

OCEAN COUNTY.

	M.	B.	D.
Berkeley	2	20	10
Brick	37	97	52
Dover	28	46	47
Eagleswood	4	6	8
Jackson	4	24	17
Lacey	1	7	10
Manchester	10	27	18
Ocean	1	9	4
Plumstead	11	31	24
Stafford	13	30	16
Union	8	23	15
	119	320	221

PASSAIC COUNTY.

	M.	B.	D.
Acquackanonk	5	32	27
Little Falls	13	28	17
Manchester	1	26	25
Passaic	106	326	243
Paterson	797	1,887	1,682
Pompton	23	49	32
Wayne	14	22	26
West Milford	12	21	30
	971	2,391	2,082

SALEM COUNTY.

	M.	B.	D.
Alloway	10	21	18
Elsinboro	0	3	4
Lower Alloways Creek	15	21	10
Lower Penns Neck	10	16	21
Mannington	1	18	39
Oldmans	6	27	20
Pilesgrove	16	51	60
Pittsgrove	11	97	28
Quinton	8	34	18
Salem	63	80	107
Upper Penns Neck	36	34	28
Upper Pittsgrove	11	9	18
	187	420	371

SOMERSET COUNTY.

	M.	B.	D.
Bedminster	17	26	34
Bernards	14	41	38
Branchburg	5	5	21
Bridgewater	84	146	149
Franklin	20	55	80
Hillsborough	13	45	49
Montgomery	6	28	26
North Plainfield	27	91	56
Warren	13	3	11
	199	440	464

SUSSEX COUNTY.

	M.	B.	D.
Andover	7	20	22
Byram	13	27	14
Frankford	12	26	21
Green	6	12	6
Hampton	5	2	11
Hardyston	14	1	29
Lafayette	6	7	9
Montague	5	1	6
Newton	32	36	36
Sandyston	5	9	9
Sparta	15	8	20
Stillwater	6	10	25
Vernon	12	4	20
Walpack	1	8	1
Wantage	34	40	52
	173	211	281

UNION COUNTY.

	M.	B.	D.
Clark	0	8	6
Cranford	6	22	14
Elizabeth	303	883	711
Fanwood	4	13	17
Linden	5	11	44
New Providence	4	16	13
Plainfield	97	185	162
Rahway	79	125	138
Springfield	6	18	12
Summit	15	40	29
Union	2	17	25
Westfield	12	46	37
	533	1,384	1,208

WARREN COUNTY.

	M.	B.	D.
Allamuchy	1	7	20
Belvidere	38	37	22
Blairstown	7	42	17
Franklin	7	4	13
Frelinghuysen	11	14	17
Greenwich	7	15	8
Hackettstown	19	45	40
Hardwick	2	10	9
Harmony	12	24	17
Hope	13	19	42
Independence	8	14	11
Knowlton	98	19	22
Lopatcong	2	30	18
Mansfield	14	12	13
Oxford	37	114	64
Pahaquarry	1	0	1
*Phillipsburg	447	246	140
Pohatcong	10	33	18
Washington	44	79	56
	778	764	548

*Marriages of non-residents 362.

TOTALS OF MARRIAGES, BIRTHS AND DEATHS, FOR ALL THE COUNTIES.

	M.	B.	D.
Atlantic	283	526	533
Bergen	258	727	634
Burlington	417	1,065	843
Camden	4,655	1,733	1,691
Cape May	97	219	187
Cumberland	383	1,043	641
Essex	2,074	6,344	5,310
Gloucester	219	617	415
Hudson	2,099	5,843	6,641
Hunterdon	265	562	437
Mercer	755	1,258	1,103
Middlesex	383	1,156	1,049
Monmouth	564	1,096	985
Morris	314	980	899
Ocean	119	320	221
Passaic	971	2,391	2,082
Salem	187	420	371
Somerset	199	440	464
Sussex	173	211	281
Union	533	1,384	1,208
Warren	778	764	548
	15,726	29,099	26,543

RETURNS OF DEATHS FROM ALL CAUSES.

Return of Deaths from all Causes and certain specified Diseases, Year ending

COUNTIES 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.	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.
Atlantic	144	47	35	162	143	2	533	25,278	21.08	16.23	35.83	158	29.64
Bergen	163	78	57	182	150	4	634	42,356	14.97	.....	38.01	243	38.33
Burlington	204	57	79	241	253	9	843	59,283	14.22	13.21	30.97	294	34.88
Camden	485	189	170	528	314	5	1,691	87,679	19.29	20.20	39.86	723	42.76
Cape May	34	18	20	46	68	1	187	11,527	16.22	.....	27.81	59	31.18
Cumberland	150	70	45	191	175	10	641	45,418	14.11	14.07	34.32	243	37.92
Essex	1,407	758	480	1,718	940	7	5,310	232,832	22.81	13.49	40.77	2,233	42.50
Gloucester	102	36	36	112	125	4	415	28,977	14.32	.....	33.25	133	32.05
Hudson	1,851	1,205	638	2,095	840	12	6,641	282,261	23.53	19.09	46.02	2,811	42.33
Hunterdon	71	29	30	115	189	3	437	37,420	11.68	.....	22.88	125	28.60
Mercer	285	81	75	374	270	18	1,103	73,764	14.95	11.98	31.37	412	37.35
Middlesex	272	146	92	283	247	9	1,049	59,295	17.69	14.61	39.85	408	37.94
Monmouth	214	85	88	275	312	11	985	67,753	14.54	14.74	30.36	357	36.24
Morris	169	99	1 01	248	279	3	899	50,775	17.71	16 33	29.81	325	36.15
Ocean	42	15	15	67	80	2	221	16,491	13.40	.....	25.79	72	32.58
Passaic	641	301	183	599	337	21	2,082	94,985	21.92	12.93	45.25	819	39.05
Salem	67	36	45	97	124	2	371	26,008	14.26	13.12	27.76	135	36.39
Somerset	86	36	38	146	153	5	464	27,635	16.79	.....	26.29	151	32.54
Sussex	53	26	20	69	109	4	281	22,401	12.54	.....	28.12	82	29.19
Union	286	158	1 01	3 80	279	4	1,208	66,853	18.07	11.66	36.75	409	33.86
Warren	116	42	47	1 42	197	4	548	38,656	14.18	13.65	88.83	181	33.03
Totals	6,842	3,512	2,895	8,068	5,586	140	26,543	1,397,647	18,99	14.97	39.01	10,373	39.13

NOTE.—Under the heading "Number of deaths from chief preventable diseases" the first

Of those dying under one year, 1,952 died under one month, of which 1,358 died in the large cities. years, 7,578 died in the larger cities. Total death-rate from consumption for the State as compared periods, or which deal with small numbers, are only approximate, since temporary causes may have in large aggregates. The number of deaths before twenty, in proportion to the rest, is much more from preventable diseases.

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
2	10	..	....	3	3	19	1	66	27	27	49	36	49	27	44	52	10	2	7	30
9	13	..	10	4	7	40	2	89	42	27	63	34	40	26	49	39	16	5	4	30
7	27	..	14	...	12	26	6	96	35	71	75	51	79	31	83	70	13	5	12	27
17	103	1	15	2	31	51	6	250	113	134	140	138	95	50	127	105	22	3	17	72
....	6	..	2	...	3	10	....	12	13	13	17	11	21	13	17	17	6	...	1	4
5	14	..	2	2	4	25	6	81	48	56	67	37	39	28	58	43	25	2	5	11
30	152	..	70	18	58	394	19	728	460	304	576	459	298	218	400	238	129	23	45	177
3	15	..	5	...	2	17	1	41	31	18	32	24	32	21	43	39	7	2	1	19
55	178	2	238	62	80	541	37	859	376	383	819	552	345	233	336	317	113	25	75	265
2	8	..	8	...	4	8	4	33	21	37	49	10	44	19	64	22	19	3	5	22
9	28	..	3	1	9	28	2	148	95	89	106	52	78	41	123	70	21	6	15	44
7	17	..	23	2	5	84	4	152	60	54	116	58	74	53	65	40	27	2	5	68
11	29	..	21	2	11	24	4	123	74	58	82	44	74	52	94	72	35	2	10	44
9	14	..	18	...	16	75	5	84	49	55	92	41	97	38	101	52	19	7	6	40
1	13	..	....	...	1	4	2	20	10	21	7	13	29	7	26	13	9	3	3	8
14	34	..	66	13	17	106	8	318	123	120	247	178	134	70	116	95	36	9	17	88
4	16	..	2	...	1	26	1	33	21	31	36	13	29	10	35	18	10	3	1	20
6	13	..	2	...	2	12	2	41	40	33	47	26	44	28	48	31	16	3	5	17
....	6	..	7	2	2	8	2	21	15	19	40	12	28	10	31	23	4	2	1	10
9	18	..	26	7	7	48	1	128	79	86	140	106	104	59	87	56	28	8	11	68
3	10	..	1	...	3	28	1	54	49	41	62	28	53	22	44	38	14	2	8	13
203	724	3	533	118	278	1,574	114	3,377	1,772	1,677	2,862	1,923	1786	1056	1,991	1450	579	117	254	1077

eleven diseases are classed including consumption, male and female.

Of those dying under one year, 4,906 died in the larger cities. Of the 10,354 that died under five with the total death-rates, 12,99, the deaths being 2,258 in cities, 1,191 outside. Rates for short been in operation, and small numbers do not eliminate or balance errors which practically disappear informatory as to local causes affecting health than the total deaths. See, also, the number dying

Return of Deaths from all Causes and certain specified Diseases, for the year ending

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.	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.
Atlantic County.												
Atlantic City	*79	22	20	92	53	1	267	9,914	†26.93	37.81	78	25.43
Burlington County												
Bordentown	17	4	3	33	31	....	88	5,857	15.02	23.86	28	31.82
Burlington City	32	14	17	41	37	2	143	7,103	20.13	32.15	45	32.17
Camden County.												
Camden City	331	126	125	383	192	2	1,159	61,864	18.73	39.43	510	48.00
Gloucester City	45	19	17	40	20	....	141	6,461	21.82	42.55	60	42.55
Cumberland Co'ty												
Bridgeton	43	18	10	51	40	3	165	11,139	14.81	36.96	58	34.84
Millville	41	17	14	33	23	3	131	9,755	13.43	23.66	66	50.38
Essex County.												
Newark	1,157	641	384	1,394	676	1	4,253	166,172	25.59	42.28	1,823	45.18
Orange	114	49	30	121	71	....	385	16,850	22.85	42 34	162	42.59
Hudson County.												
Bayonne	125	84	48	81	50	1	389	16,046	24.24	53.73	173	44.47
Harrison	56	49	23	65	13	3	209	7,843	26.65	50.24	98	46.89
Hoboken	303	219	113	340	127	....	1,102	43,099	25.57	47.82	492	44.65
Jersey City	1,117	711	385	1,370	476	6	4,065	179,746	22.66	44.97	1,691	41.60
Town of Union	69	41	20	41	35	....	206	10,438	19.74	53.40	105	50.97
Mercer County.												
Trenton	237	73	52	243	140	11	756	50,601	14.94	41.00	311	41.14
Middlesex County												
New Brunswick	96	65	38	109	76	2	386	19,132	20.18	41.71	171	44.30
Perth Amboy	74	28	15	50	19	....	186	7,513	24.76	54.83	66	35.48
MonmouthCounty												
Long Branch	29	4	7	22	15	4	72	5,800	12.41	45.99	27	37.50
Morris County.												
Morristown	39	43	36	40	55	....	213	8,760	24.32	38.50	113	53.05
Passaic County.												
Passaic City	87	42	28	53	31	2	243	9,776	24.86	52.71	115	47.33
Paterson	516	236	143	508	261	18	1,682	73,067	23.02	44.71	655	40.00
Salem County.												
Salem City	15	11	15	31	34	1	107	5,884	18.18	24.30	48	44.86
Union County.												
Elizabeth	187	119	51	227	126	1	711	35,231	20.18	43.04	257	44.60
Plainfield	37	10	18	54	42	1	162	9,543	16.97	29.01	48	29 69
Rahway	27	10	18	44	38	1	138	7,186	19.20	26.81	49	35.50
Warren County.												
Phillipsburg	42	17	12	34	34	1	140	8,760	15.98	42.75	51	36.43
Totals	4 906	2,672	1,642	5,500	2.715	64	17,499	793,540	22.04	43.31	7,300	41.72

NOTE.—Estimated populations are approximated, and we believe the census of 1890 will enable

*Probably due to infants brought to the city sick.

†This death rate is calculated on the resident estimated population, whereas the real population terion of health conditions.

in the Cities of over 5,000 population, of the State of New Jersey, June 30, 1889.

	PRINCIPAL CAUSES OF DEATH.																			
Remittent fever.	Typhoid fever.	Smallpox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
1	6	..	....	...	1	8	1	32	16	13	25	20	27	16	25	26	2	...	4	11
2	3	..	....	....	1	....	....	5	3	14	5	7	7	3	12	8	1	...	3	2
1	4	..	6	...	1	4	4	11	6	8	16	14	9	7	11	15	1	...	....	8
17	90	..	13	2	11	32	6	169	79	91	94	97	59	37	75	71	15	3	13	47
....	1	..	1	..	2	11	....	23	12	10	11	13	6	3	10	7	2	...	2	5
....	4	..	2	2	1	2	1	21	12	13	17	8	13	7	14	10	7	..	....	5
3	4	..	....	....	....	9	1	27	10	12	6	13	6	3	8	7	4	...	....	....
22	131	..	48	16	50	343	14	582	369	248	465	387	223	166	300	183	91	18	36	140
....	7	..	5	...	1	22	3	69	36	19	44	26	17	24	20	15	17	1	5	17
4	4	..	10	1	4	59	4	60	7	20	43	31	10	15	23	11	3	1	2	23
6	4	..	9	1	5	28	1	22	12	10	36	26	3	4	9	4	3	...	5	6
4	24	..	24	2	19	162	7	132	67	51	112	73	66	38	47	54	28	5	15	46
33	132	..	172	54	46	223	21	522	232	256	526	366	219	147	198	193	60	13	47	163
3	5	..	6	1	2	27	2	39	6	14	27	10	12	8	8	7	4	...	1	1
5	20	..	3	1	9	20	2	130	69	52	80	45	47	24	56	44	13	3	9	28
1	5	..	9	2	3	50	1	54	29	17	39	17	25	20	17	14	9	1	4	22
2	2	..	2	...	....	8	....	37	9	6	30	23	5	3	8	5	4	...	1	12
1	1	..	2	2	....	4	....	10	6	1	5	4	9	1	8	6	1	1	....	4
3	2	..	13	...	5	30	....	33	9	18	17	8	15	6	17	14	3	1	....	6
2	7	..	5	2	8	25	1	47	11	7	23	21	7	9	15	6	1	2	5	7
10	26	..	59	11	9	78	7	245	108	102	207	141	112	58	86	77	33	7	12	73
2	10	..	2	...	....	13	....	7	6	8	11	6	7	5	10	4	1	1	1	2
5	9	..	14	7	4	40	....	85	45	48	83	67	46	36	41	34	14	4	6	46
....	1	..	2	...	1	3	1	19	10	11	15	9	22	9	13	9	6	...	3	6
....	5	..	6	...	....	1	....	11	12	14	14	11	10	2	12	9	6	2	2	6
....	5	..	....	...	....	12	....	20	8	6	17	10	11	6	9	7	5	...	5	1
127	512	..	413	104	183	1,214	77	2,412	1,189	1,069	1,968	1,453	993	657	1,052	840	334	63	181	687

us to show a general decrease of death rates.

is often several times larger, and on account of this floating population, the death rate is not a cri-

Return of Deaths from all Causes and certain specified Diseases,

Year ending

ATLANTIC COUNTY.	DEATHS AT ALL AGES.								
Statistical Divisions.	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.
Absecon	1			4	3		8		
Atlantic City*	79	22	20	92	53	1	267	9,914	26.93
Buena Vista	3	4		3	6		16		
Egg Harbor City	6			10	11		27		
Egg Harbor Township	26	2	5	18	18		69		
Galloway	2	3	4	14	10		33		
Hamilton	8	4	2	4	7	1	26		
Hammonton	14	10	4	9	25		62		
Mullica	2	1		6	4		13		
Weymouth	3	1		2	6		12		
Totals	144	47	35	162	143	2	533	25,278	21.08

*This and all other cities that are health resorts have an excessive death-rate by reason of Local boards show this on their records.

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
....	1	....	....	....	....	....	....	1	2	1	1	....	....	....	1	....	....	....	....	....
1	6	....	....	....	1	8	1	32	16	13	25	20	27	16	25	26	2	....	4	11
....	....	....	....	....	....	2	....	2	1	....	....	2	3	1	2	1	1	....	....	....
....	1	....	....	....	....	....	....	2	3	....	2	1	2	3	2	4	1	....	1	2
....	1	....	....	....	1	2	....	11	4	5	5	9	6	3	2	5	2	....	1	4
....	....	....	....	....	....	....	....	4	....	4	4	....	3	....	2	3	2	....	....	7
1	1	....	....	....	1	2	....	4	1	1	3	1	1	1	2	3	1	....	1	....
....	....	....	....	3	....	5	....	8	....	2	7	3	7	3	3	6	....	....	....	4
....	....	....	....	....	....	....	....	1	....	1	2	....	....	....	2	3	....	1	....	1
....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	3	1	1	1	....	1
2	10	....	....	3	3	19	1	66	27	27	49	36	49	27	44	52	10	2	7	30

temporary increase of population, which also includes a proportion of invalids above the average.

Return of Deaths from all Causes and certain specified Diseases,

Year ending

BERGEN COUNTY. 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.
Boiling Spring	2				2		4		
Englewood	25	10	8	23	9	1	76		
Franklin	5	1	2	13	10		31		
Harrington	11	1	7	9	11		39		
Hohokus	11	9	3	6	8		37		
Lodi	19	10	7	17	14		67		
Midland	6	4	1	8	11		30		
New Barbadoes	24	8	2	36	21		91		
Orvil	3		1	3	3		10		
Palisade	3	4		7	7		21		
Ridgefield	18	7	4	19	12		60		
Ridgewood	3	1	5	9	10		28		
Saddle River	6	3	2	3	8		22		
Union	20	18	12	15	11	1	77		
Washington	7	2	3	14	13	2	41		
Totals	163	78	57	182	150	4	634	42,356	14.97

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption.—males.	Consumption.—females.	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.
											1	1	1							
1	5		1	1	1	12		14	4	1	8	4	7	1	4	3				5
						2		1	2	3	2	1	1	1	6	2	2		1	2
2	1		1			2		7	2		6	1	3		3	1	2			1
1			1	1	12	2		6	1	2	6	2	1	1	1	4		1		1
	1					3		10	6	3	7	7	3	1	4	6	2		1	4
1	1					3		5	4			1	2	1	3	3	3			
	1		1	1		1		19	5	4	8	4	11	7	8	4		2		3
										1	3	1			1	2				
			1			1	1	1	1		1	2	1	1	4	2			1	3
			2		1			13	4	4	8	2	3		4	2	1	2		6
2	2				1	2		1		1	3	3	1	3	3	1				2
1				1				2	1	3	3	1			3	1				1
	2		3		1	21	1	9	5		4	4	1	9	3	6	1	1		1
1					1	1		1	7	5	3		5	1	2	2	3			1
9	13		10	4	7	40	2	89	42	27	63	34	40	26	49	39	16	5	4	30

Return of Deaths from all Causes and certain specified Diseases, Year ending

DEATHS AT ALL AGES.

BURLINGTON COUNTY Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1000.
Bass River	3	3	4	5	1	1	17	.....	.....
Beverly	13	2	3	16	10	1	45	.....	.....
Bordentown	17	4	3	33	31	....	88	5,857	23.80
Burlington	32	14	17	41	37	2	143	7,103	20.10
Chester	18	2	2	13	12	....	47	.....	.....
Chesterfield	5	1	3	6	6	....	21	.....	.....
Cinnaminson	19	6	3	10	14	1	53	.....	.....
Delran	7	.....	4	7	4	....	22	.....	.....
Eastampton	.....	.....	.....	2	3	....	5	.....	.....
Evesham	5	1	2	8	8	....	24	.....	.....
Florence	9	3	1	6	5	....	24	.....	.....
Little Egg Harbor	10	2	1	5	10	1	29	.....	.....
Lumberton	8	.....	.....	2	.....	....	10	.....	.....
Mansfield	5	1	2	8	12	....	28	.....	.....
Medford	2	2	5	8	15	....	32	.....	.....
Mt. Laurel	3	1	7	3	3	....	17	.....	.....
New Hanover	8	1	3	10	13	1	36	.....	.....
Northampton	19	2	6	24	27	1	79	.....	.....
Pemberton	10	3	2	13	19	1	48	.....	.....
Randolph	.....	.....	.....	1	2	....	3	.....	.....
Shamong	1	3	2	2	1	....	9	.....	.....
Southampton	5	3	8	6	7	....	29	.....	.....
Springfield	2	1	.....	4	6	....	13	.....	.....
Washington	.....	.....	.....	3	.....	....	3	.....	.....
Westampton	1	.....	.....	2	2	....	5	.....	.....
Willingboro	2	1	.....	2	4	....	9	.....	.....
Woodland	.....	1	1	1	1	....	4	.....	.....
Totals	204	57	79	241	253	9	843	59,283	14.2

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
			2					3		3	4	1	1			1				
12	1				1	1		8	3	4	12	4	4		4	12	1			3
	3				1			5	3	14	5	7	7	3	12	8	1		3	12
1	4		6		1	4	4	11	6	8	16	14	9	7	11	15	1			8
	1				2			8	1	5	5	2	4	3	6	2				2
	1		1		2			3		4	1		12	1	3	12				1
1	1				2		1	11	1	4	2	3	7	3	3	5		2		1
			2			1		3		2	1	3			1	5	1			1
									3						1			1		
					1			4		1	3		1		4	5			1	
					1			3			1	3	2	2	1	2	1			1
	1				2			2		2	4	1	4		2		1			1
								4	1		2	1			1					
	1							2	1	1	1	1	3	1	4	7			1	1
	1					3		1	2	4	3	1	4	2	4		3			2
	3		1					2		3	1	2	1		2	1				
	1		1					3	3	5	1	3	3	1	3	2		1	1	1
1	1					2	1	13	4	7	8	2	14	3	7	4	1	1	4	
	4					1		6	3	2	7		4	2	5	5	2			1
									1		1									
						4					2		1						1	2
	1		1			8		4	2		1	1	6		2				1	
									1	1	2	1		1	3	2				
	1												1						1	
	2														1	1				
												1	1	1	2	1	1			
						2								1	1					
7	27		14		12	26	6	96	35	71	75	51	79	31	83	70	13	5	12	27

Return of Deaths from all Causes and certain specified Diseas

Year end

CAMDEN COUNTY. 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.
Camden City	331	126	125	383	192	2	1,159	61,864
Centre	14	9	5	8	11	....	47	.....
Delaware	1	1	.....	2	3	....	7	.....
Gloucester City	45	19	17	40	20	....	141	6,461
Gloucester	19	1	2	28	27	2	79	.....
Haddon	13	5	5	16	24	....	63	.....
Stockton	41	24	10	28	21	1	125	.....
Waterford	14	2	3	13	8	....	40	.....
Winslow	7	2	3	10	8	....	30	.....
Totals	485	189	170	528	314	5	1,691	87,679

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PRINCIPAL CAUSES OF DEATH.

Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
90	..	13	2	11	32	6	169	79	91	94	97	59	37	75	71	15	3	13	47
1	..	....	..	8	....	....	9	....	5	5	4	2	1	6	3	....	....	....	....
1	..	....	..	....	....	....	1	....	....	3	....	2	....	....	....	....	....	....	....
1	..	1	..	2	11	....	23	12	10	11	13	6	3	10	7	2	....	2	5
1	1	....	..	....	1	....	5	8	6	2	6	9	2	15	12	....	....	1	2
6	..	....	..	3	1	....	7	5	3	4	2	3	4	8	4	2	....	1	3
....	..	1	..	4	3	....	22	5	12	18	14	11	....	8	4	1	....	....	8
1	..	....	..	1	3	....	9	1	3	1	1	2	3	1	3	....	....	....	6
2	..	....	..	2	....	....	5	3	4	2	1	1	....	4	1	2	....	....	1
103	1	15	2	31	51	6	256	113	134	140	138	95	50	127	105	22	3	17	72

Return of Deaths from all Causes and certain specified Diseases

Year ending

CAPE MAY COUNTY. 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.
Cape May City	6	3	2	12	12	....	35	.....	.....
Dennis	10	3	13	6	10	....	42	.....	.....
Lower	10	5	3	10	15	....	43	.....	.....
Middle	3	3	1	12	14	....	33	.....	.....
Upper	5	4	1	6	17	1	34	.....	.....
Totals	34	18	20	46	68	1	187	11,527	1,6:

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PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
...	1	..	....	..	....	....	....	3	2	2	3	4	4	2	5	3	1	....	1	1
...	1	..	2	..	1	6	....	1	1	2	7	3	5	4	1	3	1	....	....	....
...	2	..	....	..	1	1	....	6	4	4	3	......	5	4	3	5	....	....	....	1
...	1	..	....	..	1	1	....	......	3	4	2	2	4	2	3	....	1	....	....	2
...	1	..	....	..	....	2	....	3	1	1	2	2	3	1	5	6	3	....	....	....
...	6	..	2	..	3	10	....	12	13	13	17	11	21	13	17	17	6	....	1	4

Return of Deaths from all Causes and certain specified Diseases, Year ending

CUMBERLAND COUNTY. 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.
Bridgeton	43	18	10	51	40	3	165	11,139	14.81
Commercial	5	1	2	7	8	....	23	.....	.....
Deerfield	7	2	2	7	9	1	28	.....	.....
Downe	4	3	.....	6	6	1	20	.....	.....
Fairfield	6	1	.....	8	11	....	26	.....	.....
Greenwich	2	1	.....	3	7	....	13	.....	.....
Hopewell	7	1	3	9	15	....	35	.....	.....
Landis	22	16	10	48	36	2	134	.....	.....
Lawrence	8	1	1	10	11	....	31	.....	.....
Maurice River	3	9	3	6	7	....	28	.....	.....
Millville	41	17	14	33	23	3	131	9,755	13.43
Stoe Creek	2	....	.....	3	2	....	7	.....	.....
Totals	150	70	45	191	175	10	641	45,318	14.11

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PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	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.
....	4	..	2	2	1	2	1	21	12	13	17	8	13	7	14	10	7	....	....	5
....	1	..	....	..	....	....	....	1	2	3	2	1	2	....	1	3	1	....	....	2
....	....	..	....	..	1	....	1	....	1	3	5	2	2	1	5	2	2	....	....	....
....	....	..	....	..	1	....	....	....	1	2	8	....	2	....	2	2	1	....	....	1
1	2	..	....	..	1	1	1	2	2	3	1	....	3	3	1	....	....	....	....	....
1	....	..	....	..	....	....	....	2	1	....	3	....	....	3	....	1	....	....	1	....
....	1	..	....	..	....	1	....	2	3	1	4	1	1	1	8	4	1	....	....	....
...	2	..	....	..	....	6	2	17	11	13	10	10	9	4	15	11	4	2	4	1
....	....	..	....	..	....	1	....	3	2	2	5	1	1	5	2	2	3	....	....	1
....	....	..	....	..	....	5	....	5	2	3	4	1	....	1	2	1	1	....	....	1
3	4	..	....	..	....	9	1	27	10	12	6	13	6	3	8	7	4	....	....	....
....	....	..	....	..	....	....	....	1	1	1	2	....	....	....	....		1	....	....	....
5	14		2	2	4	25	6	81	48	56	67	37	39	28	58	43	25	2	5	11

Return of Deaths from all Causes and certain specified Diseases, Year ending

DEATHS AT ALL AGES.

ESSEX COUNTY. Statistical Divisions.	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.
Belleville	13	17	7	24	15	1	77	.....	.....
Bloomfield	27	6	14	25	32	....	104	.....	.....
Caldwell	5	2	.....	10	13	....	30	.....	.....
Clinton	5	.....	3	16	14	....	38	.....	.....
East Orange	34	9	20	43	47	1	154	.....	.....
Franklin	3	2	3	3	8	2	21	.....	.....
Livingston	3	1	.....	4	11	....	19	.....	.....
Millburn	3	3	2	11	4	....	23	.....	.....
Montclair	20	14	6	33	22	....	95	.....	.....
Newark	1,157	641	384	1,394	676	1	4,253	166,172	25.59
Orange	114	49	30	121	71	....	385	16,850	22.85
South Orange	9	10	6	19	17	1	62	.....	.....
West Orange	14	4	5	15	10	1	49	.....	.....
Totals	1,407	758	480	1,718	940	7	5,310	232,832	22.81

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PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	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.
2	....	..	....	..	....	9	1	3	7	3	8	12	5	3	9	3	2	1	....	1
....	3	..	5	..	....	2	....	17	6	4	12	9	12	6	6	5	2	....	1	5
....	....	..	....	..	....	....	....	4	3	2	1	2	7	1	6	1	2	....	....	....
....	1	..	....	..	....	....	....	2	3	5	3	2	5	3	6	3	2	....	....	....
....	4	..	4	..	4	12	1	15	11	10	16	4	11	8	12	10	5	3	1	5
....	1	..	2	..	....	....	....	4	2	1	2	1	....	....	4	2	....	....	....	1
1	....	..	....	..	....	....	....	2	1	1	2	.....	3	....	5	2	....	....	....	1
3	....	..	....	..	....	....	....	2	2	....	.....	2	2	2	3	2	....	....	1	3
....	4	..	1	2	2	2	....	8	9	7	11	9	8	2	13	7	2	....	1	1
22	131	..	48	16	50	343	14	582	369	248	465	387	223	166	300	183	91	18	36	140
....	7	..	5	..	1	22	3	69	36	19	44	26	17	24	20	15	17	1	5	17
2	1	..	1	..	....	3	....	11	5	2	8	5	4	1	9	3	5	....	....	1
....	....	..	4	..	1	1	....	9	6	2	4	.....	1	2	7	2	1	....	....	2
30	152	..	70	18	58	394	19	728	460	304	576	459	298	218	400	238	129	23	45	177

Return of Deaths from all Causes and certain specified Diseases,

Year ending

GLOUCESTER COUNTY. 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.
Clayton	10	6	4	8	12	....	40	.....	.....
Deptford	10	5	1	8	5	....	29	.....	.....
East Deptford	2	.....	.....	.....	.....	....	2	.....	.....
East Greenwich	3	.....	1	8	8	1	21	.....	.....
Franklin	9	3	4	12	12	....	40	.....	.....
Glassboro	8	9	7	14	8	....	46	.....	.....
Greenwich	6	1	2	5	6	....	20	.....	.....
Harrison	2	1	3	8	13	....	27	.....	.....
Logan	2	1	1	9	3	1	17	.....	.....
Mantua	8	1	2	6	10	....	27	.....	.....
Monroe	11	3	5	12	10	1	42	.....	.....
South Harrison	1	1	.....	2	3	....	7	.....	.....
Washington	7	1	1	4	6	....	19	.....	.....
West Deptford	2	2	.....	1	3	....	8	.....	.....
Woodbury	16	2	2	7	10	1	38	.....	.....
Woolwich	5	.....	3	8	16	....	32	.....	.....
Totals	102	36	36	112	125	4	411	28,977	14.32

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PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
....	1	..	....	..	1	5	....	5	2	1	3	2	4	2	2	4	1	....	....	2
....	....	..	....	..	....	1	....	3	1	1	3	3	1	....	2	3	1	....	....	2
....	....	..	....	..	....	....	....	.....	....	....	2	.....	....	....	....	....	....	....	....	....
....	....	..	....	..	....	....	....	.....	2	3	.....	1	3	....	1	1	....	....	....	....
1	....	..	2	..	....	2	....	4	3	2	2	2	....	4	5	3	....	....	....	2
....	4	..	2	..	1	3	....	3	7	3	3	4	3	1	2	3	1	....	....	1
1	1	..	....	..	....	....	....	3	1	....	.....	.....	2	2	1	2	1	....	....	2
....	1	..	....	..	....	1	....	2	1	2	1	.....	2	1	5	5	1	1	....	2
....	1	..	....	..	....	....	....	.....	1	....	3	2	3	....	2	2	....	....	....	2
....	....	..	....	..	....	....	1	4	1	....	4	1	2	2	5	2	....	....	....	1
1	1	..	....	..	....	3	....	3	7	1	3	5	1	2	4	2	2	....	1	....
....	2	..	....	..	....	....	....	.....	1	....	1	.....	1	1	1	....	....	....	....	....
....	2	..	....	..	....	....	....	5	....	2	1	.....	1	1	3	2	....	....	....	1
....	....	..	....	..	....	....	....	1	2	....	.....	1	....	1	....	1	....	1	....	....
....	1	..	....	..	....	1	....	5	1	1	5	1	2	3	4	3	....	....	....	3
....	1	..	....	..	....	1	....	3	1	2	1	.....	7	1	6	6	....	....	....	1
3	15	..	5	..	2	17	1	41	31	18	32	24	32	21	43	39	7	2	1	19

Return of Deaths from all Causes and certain specified Diseases, Year ending

HUDSON COUNTY. 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.
Bayonne	125	84	48	81	50	1	389	16,046	24.24
Guttenberg	11	11	2	10	6	....	40	.....	.....
Harrison	56	49	23	65	13	3	209	7,843	26.65
Hoboken	303	219	113	340	127	....	1,102	43,099	25.57
Jersey City	1,117	711	385	1,370	476	6	4,065	179,746	22.66
Kearny	25	18	14	37	34	1	129	.....	.....
North Bergen	43	20	16	74	61	1	215	.....	.....
Town of Union	69	41	20	41	35	....	206	10,438	19.74
Union	15	11	3	12	5	....	46	.....	.....
Weehawken	9	7	3	15	1	....	35	.....	.....
West Hoboken	78	34	11	50	32	....	205	.....	.....
Totals	1,851	1,205	638	2,095	840	12	6,641	282,261	23.53

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PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Smallpox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	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.
4	4	..	10	1	4	59	4	60	7	20	43	31	10	15	23	11	3	1	2	23
....	....	..	1	..	....	3	....	6	3	6	4	4	....	1	....	4	....	....	1	1
6	4	..	9	1	5	28	1	22	12	10	36	26	3	4	9	4	3	....	5	6
4	24	..	24	2	19	162	7	152	67	51	112	73	66	38	47	54	28	5	15	46
33	132	..	172	54	46	223	21	522	232	256	526	366	219	147	198	193	60	13	47	163
4	2	..	6	1	1	4	1	8	10	2	11	6	10	5	14	4	5	2	1	6
....	4	2	3	2	1	12	1	26	23	13	16	10	13	7	28	15	1	1	1	6
3	5	..	6	1	2	27	2	39	6	14	27	10	12	8	8	7	4	....	1	1
....	....	..	....	..	....	6	....	3	3	2	11	6	2	....	3	2	2	1	....	2
....	....	..	4	..	....	1	....	2	3	1	4	1	2	2	1	1	....	1	1	6
1	3	..	3	..	2	16	....	39	10	8	29	19	8	6	5	12	7	1	1	5
55	178	2	238	62	80	541	37	859	370	383	819	552	345	233	336	317	113	25	75	265

Return of Deaths from all Causes and certain specified Diseases,

Year ending

HUNTERDON COUNTY. 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 1000.
Alexandria	1	1	1	4	6	....	13	.....	.....
Bethlehem	6	4	2	13	13	....	38	.....	.....
Clinton	2	2	3	8	8	1	24	.....	.....
Delaware	3	2	4	7	23	....	39	.....	.....
East Amwell	1	1	2	4	5	....	13	.....	.....
Franklin	2	.....	2	3	7	....	14	.....	.....
Frenchtown,,	3	.....	1	4	6	1	15	.....	.....
High Bridge	5	1	4	6	5	....	21	.....	.....
Holland	2	3	1	4	9	....	19	.....	.....
Kingwood	1	3	.....	3	6	....	13	.....	.....
Lambertville	12	6	4	20	22	....	64	.....	.....
Lebanon	6	2	2	11	11	....	32	.....	.....
Raritan	7	1	1	16	20	....	45	.....	.....
Readington	4	3	2	5	27	1	42	.....	.....
Tewksbury	10	.....	1	6	11	....	28	.....	.....
Union	2	.....	.....	1	3	....	6	.....	.....
West Amwell	4	.....	.....	.....	7	....	11	.....	.....
Totals	71	29	30	115	189	3	437	37,420	11.68

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PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption.—males.	Consumption —females.	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.
....	....	..	....	..	....	1	2	.....	1	1	2	.....	1	2	2	.....	....	....	....	1
....	....	..	....	..	2	....	1	5	4	2	3	1	5	2	6	....	2	1	....	1
1	....	..	1	..	....	2	....	2	2	3	3	.....	2	....	3	....	1	1	....	3
....	2	..	....	..	....	....	....	.....	4	4	6	2	6	...	5	....	1	....	2	2
....	....	..	....	..	....	1	....	1	1	1	1	.....	....	2	4	....	1	...	....	....
....	....	..	....	..	....	....	....	3	....	1	.....	1	1	....	2	1	....	....	....	1
....	....	..	....	..	....	....	....	1	....	1	.....	.....	1	1	1	3	1	....	....	2
....	1	..	....	..	....	....	....	3	1	2	.....	1	1	....	2	1	1	....	1	5
....	1	..	....	..	....	....	....	3	....	2	1	1	2	....	6	1	1	....	....	....
1	....	..	....	..	1	....	....	1	....	....	.....	.....	....	1	1	2	1	....	1	....
....	1	..	6	..	....	2	1	4	4	10	6	1	3	1	8	3	3	....	....	2
....	1	..	....	..	1	....	....	2	1	1	6	.....	5	3	5	....	....	1	....	2
....	2	..	1	..	....	....	....	3	2	5	1	1	7	2	4	4	5	....	....	1
....	....	..	....	..	....	1	....	1	....	2	12	1	3	4	7	4	1	....	1	1
....	....	..	....	..	....	1	....	1	1	2	6	1	6	1	3	2	....	....	....	....
....	....	..	....	..	....	....	....	2	....	....	.....	.....	....	....	1	1	....	....	....	1
....	....	..	....	..	....	....	....	1	....	....	2	.....	1	....	4	....	1	....	....	....
2	8	..	8	..	4	8	4	33	21	37	49	10	44	19	64	22	19	3	5	22

Return of Deaths from all Causes and certain specified Diseases,

Year ending

DEATHS AT ALL AGES.

MERCER COUNTY. Statistical Divisions.	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.
East Windsor	5	1	1	10	16	1	34	.....	.....
Ewing	10	2	3	40	33	4	92	.....	.....
Hamilton	9	1	5	37	22	1	75	.....	.....
Hopewell	4	3	6	10	22	...	45	.....	.....
Lawrence	3	.....	.....	8	5	....	16	.....	.....
Princeton	10	1	5	22	20	1	59	.....	.....
Trenton	237	73	52	243	140	11	756	50,601	14.94
Washington	3	.....	1	1	5	....	10	.....	.....
West Windsor	4	.....	2	3	7	....	16	.....	.....
Totals	285	81	75	374	270	18	1,103	73,764	14.95

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

	PRINCIPAL CAUSES OF DEATH.																			
Remittent fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
....	....	..	....	..	....	1	....	1	2	4	4	.....	4	1	6	1	1	1	2	1
....	....	..	....	..	....	....	....	3	6	13	4	1	5	6	33	6	1	....	1	4
1	4	..	....	..	....	2	....	6	7	8	8	.....	3	4	7	5	3	....	2	5
....	....	..	....	..	....	5	....	2	3	4	5	1	3	1	9	4	....	1	....	2
....	1	..	....	..	....	....	....	1	1	2	1	.....	....	1	3	3	1	....	....	1
2	3	..	....	..	....	....	....	4	6	5	2	3	10	2	6	5	1	....	1	3
5	20	..	3	1	9	20	2	130	69	52	80	45	47	24	56	44	13	3	9	28
....	....	..	....	..	....	....	....	.....	....	1	1	.....	1	....	3	1	1	....	....	....
1	....	..	....	..	....	....	....	1	1	....	1	2	5	2	....	1	....	1	....	....
9	28	..	3	1	9	28	2	148	95	89	106	52	78	41	123	70	21	6	15	44

Return of Deaths from all Causes and certain specified Diseases, Year ending

MIDDLESEX COUNTY. 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 1000.
Cranbury	3	1	1	6	6	3	20	.....	.....
East Brunswick	13	10	4	12	22	....	61	.....	.....
Madison	4	1	4	2	6	....	17	.....	.....
Monroe	11	6	1	8	10	2	38	.....	.....
New Brunswick	96	65	38	109	76	2	386	19,132	20.18
North Brunswick	1	1	2	7	9	....	20	.....	.....
Perth Amboy	74	28	15	50	19	....	186	7,513	24.76
Piscataway	9	3	2	10	27	....	51	.....	.....
Raritan	6	4	3	8	17	....	38	.....	.....
Sayreville	10	9	2	11	3	1	36	.....	.....
South Amboy	20	11	10	27	21	....	89	.....	.....
South Brunswick	9	5	4	13	17	....	48	.....	.....
Woodbridge	16	2	6	20	14	1	59	.....	.....
Totals	272	146	92	283	247	9	1,049	59,295	17.69

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
1	....	..	....	..	....	....	....	1	4	2	....	1	2	3	2	....	....	....	....	1
....	2	..	....	..	1	6	....	8	2	4	5	1	6	3	10	1	2	....	....	4
....	....	..	1	..	....	1	....	2	....	1	1	.....	1	1	1	2	1	....	....	....
....	3	..	....	..	....	3	....	7	2	....	1	3	6	4	1	....	2	....	....	12
1	5	..	9	2	3	50	1	54	29	17	39	17	25	20	17	14	9	1	4	12
....	....	..	....	..	....	....	....	.....	1	5	2	.....	1	....	6	1	1	....	....	1
2	2	..	2	..	.....	8	....	37	9	6	38	23	5	3	8	5	4	...	1	12
1	1	..	....	..	.....	1	....	4	1	5	9	2	6	1	7	2	1	1	....	2
1	1	..	1	..	.....	1	....	4	1	1	4	3	8	3	....	3	1	....	....	4
1	1	..	....	..	.....	5	....	9	2	1	6	.....	1	....	2	....	2	....	....	2
....	1	..	7	..	1	3	1	17	6	4	6	3	3	12	6	6	....	....	....	3
....	....	..	....	..	....	4	....	2	3	3	6	3	3	2	3	5	2	....	....	7
....	1	..	3	..	....	2	2	7	....	5	5	2	7	1	2	2	1	....	....	8
7	17	..	23	2	5	84	4	152	60	54	116	58	74	53	65	40	27	2	5	68

Return of Deaths from all Causes and certain specified Diseases,

Year ending

DEATHS AT ALL AGES.

MONMOUTH COUNTY. Statistical Divisions.	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.
Atlantic	5	.....	4	6	5	....	20	.....	.....
Eatontown	6	2	5	7	18	....	38	.....	.....
Freehold	11	11	7	21	35	1	86	.....	.....
Holmdel	2	2	1	3	11	....	19	.....	.....
Howell	8	4	5	5	16	....	38	.....	.....
Long Branch	20	4	7	22	15	4	72	5,800	12.41
Manalapan	5	2	1	6	15	....	29	.....	.....
Marlboro	7	2	3	6	10	....	28	.....	.....
Matawan	13	8	5	19	8	....	53	.....	.....
Middletown	26	5	7	28	30	1	97	.....	.....
Millstone	4	2	.....	5	10	....	21	.....	.....
Neptune	39	11	15	38	37	3	143	.....	.....
Ocean	9	3	4	16	4	....	36	.....	.....
Raritan	22	9	7	27	20	2	87	.....	.....
Shrewsbury	19	4	7	33	37	....	100	.....	.....
Upper Freehold	5	4	3	13	24	....	49	.....	.....
Wall	13	12	7	20	17	....	69	.....	.....
Totals	214	85	88	275	312	11	985	67,753	14.54

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females	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.
....	2	..	....	..	....	....	....	2	1	2	.....	1	....	1	2	2	2	....	....	2
....	3	..	....	..	....	1	1	5	2	2	5	1	3	3	4	1	....	....	1	3
1	3	..	3	..	....	....	....	11	8	10	3	4	6	4	8	9	4	1	1	4
....	1	..	....	..	....	....	....	2	....	1	2	.....	3	1	3	2	1	....	....	1
....	....	..	2	..	....	....	....	6	2	4	9	.....	2	3	3	2	2	....	....	1
1	1	..	2	2	....	4	....	10	6	1	5	4	9	1	8	6	1	1	....	4
....	....	..	....	..	....	2	....	2	....	2	.....	1	1	2	5	2	....	....	....	2
....	....	..	1	..	....	....	....	3	2	2	5	1	2	2	2	1	....	....	....	....
....	....	..	3	..	2	2	....	4	7	8	3	5	....	3	....	4	1	....	....	3
2	1	..	3	..	1	....	....	16	12	4	7	5	3	1	9	7	8	....	3	5
....	....	..	....	..	....	1	....	3	2	....	1	1	2	....	6	1	1	....	1	....
3	1	..	....	..	5	8	....	18	6	8	14	10	11	5	13	12	5	....	1	4
....	1	..	....	..	....	....	1	4	5	....	4	1	2	2	2	1	2	....	....	7
3	4	..	1	..	3	2	....	13	4	5	4	4	8	5	4	10	1	....	1	4
1	3	..	1	..	....	....	....	10	13	7	11	3	10	6	9	4	2	....	....	....
....	4	..	2	..	....	1	....	5	2	1	1	2	4	1	13	3	3	....	1	....
....	5	..	3	..	....	3	2	9	2	1	8	1	8	5	3	5	2	....	1	4
11	29	..	21	2	11	24	4	123	74	58	82	44	74	52	94	72	35	2	10	44

Return of Deaths from all Causes and certain specified Diseases,

Year ending

DEATHS AT ALL AGES.

MORRIS COUNTY. Statistical Divisions.	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.
Boonton	9	3	8	14	13	1	48	.....	.....
Chatham	13	1	5	22	24	....	65	.....	.....
Chester	5	1	5	10	15	....	36	.....	.....
Hanover	9	7	3	58	56	2	135	.....	.....
Jefferson	5	3	1	4	5	....	18	.....	.....
Mendham	2	1	2	7	16	....	28	.....	.....
Montville	5	3	1	4	7	....	20	.....	.....
Morristown	39	43	36	40	55	....	213	.....	.....
Mount Olive	2	2	2	4	5	....	15	.....	.....
Passaic	6	2	5	6	12	....	31	.....	.....
Pequannock	5	3	2	9	10	....	29	.....	.....
Randolph	27	13	9	27	22	....	98	.....	.....
Rockaway	22	9	17	35	19	....	102	.....	.....
Roxbury	14	3	2	6	10	....	35	.....	.....
Washington	6	5	3	2	10	....	26	.....	.....
Totals	169	99	101	248	279	3	899	50,775	17.71

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
1	2	..	..	..	..	8	....	5	2	2	5	.....	5	4	2	2	....	....	....	4
....	1	..	1	..	1	....	1	7	4	4	8	4	8	6	5	5	1	1	....	3
1	1	..	1	..	....	2	....	3	2	2	3	2	4	2	6	3	1	1	....	1
1	5	..	....	..	1	8	2	2	10	3	4	1	15	5	51	3	3	3	....	6
....	1	..	....	..	....	....	....	.....	1	....	6	.....	2	3	....	....	1	....	....	....
....	....	..	....	..	....	....	....	1	4	4	.....	1	6	3	3	3	1	....	....	....
....	1	..	....	..	....	1	....	3	1	2	1	3	2	1	1	3	....	....	....	....
3	2	..	13	..	5	30	....	33	9	18	17	8	15	6	17	14	3	1	....	6
....	....	..	....	..	....	....	....	2	1	1	2	.....	4	....	....	1	1	....	....	1
....	1	..	1	..	....	....	....	2	2	3	5	3	5	1	2	3	1	....	....	....
1	....	..	1	..	....	1	....	3	1	....	6	1	5	1	3	2	2	....	....	....
....	....	..	1	..	3	7	1	13	6	8	8	6	13	2	3	3	2	1	3	2
....	....	..	....	..	2	13	1	5	2	5	21	6	8	4	4	5	2	....	3	12
2	....	..	....	..	2	1	....	5	2	3	3	5	1	....	3	2	1	....	....	3
....	....	..	....	..	2	4	....	.....	2	....	3	1	4	1	1	3	....	....	....	2
9	14	..	18	..	16	75	5	84	49	55	92	41	97	38	101	52	19	7	6	40

Return of Deaths from all Causes and certain specified Diseases, Year ending

DEATHS AT ALL AGES.

OCEAN COUNTY. Statistical Divisions.	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
Berkeley	7			3			10		
Brick	13	6		11	21	1	52		
Dover	6	3	6	17	15		47		
Eagleswood	2			2	4		8		
Jackson		1		7	9		17		
Lacey	1	1		1	7		10		
Manchester	3	1	1	6	7		18		
Ocean		1	1	1	1		4		
Plumstead	3		2	11	8		24		
Stafford	3	1	3	5	3	1	16		
Union	1	1	2	6	2		15		
Totals	42	15	15	67	80	2	221	16,491	13.40

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

	PRINCIPAL CAUSES OF DEATH.																					
Remittent fever.	Typhoid fever.	Smallpox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
								3				1			1	1				
	1				1		1	7	1	4	2	3	9	1	7	2	1	1	1	4
	5					4		4	3	4	1	1	6	3	4	4	1			3
											2		3					1		
									1	2	1	1	4		4	1	2		1	
										1		1		1	1	1	2			
	3							2	1	3			2	1	3		1			
1													2							
	1						1	1	4	3			1	1	2	3	1		1	1
	2							1		2	1	4	2			1	1	1		
	1							2		2		2			4					
1	13				1	4	2	20	10	21	7	13	29	7	26	13	9	3	3	8

Return of Deaths from all Causes and certain specified Diseases,

Year ending

PASSAIC COUNTY. 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.
Acquackanonk	7	3	2	8	7	....	27	.....	.....
Little Falls	7	3	3	3	1	....	17	.....	.....
Manchester	7	2	2	10	4	....	25	.....	.....
Passaic	87	42	28	53	31	2	243	9,776	24.86
Paterson	516	236	143	508	261	18	1,682	73,067	23.02
Pompton	5	9	1	5	12	....	32	.....	.....
Wayne	5	3	1	6	11	....	26	.....	.....
West Milford	7	3	3	6	10	1	30	.....	.....
Totals	641	301	183	599	337	21	2,082	94,985	21.92

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

	PRINCIPAL CAUSES OF DEATH.																			
Remittent fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	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.
....	....	....	....	....	....	....	....	8	....	2	4	1	2	1	3	4	1	....	....	....
1	1	..	1	..	....	1	....	3	1	1	1	.....	2	....	....	1	....	....	....	1
....	....	..	....	..	....	1	....	4	2	....	2	5	....	1	1	3	....	....	....	2
2	7	..	5	2	8	25	1	47	11	7	23	21	7	9	15	6	1	2	5	7
10	26	..	59	11	9	78	7	245	108	102	207	141	112	58	86	77	33	7	12	73
....	....	..	....	..	....	1	....	5	....	5	6	2	3	....	3	1	1	....	....	1
1	....	..	1	..	....	....	....	1	1	1	1	5	4	1	5	1	....	....	....	....
....	....	..	....	..	....	....	....	5	....	2	3	3	4	....	3	2	....	....	....	3
14	34	..	66	13	17	106	8	318	123	120	247	178	134	70	116	95	36	9	17	88

Return of Deaths from all Causes and certain specified Diseases,

Year ending

SALEM COUNTY. 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 1000.
Alloway	4	2	3	3	6	....	18	.....	.....
Elsinboro	1	1	.....	1	1	....	4	.....	.....
Lower Alloways Creek	3	.....	.....	1	6	....	10	.....	.....
Lower Penns Neck	3	1	2	10	5	....	21	.....	.....
Mannington	6	3	8	6	16	....	39	.....	.....
Oldmans	3	2	2	8	5	....	20	.....	.....
Pilesgrove	8	6	9	14	23	....	60	.....	.....
Pittsgrove	5	3	3	10	7	....	28	.....	.....
Quinton	4	5	1	6	2	....	18	.....	.....
Salem	15	11	15	31	34	1	107	5,884	18.18
Upper Penns Neck	11	1	.....	6	9	1	28	.....	.....
Upper Pittsgrove	4	1	2	1	10	....	18	.....	.....
Totals	67	36	45	97	124	2	371	26,008	14.26

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

	PRINCIPAL CAUSES OF DEATH.																				
	Remittent fever.	Typhoid fever.	Small pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
	....	3	..	....	..	....	2	....	1	....	3	1	.....	....	1	1	....	2	....	....	....
	....	....	..	....	..	....	....	....	2	....	....	1	.....	....	....	1	....	....	....	....	....
	....	1	..	....	..	....	....	....	.....	....	....	2	.....	1	1	1	1	....	....	....	....
	....	1	..	....	..	....	....	....	.....	1	3	.....	1	2	2	1	....	1	....	....	7
	....	1	..	....	..	....	1	....	2	3	5	2	2	2	....	5	4	1	....	....	1
	1	....	..	....	..	....	1	1	3	1	3	1	1	2	....	....	1	2	....	....	....
	....	....	..	....	..	....	4	....	3	5	5	9	.....	8	1	6	3	2	....	....	2
	....	1	..	....	..	1	2	....	3	4	2	3	1	1	....	4	1	....	1	....	1
	....	....	..	....	..	....	3	....	1	....	2	1	1	2	....	....	2	....	....	....	5
	2	10	..	2	..	....	13	....	7	6	8	11	6	7	5	10	4	1	1	1	2
	1	....	..	....	..	....	....	....	7	1	....	3	1	3	....	4	2	....	....	....	....
	....	....	..	....	..	....	....	....	4	....	....	2	.....	1	....	2	....	1	1	....	2
	4	16	..	2	..	1	26	1	33	21	31	36	13	29	10	35	18	10	3	1	20

Return of Deaths from all Causes and certain specified Diseases,

Year ending

SOMERSET COUNTY. 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.
Bedminster		1		13	20		34		
Bernards	6	1	4	12	15		38		
Branchburg	4	1	2	3	9	2	21		
Bridgewater	28	18	13	47	42	1	149		
Franklin	16	4	9	26	23	2	80		
Hillsborough	9	3	4	12	21		49		
Montgomery	5		3	7	11		26		
North Plainfield	17	7	3	22	7		56		
Warren	1	1		4	5		11		
Totals	86	36	38	146	153	5	465	27,635	16.79

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping-cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
2	....	..	....	..	....	1	....	.....	3	3	4	.....	5	1	6	5	1	1	....	1
....	....	..	....	..	1	1	...	2	5	....	6	1	....	4	4	2	3	....	1	....
....	....	..	....	..	....	....	....	1	1	1	2	1	1	4	1	4	....	....	....	3
3	5	..	1	..	1	5	....	14	14	9	14	10	13	8	13	10	4	....	1	5
....	4	..	....	..	....	1	2	7	7	7	9	6	5	4	7	6	4	....	1	4
....	1	..	....	..	....	....	....	6	2	5	6	1	10	1	8	2	2	....	....	1
1	1	..	....	..	....	....	....	2	1	1	4	.....	2	2	5	....	1	....	....	2
....	2	..	1	..	....	3	....	9	7	4	1	6	6	3	3	1	1	2	2	1
....	....	..	....	..	....	1	....	.....	....	3	1	1	2	1	1	1	....	....	....	....
6	13	..	2	..	2	12	2	41	40	33	47	26	44	28	48	31	16	3	5	17

Return of Deaths from all Causes and certain specified Diseases,

Year ending

DEATHS AT ALL AGES.

SUSSEX COUNTY. Statistical Divisions.	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.
Andover	2	1	2	5	12	....	22	.....	.....
Byram	4	1	.....	2	7	....	14	.....	.....
Frankford	2	1	1	4	13	....	21	.....	.....
Green	.....	1	1	2	2	....	6	.....	.....
Hampton	3	1	.....	2	4	1	11	.....	.....
Hardyston	7	6	4	7	5	....	29	.....	.....
Lafayette	2	1	.....	3	2	1	9	.....	.....
Montague	2	1	.....	2	.....	1	6	.....	.....
Newton	8	2	2	11	13	....	36	.....	.....
Sandyston	2	1	.....	3	3	....	9	.....	.....
Sparta	4	2	2	6	6	....	20	.....	.....
Stillwater	3	1	.....	8	13	....	25	.....	.....
Vernon	4	1	4	3	8	....	20	.....	.....
Walpack	.....	.....	.....	.....	1	....	1	.....	.....
Wantage	10	6	4	11	20	1	52	.....	.....
Totals	53	26	20	69	109	4	281	22,401	12.54

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption.—males.	Consumption.—females.	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.
....	2	..	....	..	....	....	....	1	....	....	4	1	1	....	5	3	1	....	....	1
....	....	..	....	..	....	....	....	2	2	1	.....	1	2	....	3	....	....	....	....	1
....	....	..	....	..	....	....	....	.....	3	4	1	.....	4	....	3	2	....	....	....	....
....	....	..	....	..	....	....	....	.....	1	1	1	1	1	....	1	....	....	....	....	....
....	....	..	....	..	....	1	1	.....	....	....	2	1	1	....	....	3	....	....	....	....
....	....	..	1	1	....	3	....	2	2	3	7	1	....	1	2	2	....	.	1	1
....	1	..	....	..	....	....	....	.....	1	....	1	1	1	1	1	1	....	....	....	....
....	....	..	1	..	....	....	....	2	....	....	.....	.....	....	....	1	....	....	..	....	1
....	1	..	....	..	....	....	....	5	3	3	7	.....	8	1	3	1	....	....	....	1
....	1	..	....	..	....	....	....	.....	....	2	1	1	2	1	....	..	....	....	....	....
....	....	..	1	..	....	....	....	2	....	1	4	1	....	1	1	3	1	....	....	1
....	1	..	....	..	....	....	....	1	....	2	2	2	1	4	4	4	1	1	....	....
....	....	..	2	1	2	....	....	.....	....	2	5	1	2	1	1	1	1	....	....	....
....	....	..	....	..	....	....	....	.....	....	....	.....	.....	....	....	....	1	....	....	....	....
....	....	..	2	..	....	4	1	6	3	....	5	1	5	....	6	2	....	1	....	4
....	6	..	7	2	2	8	2	21	15	19	40	12	28	10	31	23	4	2	1	10

Return of Deaths from all Causes and certain specified Diseases,

Year ending

UNION COUNTY, 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.
Clark	2	1	1	.....	2	....	6	.....	.....
Cranford	4	.....	.....	4	6	....	14	.....	.....
Elizabeth	187	119	51	227	126	1	711	35,231	20.18
Fanwood	3	1	1	5	7	....	17	.....	.....
Linden	6	7	3	15	13	....	44	.....	.....
New Providence	4	1	2	1	5	....	13	.....	.....
Plainfield	37	10	18	54	42	1	162	9,543	16.97
Rahway	27	10	18	44	38	1	138	7,186	19.29
Springfield	1	1	1	3	6	....	12	.....	.....
Summit	5	2	2	16	4	....	29	.....	.....
Union	4	2	2	2	15	....	25	.....	.....
Westfield	6	4	2	9	15	1	37	.....	.....
Totals	286	158	101	380	279	4	1,208	66,853	18.07

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889

PRINCIPAL CAUSES OF DEATH.

Remittent fever.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrhœal diseases.	Consumption—males.	Consumption—females.	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.
....	....	....	....	....	....	....	....	2	....	....	.....	1	....	....	1	1	....	....	....	....
....	....	....	....	....	....	....	....	1	....	1	3	.....	2	1	1	....	....	....	....	2
5	9	..	14	7	4	40	....	85	45	48	83	67	46	36	41	34	14	4	6	46
....	....	..	....	..	....	....	....	1	....	1	3	3	4	1	2	....	....	....	....	....
....	1	..	3	..	....	1	....	5	3	....	2	3	5	5	5	....	2	....	....	4
....	....	..	....	..	....	2	....	.....	1	1	4	2	....	....	2	1	....	....	....	....
....	1	..	2	..	1	3	1	19	10	11	15	9	22	9	13	9	6	....	3	6
....	5	..	6	..	....	1	....	11	12	14	14	11	10	2	12	9	6	2	2	6
....	....	..	1	..	....	....	....	.....	1	1	1	2	5	1	....	....	....	....	....	....
1	....	..	....	..	....	....	....	3	6	3	3	2	2	1	4	....	....	1	....	1
2	1	..	....	..	1	....	....	.....	....	1	3	4	3	2	3	1	....	....	....	2
1	1	..	....	..	1	1	....	1	1	5	9	2	5	1	3	1	....	1	.....	1
9	18		26	7	7	48	1	128	79	86	140	106	104	59	87	56	28	8	11	68

Return of Deaths from all Causes and certain specified Diseases,

Year ending

DEATHS AT ALL AGES.

WARREN COUNTY. Statistical Divisions.	Under one year.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total, including unclassified.	Estimated population.	Death rate per 1000.
Allamuchy	3	1	1	5	10	....	20	.....	.....
Belvidere	1	.....	.....	7	14	....	22	.....	.....
Blairstown	1	1	.....	5	10	....	17	.....	.....
Franklin	3	.....	1	3	6	....	13	.....	.....
Frelinghuysen	.....	1	1	8	7	....	17	.....	.....
Greenwich	1	.....	2	2	3	....	8	.....	.....
Hackettstown	4	4	5	12	15	....	40	.....	.....
Hardwick	2	1	.....	1	5	....	9	.....	.....
Harmony	3	.....	1	6	7	....	17	.....	.....
Hope	9	5	1	9	17	1	42	.....	.....
Independence	2	.....	1	3	5	....	11	.....	.....
Knowlton	1	2	3	4	12	....	22	.....	.....
Lopatcong	5	2	2	2	7	....	18	.....	.....
Mansfield	1	1	1	5	4	1	13	.....	.....
Oxford	24	5	8	13	14	....	64	.....	.....
Pahaquarry	.....	.....	1	.....	.....	....	1	.....	.....
*Phillipsburg	42	17	12	34	34	1	140	8,760	15.98
Pohatcong	1	1	1	8	7	....	18	.....	.....
Washington	13	1	6	15	20	1	56	.....	.....
Totals	116	42	47	142	197	4	548	38,656	14.18

in the Statistical Divisions of the State of New Jersey, for the June 30, 1889.

PRINCIPAL CAUSES OF DEATH.

Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and diphtheria.	Erysipelas.	Diarrheal diseases.	Consumption—males.	Consumption—females.	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.
....	....	..	....	..	....	....	....	1	1	....	3	2	4	4	2	1	1	....	....	1
....	....	..	....	..	....	....	....	.....	3	3	2	.....	....	1	2	3	2	1	....	....
....	....	..	....	..	....	....	....	1	....	1	3	.....	4	....	2	4	....	....	1	....
....	....	..	....	..	....	....	....	2	1	1	1	1	1	....	4	....	....	....	1	....
....	....	..	....	..	....	2	....	.....	1	3	5	.....	1	....	2	2	....	....	....	1
....	....	..	....	..	....	1	....	.....	1	....	.....	.....	1	1	....	1	1	....	....	....
....	....	..	....	..	2	....	....	1	2	10	1	2	5	....	3	5	2	....	....	2
....	....	..	....	..	....	....	....	2	1	1	1	.....	2	....	....	....	....	....	....	....
....	1	..	....	..	....	....	....	.....	2	1	1	1	4	1	....	2	....	....	....	....
....	1	..	....	..	1	2	....	2	4	5	6	1	3	1	2	4	....	1	....	....
....	....	..	....	..	....	....	....	2	1	2	.....	.....	.....	....	1	1	1	....	....	....
....	1	..	1	..	....	....	....	3	....	1	1	1	3	1	3	2	....	....	....	2
....	....	..	....	..	....	2	....	3	1	1	3	.....	1	1	2	....	....	....	....	1
....	....	..	....	..	....	....	....	1	2	....	4	.....	1	1	2	1	....	....	....	....
1	1	..	....	..	....	7	....	8	8	1	7	8	4	....	6	1	....	....	....	1
....	....	..	....	..	....	....	....	.....	1	....	.....	.....	.....	....	....	....	....	....	....	....
....	5	..	....	..	....	12	....	20	8	6	17	10	11	6	9	7	5	....	5	1
....	....	..	....	..	....	....	....	2	....	3	2	.....	2	1	2	3	....	....	....	1
2	1	....	....	....	....	2	1	6	3	2	5	2	6	4	2	1	2	....	1	3
3	10	1	3	28	1	54	40	41	62	28	53	22	44	38	14	2	8	13		

SYNOPSIS OF VITAL AND MORTUARY STATISTICS.

The following outline presents the comparative numbers of marriages, births and deaths as follows:

Average for five years ending June 30, 1883:

Marriages	8,539
Births	24,281
Deaths	21,981

Average for five years ending June 30, 1888:

Marriages	*10,067
Births	26,050
Deaths	23,952

This average after June 30, 1885, was on an increased population of 146,917.

The largest death rate was from June 30, 1888, to June 30, 1889, the actual number over the largest rate of any previous year, having been 2,842.

The marriages occuring in Camden and other places, as a result of the Pennsylvania law, so far as known, are not counted in our reckoning, although necessarily recorded. This excess as we have it is as follows:

1886	2,527
1887	4,332
1888	4,557

The following is the record for the year, from July 1, 1888, to June 30, 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

*Corrected from last report.

For the year 1888–9, we find that of the 26,543 deaths occurring 6,842 were under 1 year of age; 3,512 between 1 and 5 years; 2,395 between 5 and 20 years; 8,068 between 20 and 60 years; and 5,586 over 60 years. Of those under 1 year, 1,952 died under 1 month.

NOMENCLATURE AND FORMS FOR WEEKLY RETURNS.

There has been but little change by medical and norological authorities in the nomenclature of disease since that given in our fifth report.

The nomenclature of Dr. Farr are still the basis of all more recent forms with such slight variations as local authorities have advised.

Thus diptheria and croup are now usually stated as one. Tonsilitis is classed by some with stomactic and by others with zymotic disease. Malarial diseases are sometimes placed under the general class, miomatic, or else separately classified. A few are ready to greatly enlarge the class, parasitic or microbic, and to transfer to it a large number of diseases.

NOMENCLATURE OR THE REVISED CLASSIFICATION OF DISEASES.

In the sixth report (1882) we gave for the guide of physicians in diagnoses and in making out burial certificates the nomenclature of Dr. Farr as revised and improved in 1880 by the National Board of Health in conference with various Boards and with the Register General's office for England and Wales.

We know of no improvement since sufficient to authorize change and so repeat it as then presented since the sixth report is out of print.

Transcribe from sixth report, page 286 to 290, opposite cerebro-spinal fever, line 12, put cerebro-spinal meningitis; opposite enteric fever, line 14, put typhoid.

I.

SPECIFIC FEBRILE DISEASES, OR ZYMOTICS.

1. *Miasmatic Diseases.*

Small-pox { Vaccinated. / Unvaccinated. / No statistics.

Chicken-pox.

Measles.

Epidemic rose-rash.
Scarlet fever.
Typhus.
Relapsing fever.
Influenza.
Whooping-cough.
Mumps.
Diptheria.
Cerebro-spinal fever, cerebro-spinal meningitis.
Simple continued fever.
Enteric fever, typhoid fever.
Other miasmatic diseases.

2. *Diarrhœal Diseases.*

Simple cholera.
Diarrhœa, dysentery.

3. *Malarial Diseases.*

Remittent fever.
Ague.

4. *Zoogenous Diseases.*

Hydrophobia.
Glanders.
Splenic fever.
Cow-pox and vaccination.

5. *Venereal Diseases.*

Syphilis.
Gonorrhœa, stricture of the urethra.

6. *Septic Diseases.*

Phagedæna.
Erysipelas.
Pyæmia, septicæmia.
Puerperal fever.

II.

PARASITIC DISEASES.

Thrush.
Other vegetable parasitic diseases.
Hydatid disease.
Other animal parasitic diseases.

III.

DIETIC DISEASES.

Starvation, want of breast milk.
Scurvy.
Intemperance. { Chronic alcoholism. / Delirium tremens.

IV.

CONSTITUTIONAL DISEASES.

Rheumatic fever, rheumatic heart.
Rheumatism.
Gout.
Rickets.
Cancer, malignant disease.
Tabes mesenterica.
Tubercular meningitis.
Phthisis.
Scrofula, Tuberculosis.
Perpura, hæmorrhagic diathesis.
Anæmia, etc.
Diabetes mellitus.
Other constitutional diseases.

V.

DEVELOPMENTAL DISEASES.

Premature birth.
Atelectasis.
Cyanosis.
Spina bifida.
Imperforate anus.
Cleft palate, hair lip.
Other congenital defects.
Old age.

VI.

LOCAL DISEASES.

1. *Diseases of Nervous System.*

Inflammation of brain.
Apoplexy.
Softening of brain.
Hemiplegia, paralysis.
Paralysis agitans.
Hydrocephalus (not acute).
Insanity (general paralysis of insane).
Chorea.

Epilepsy.
Convulsions.
Laryngismus stridulus.
Idiopathic tetanus.
Paraplegia and disease of cord.
Others, nervous system.

2. *Diseases of Organs of Special Sense.*

Otitis, otorrhœa.
Epistaxis and disease of nose.
Ophthalmia and disease of eye.

3. *Diseases of Circulatory System.*

Endocarditis, valvular disease.
Pericarditis.
Hypertrophy of heart.
Angina pectoris.
Syncope.
Aneurism.
Senile gangrene.
Embolism, thrombosis.
Phlebitis.
Varicose veins.
Others, circulatory system.

4. *Diseases of Respiratory System.*

Laryngitis.
Croup.
Others, larynx, trachea.
Emphysema, asthma.
Bronchitis.
Pneumonia.
Pleurisy.
Other diseases of respiratory system.

5. *Diseases of Digestive System.*

Stomatitis.
Dentition.
Sore throat, quinsy.
Dyspepsia.
Hæmatemesis.
Melæna.
Disease of stomach.
Enteritis.
Ulceration of intestines.
Ileus, obstruction of intestines.
Stricture and strangulation of intestines.

Intussusception of intestines.
Hernia.
Fistula.
Peritonitis.
Ascites.
Gallstones.
Cirrhosis of liver.
Others, liver disease.
Others, digestive system.

6. *Diseases of Lymphatic System.*

Disease of lymphatics.
Disease of the spleen.

7. *Diseases of Gland-like Organs of Uncertain Use.*

Bronchocele.
Addison's diseases.

8. *Diseases of Urinary System.*

Nephritis.
Bright's disease, albuminuria.
Uræmia.
Suppression of urine.
Calculus.
Hæmaturia.
Disease of bladder and prostate.
Others, urinary system.

9. *Diseases of Reproductive System.*

a. Diseases of Organs of Generation.

Ovarian disease.
Disease of uterus and vagina.
Disorder of menstruation.
Pelvic abscess.
Perineal abscess,
Disease of testes, penis, etc.

b. Diseases of Parturition.

Abortion, miscarriage.
Puerperal mania.
Puerperal convulsions.
Placenta prævia, flooding.
Phlegmaria dolens.
Other accidents of childbirth.

10. *Diseases of Locomotor System.*

Caries, necrosis.
Arthritis, ostitis.
Others, locomotor system.

11. *Diseases of Integumentary System.*

Carbuncle.
Phlegmon, cellulitis.
Lupus.
Ulcer, bed-sore.
Eczema.
Pemphigus.
Others, integumentary system.

VII.

DEATH FROM VIOLENCE.

1. *From Accident or Negligence.*

Fracture, contusion.
Gunshot wounds.
Cut, stab.
Burn, scald.
Poison.
Drowning.
Suffocation.
Otherwise.

2. *From Homicide.*

Murder, manslaughter.

3. *From Suicide.*

Gunshot wounds.
Cut, stab.
Poison.
Drowning.
Hanging.
Otherwise.

4. *By Execution.*

Hanging (execution.)

VIII.

DEATHS FROM ILL-DEFINED CAUSES.

Dropsy.
Debility.
Atrophy and inanition.

Mortification.
Tumor.
Abscess.
Hemorrhage.
Sudden (cause unascertained.)
Not specified, or ill-defined.

The following changes are some of those advocated: add Rothëlan to zymotic diseases, also erysipelas. Some would add pneumonia and tuberculosis because of claimed microbic origin. Croup is often left out and included under diphtheria. Quinsy is claimed by some as a stomachtic disease and by others as miasmatic or glandular leuco.

The term zymotic is still in convenient use as designating chief communicable diseases, although the idea of their depending on a ferment, as once supposed, is abandoned or modified.

WEEKLY MORTUARY REPORTS FOR CITIES.

These need to differ somewhat from the horology which guides physicians in diagnosis and classification, yet it is desirable to have them uniform in order for comparison.

They should give area of districts and wards and population, and so locate deaths.

Deaths in institutions should be separated, and where the person has not been over six months from home should be assigned to their respective wards or marked non resident.

In many cities deaths in tenement houses containing three families or over should be specified.

For comparison the annual death rate per thousand for corresponding week should be given, and either of the year previous or for five previous years.

It is common in some cities to give some idea of the character of the ward, thus:

Ward 1—Banks, office buildings, wholesale stores, some tenements for laborers, immigrant hotels.

Ward 4—Tenements of a poor class, sailors' boarding houses, many Italian laborers.

We greatly desire more uniformity of method on the part of our cities in their weekly reports and present the following, after careful study and comparison as a brief outline:

HEALTH DEPARTMENT OF————————

DIVISION OF VITAL STATISTICS.

REPORT FOR THE WEEK ENDING————————

—— —— deaths were registered in this office during the week ending at noon of Saturday, ————————. representing an annual death-rate of —— per 1,000 on an estimated population of ———

Deaths from Principal Diseases by Wards. for Week ending Saturday, ————————.*

Wards.	Area in Acres and Population by Census of 1890.	Character of Dwellings and Population. General Sanitary Condition.	Cerebro-spinal Meningitis	Croup and diphtheria.	Enteric fever.	Erysipelas.	Malarial fevers.	Measles.	Scarlatina.	Small-pox.	Typhus fever.	Whooping-cough.	Diarrhœal diseases.	Rheumatism.	Phthisis.	Bronchitis.	Bright's disease, Nephritis and cystitis.	Diseases of digestive system.	Brain and nervous diseases.	Pneumonia.	Puerperal diseases.	All causes.	In institutions.	Under one month.	Total under five years.	Five to twenty.	Twenty to sixty.	Over sixty.
1	Area, Pop.,	Banks, office buildings, wholesale stores, shipping region, some tenements for laborers, immigrant hotels, Castle Garden.....																										
2	Area, Pop.,	Stores and warehouses, office buildings, a few tenements.....																										

Annual death-rate per 1 000, ———.

Particulars regarding Births, Deaths Marriages, and Still births for Week ending Saturday, ———— ————

	Total.	White.		Colored.		Native Parents.		Foreign Parents		Mixed Nativities of Parentage		Parentage Unknown.		Single.		Married		Widowed.		Not Stated.		Non-residents.
		M.	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M	F.	M.	F.	M.	F.	
Marriages.....																						
Births.....																						
Deaths.....																						
Still-births.....																						

We herewith subjoin the annual death rates for some of the chief cities of the world with their estimated populations for 1888. While generally correct there is here and there a case where the population is probably over estimated and so the death rate reduced. Also the modes of collection in some few instances are imperfect, especially is this true of two or three American cities which might be named.

Cities.	Estimated Present Population.	Annual Death Rate per 1,000.
New York	1,589,261	19.86
Baltimore	500,343	13.00
Boston	415,000	21.62
Brooklyn	814,505	16 51
Chicago	1,100,000	17.82

The following table will show the average number of deaths from each of the principal causes for the Ten years, beginning July 1, 1878, and also for the year, from July 1, 1888, to July 1, 1889.

It is to be remembered that in this period there had been an increase of inhabitants of over 20 per cent., and hence twenty-five deaths per thousand now, is not more than twenty would have been ten years ago.

YEARLY AVERAGE OF DEATHS FROM PRINCIPAL DISEASES FOR TEN YEARS, BEGINNING JULY 1, 1878.

Remittent	289
Typhoid	579
Small Pox	71
Scarlet Fever	610
Measles	135
Whooping Cough	161
Diptheria	1280
Erysipelas	101
Diarrhœaral Diseases	2592
Consumption	3182
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 1, 1888, TO JULY 1, 1889.

Remittent	203
Typhoid	724
Small Pox	3
Scarlet Fever	533
Measles	118
Whooping Cough	278
Diptheria	1,574
Erysipelas	114
Diarrhœral 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

[NOTE.—It is to be remembered that the latter list represents over 220,000 more inhabitants and that the returns for the first few years were more imperfect. ~~imperfect.~~

As we have heretofore, from time to time, commented on each disease, and as to most of them there are no new facts to communicate, we confine our remarks this year briefly to Remittent Fever, Typhoid Fever, Diptheria and Consumption.

As to remittent fever the yearly record shows a favorable diminution of deaths from this cause. There will no doubt be seasons in which owing to excessive heat or moisture, or sudden alterations, or the opening up of new areas there will be sudden recurrence of attacks. While the relation of undrained lands and stagnant water to it are unmistakable, yet it is the combination of influences that produces untoward results We cannot too earnestly direct attention to the evils of wet lands, stagnant water and mill-dams, where these cause large overflow amid vegetable decay and crowded populations. While those acclimated do not so uniformly suffer, new residents are affected and others discouraged from settlement. The relation of micro-organisms thereto is being closely studied. As the most recent and concise summary we give a contribution of Prof. William Osler, M. D., of Johns Hopkins Univer-

sity, "On the Value of Laveran's Organisms in the Diagnosis of Malaria."

"The attitude of the profession on the question of micro-organisms of malaria is one of judicious skepticism. Between the bacillus malariæ of Klebs and Tomassi-Crudelli, and the protozoa described by Laveran, the average doctor cannot be expected to decide; but even among workers and teachers, there is by no means unanimity. So far as I know, there has been no confirmation of the observations of the first named authors on a specific bacillus in the disease. It is far otherwise with the organisms described by Laveran, whose work has now been confirmed by competent observers, in Italy, America and India. I do not know of a single clinican or pathologist, living in a suitable region, which has really worked at the subject, who has not been convinced of the truth of Laveran's statements. Doubtless many have had my experience. In 1886, at the meeting of the "Association of American Physicians," when Dr. Councilman presented a summary of Laveran's views, I (speaking out of the fullness of my ignorance) was extremely skeptical. When I had the opportunity of giving to the question, the study which its importance demanded, I was soon convinced, and I had the satisfaction of confirming, in almost every particular, the observations which Laveran had made, and discussed the whole subject in a paper, published in the "British Medical Journal," March 12, 1887. For the past two years, at the Philadelphia and University Hospitals, I have had abundant opportunities of studying cases of malaria, with an ever-deepening conviction that the organisms of Laveran are peculiar to the disease.

Putting aside, for the time, until the complete life history of these organisms shall be worked out, the question of their etiological relation to the disease, I would briefly refer to their diagnostic importance. In my former paper, I gave in this connection several interesting illustrations. Since that date, I have, in an increased experience, become even more convinced of the really great value in doubtful cases of these blood examinations. In ordinary intermittent fever, of recent origin, there is hardly ever any question in the diagnosis, and any doubts which may exist, quinine readily clears up. The value of the blood examination lies particularly in the chronic cases and in anomalous forms. Here one has to be constantly on guard and it may be impossible for days to determine

definitely the nature of the affection. We have since the opening of the hospital, admitted twenty-four cases of malaria to the wards, of which, in seven instances, the diagnosis was definitely determined by blood examination, and could have been determined in no other manner. So important do we consider it, that we now, as a matter of routine, examined the blood of all cases of fever, and indeed all cases of low temperature, which seem so peculiar in certain forms of chronic malarial poison. We have yet to determine fully the relation of the forms to each other and the complete life history of the parasite in the body; and, what is much more important, to ascertain its existence outside and to learn the conditions of its development and the way in which it gains access to the body."

In respect to Enteric or Typhoid Fever no new facts of importance have been elicited during the year. It is still recognized as a manufactured disease, to be greatly diminished by sanitary measures. What Dr. T. Thorne, said in 1887 is still true, namely, in which he says "Enteric Fever has been enormously diminished and this has been brought about through the adoption of methods which the new knowledge showed to be necessary." While excremental pollution chiefly through water supply is the main source of its spread the views of Prof. Brouardel of Paris and others, that moistened air will also convey it is gaining ground. Prof. Dixon of Philadelphia, has recently claimed the leakage from imperfect sewers as one of the causes of its extension. The bacillus of Eberth is still regarded as diagnostic of the disease although other microbes are often present.

Our chief reliance must continue to be a thorough guarding of first cases, the most exact sanitary precautions, a thorough investigation of water supplies and scrupulous attention to the condition of all surroundings. We have recently had occasion to investigate seven cases occuring on a farm in a family of eight persons in which the first two cases were children who were drinking water from a barn yard well.

The origin of some cases is still obscure. It sometimes seems to arise de novo, or else the ground must be taken that cases of septic fever, or other modified forms of low fever simulate it.

Diphtheria still continues to be both in city and county the great menace of child life. It seems to have come to stay, yet where first cases are promptly met with the conjoined methods of sanitation

and medicine it is largely within the range and duty of our control. While the bacillus of Loeffler still seems to be the most prominent one in its diagnostic, or causative relations, as with most of the communicable diseases, the question is still one of doubt. "In some cases the specific organism seems to be a streptococcus, in others a bacillus; while perhaps the most important idea gained is, that primarily the disease is a local one." From a paper by Dr. B. K. Rachford, of the Medical College of Ohio, Cincinnati, January 1889, on the etiology of diptheria, (The Medical News, February 2, 1889,) we quote as follows: "The present state of our knowledge derived from bacteriological investigations is as follows: The most experienced bacteriologists have failed to find in the blood or tissues of animals any micro-organism which could possibly be etiologically related to diptheria.

Every diphtheritic membrane contains many species of bacteria; these are chiefly those which normally inhabit the mouth, but septic bacteria are also almost always found." He then proceeds to show that the disease is the result of bacterial and poisonous alkaloids or ptomaines, these being introduced into the system chiefly from the throat. He also claims that many of the complications occur from septic germs.

Prof. J. Lewis Smith, in a paper read before the New York County Medical Association, March 18th, 1889, said, " Each year of recent investigation has strengthened the belief that the cause of diptheria is a microbe; but it is still a matter of doubt which microbe is the causal agent, or whether there may not be more than one species of bacteria, which by their action upon and in the tissues produce disease. He then went on to speak of the more recent investigations of Wood and Formad, Klebs and Loffler, Cheyne, von Hoffman, Wellenhof and Oertel, and stated that the later, who was one of the earliest advocates of the theory of the microbic origin of diptheria, now admits that the causative action of bacteria, though plausible, is not proven. The specific principle must be introduced from without, but if it obtain a lodgement upon the wet and mouldy surface of any filthy accumulation, it may find there a nidus favorable for its devlopment. The fact appears to be fully established, as would be shown later on in the paper, that the diphtheritic virus is frequently propagated in foul and damp localities, apart from the animal tissues and independently of the sick. The theory of the

causation of diptheria which is gaining acceptance throughout the world is, that it is produced by a specific microbe or microbes, whose action is chiefly on the surface, or at no great depth, and that blood poisoning occurs mainly from a ptomaine or ptomaines produced by microbic agency. In order to obtain a knowledge of the ptomaines, chemistry must aid microscopical investigations."

As to prevention he speaks thus: "As regards the small extent of the area of its contagiousness and the persistence and highly infective character of its virus within that area, diptheria resembles scarlet fever, and is unlike measles and pertussis, the specific principles of which, although they have a wider contagious area, are more volatile and more quickly dissipated. The most efficient method of preventing the propagation of diphtheria is the isolation and disinfection of patients, the prompt and thorough disinfection of the apartments in which they have been treated, and of the bedding and furniture of these apartments, and the exclusion or prevention of all noxious gases."

Prof. T. Mitchell Prudden, M. D., Biologist of the College of Physicians and Surgeons, New York City, has, during the present year, furnished an important paper on the Etiology of Diphtheria. (See April and May, 1889, of the American Journal of Medical Sciences.) We quote as follows from his summary:

"We have found, by a critical examination of the studies which have heretofore been made on diptheria by the use of the modern methods of research, that no definite species of bacteria has been discovered which could fairly be positively regarded as the cause of the disease. * * * *

"Our observations, taken together, seem to lead us to so strong a presumption that the streptococcus is the causative factor, in this group of cases, at least, of diptheria, that it practically amounts to a demonstration.

"We have found reason for believing on biological and experimental grounds that the streptococcus occurring so constantly in these cases of diptheria (called by him streptococcus diptherial), is probably identical with the streptococcus pyogenes and streptococcus erysipelatos. It has been shown that the apparent identity of the inciting species of bacteria in erysipelus, in some forms of phlegmonous inflammation and in at least certain groups of cases of diptheria is not only not inconsistent with our knowledge of the path-

ology and symptoms of these three forms of inflammation, but serves to account for various facts concerning the nature and spread of diptheria which have hitherto seemed obscure.

"We have found that the crypts of the fossils form a favorite nesting-place for the streptococcus and that it may lie harmlessly there even in considerable numbers, unless some lesion of the mucous membrane provides conditions suitable for its growth, when it may enter upon a career of active and, as it would seem, fateful proliferation.

"In the presence of the streptococcus in large numbers in the local lesions of diptheria and in its absence in any considerable number as a rule in the internal organs, we find ground for the belief that the symptoms of systemic inflection are probably in large measure due to the absorption of a soluble poison produced by the bacteria at the seat of their most active proliferation.

"We have demonstrated that the streptococcus of diptheria is not really destroyed by drying, but both in the form of pure cultures on threads and fabrics and in the pseudo-membrane itself may retain its vitality for long periods when dried in the air. We have tested its vulnerability when brought in contact with some of the commonly used antiseptic agents and found first that the vapor of burning sulphur is very inefficient and unreliable in destroying the germs. We have found that carbolic acid and creolin in considerable strength destroy the streptococci but in dilute solutions are inefficient; while sublimate even in very dilute solutions heads the list in its killing power. But we have also found, as was to be expected, that all of these germicides are much less efficient when applied to the bacteria which lie embedded in the pseudo-membranes and the tissues, than when they are free in the pure cultures. * * * *

"As to the details of a mode of room disinfection upon which we may rely, I think it may not be out of place here to formulate a set of directions which largely embody, and are in part a transcript of the official regulations for disinfection as required by the health authorities in Berlin in 1887.

"All bed-linen, clothing, handkerchiefs, etc., which are to be washed, and all cloths which have been used for dusting the room, should be placed for at least twenty-four hours in 2 per cent solution of carbolic acid, then boiled for an hour in water, and then washed with strong soapsuds.

"The disinfection of the room and its contents at the close of the illness will be more easy, and certainly efficient, the greater the care which has been exercised in removing all unnecessary articles of furniture, hangings, pictures, etc., from it at the commencement of the disease.

"In the first place, all clothing which cannot be washed, bedding, mattresses, pillows, etc., carpets, cushions and all such furniture as has not exposed wooden frames, should be tied up in cloths (sheets) which are saturated with 2 per cent. carbolic solution, and sent away to be steamed at the public disinfecting station.[1]

"All valueless articles of furniture or clothing should be burned —best at the disinfecting station—but in case of necessity the smaller articles may be disposed of in the house furnace or range at such time as cooking is not going on.

Polished articles of furniture, picture-frames, metalic articles, etc., should be firmly rubbed off on all their surfaces with dry cloths, or when permissible, with cloths wet with 5 per cent. carbolic acid. The cloths used should be immediately burned or put into 2 per cent. carbolic solution.

"If the walls of the room are hard-finished or painted, they, together with all doors, windows, and woodwork, should be thoroughly washed, as should finally the floor, with 5 per cent. carbolic solution. If the room have papered or frescoed walls, the floors should be thoroughly flushed with 5 per cent. carbolic solution, and then all the walls should be thoroughly and firmly rubbed down in every part with lumps of bread, the crumbs being allowed to fall on the carbolized floor. Then the woodword is washed with carbolic solution, the crumbs gathered up and burned, and the floors washed with water.

"The room should be finally exposed as fully as possible to the air for at least twenty-four hours, and longer if it is practicable.

"Now, this will seem at first, no doubt, a very formidable process, but where a large public disinfecting plant is available it is,

[1] A large and well-arranged disinfecting plant is now being planned for the city of New York, and will, it is hoped, soon be in operation. Where such disinfecting stations do not exist, as they should in every large town, a thorough scrubbing of the surfaces of mattresses, pillows, etc., with 2 per cent. carbolic solution and subsequent prolonged exposure to the air, and boiling of blankets, coverlets, etc., after washing in the carbolic solution, will be perhaps the best procedure.

after all, comparatively simple; and, what is more important, if faithfully and intelligently executed, will insure purification of the infected room. Of course, other germicides than carbolic acid might be used for washing the room, such as 1: 1000 sublimate solution, but the experimental data which these studies furnish indicate that the carbolic solution will kill streptococcus if it comes in contact with it."

R. Stern, of the Hygienic Institute of Breslau, is so impressed with the risks of dust that he recommends as a means of disinfecting rooms which have been occupied by persons suffering from infectious diseases, that as soon as the patient has been removed, the room be closed and allowed to remain so for at least twenty-four hours, after which it is to be quietly entered and floors, wall surfaces and furniture mopped with cloths saturated in corrosive sublimate 1 : 1000. Under no consideration is dusting to be countenanced.

PHTHISIS OR CONSUMPTION.

The question, which perhaps, more than any other has for the past year attracted the attention of biologists and physicians is that relating to the communicability of phthisis or other forms of tuberculoer disease. The tendency undoubtedly is to regard most diseases as dependent upon micro organisms and to look upon all such as communicable. Especially when the same disease can be produced in animals by inoculation, there are those who are very open to conviction that it is also transmissible in other forms. Yet it is to be remembered that there are not more than two or three diseases as to which there is agreement in respect to the diagnostic microbe, and that in some, as in diphtheria, inoculation has failed to reproduce the same disease, even where a specific microbe is somewhat confidently claimed. The Hygienic Institute of Berlin under the superintendency of Dr. Koch has made such brilliant achievements and by its successes, its publications, and by having supplied all but one of the Universities of Germany with a biological professor has gained such prestige as to secure, what sometimes seems a too ready acceptance of its views, even to the obscuration of the facts and opinions of those who cannot yet adopt the radical contagion hypothesis. Two papers early in the year by Dr. George Cornet one of the pupils of Koch have

been largely accepted as showing the communicability of Phthisis by means of pulverized sputa. We can not here review all the grounds of this belief or state all the reasons why so many still regard the evidence as questionable. If such views are correct the same grounds for complete isolation apply to it as for instance to Diphtheria. We cannot so completely dissociate the patient from his sputa as to make the spit-cup and disposal of its contents, however important, the reliable protection. We for years past have urged the great importance of the disposal of all sputa from all diseases but in so wide spread a malady occurring in tenement and palace everywhere and with its subjects by multitudes in streets and highways and in all the public modes of conveyance we see little hope of relief in this way. For the past year especially we have made a somewhat careful and extended study of the literature of the subject, of the testimonies of Biologists and the opinions of practitioners and do not find such consensus of opinion as yet warrants definite conclusions. Here is a statement quite shared by many veterinary authorities. It is from the pen of Dr. Brush, a member of the State Medical Society of New York and one who has had large experience with cattle.

E. F. Brush, (Boston Medical and Surgical Journal No. 19, 1889,) after having for several years made a close study of the affection, including the consideration of all available statistics and the habits of the people where it prevails, has come to the conclusion that the only constant factor is the presence of in-bred dairy cattle. Where these are not, he has found human tuberculosis to be absent. He gives a number of statistics to prove this position; among these the prevalence of the disease among the Hottentots, where a number of distinct breeds of cattle are raised. The same is true of Ireland and Denmark, where the number of cattle is large. In Ireland, where the cattle are few, the disease is very rare, though the climatic conditions are almost identical with those of Denmark. In the portions of Greenland where dairy cattle are common, phthisis is prevalent; while in those in which the number of cattle is extremely small, the disease is almost unknown. Phthisis was unknown in Australia until after the introduction and breeding of cattle. The author cites quite a number of other instances. From the statistics produced, he concludes that there is little doubt that in-bred cattle are the chief etiological factor in the production of human

tuberculosis. They foster the germ, prevent its extinction, and sow it abundantly in the human race. No other germ has so hard a struggle for existence in man as has the tubercle bacillus, as shown by the fact that of the immense number exposed to its contagion comparatively few take the disease. On the other hand, the in-breeding of cattle has made these delicate, and a very large proportion of them are infected by the disease. He believes that the disease was originally derived from the bovine species, and that were it not for cattle it would die out. To many, meat and milk are the great modes of prepagation.

On the other hand, Cornet and his followers regard it as chiefly diffused by bucillary dust. The doctrine of heredity is practically denied.

The period is one in which we may well be on the alert, in studying facts that are proven by experience. We are to be receptive of truth and cautions as to hypothesis.

The following editorial from a recent member of the London Lancet as to "the contagiousness or otherwise of tuberculosis is timely."

"Few questions are more worthy of the most anxious attention, and few seem so difficult of satisfactory elucidation. Since from one-fifth to one-seventh of the human family succumb to tuberculosis in various forms, and since the disease when well established is one of the most formidable nature, the questions of its etiology and of its preventive treatment are of overwhelming importance. Yet, although the discovery of Koch is now a good many years old, and its substantial accuracy is no longer seriously questioned, we are still far from having attained a much to be desired unanimity regarding its clinical significance and its practical bearings. The difficulty arises largely from the fact that on this question pathology and clinical observation seem to speak with discordant voices. The former shows strong *a priori* ground for expecting that tuberculosis should be contagious; the latter very feebly, if at all, confirms this expectation. The pathologist seeing in a specific virus the cause of the disease, and perceiving the unlimited facilities offered for its dissemination is naturally predisposed to regard tuberculosis as infective. The clinical observer, on the contrary, finds that to him the most striking features of the disease are its dependence upon hereditary taint, upon unhealthy modes of life,

upon malnutrition and the like; and he is at a loss to discover sure instances of its transmission from one individual to another, although the opportunities for such transmission are unhappily only too abundant. If the attention which is now being given to the question of the transmission of tuberculosis from animals to man should avail to throw new light upon the wider question of the contagiousness of the disease, it will have been exceedingly well bestowed.

"It is believed by many able pathologists that these two apparently discrepant views of tuberculosis are in reality quite reconcilable, that the apparent opposition between them is like the dispute in the fable as to whether the shield was made of gold or of silver. One observer saw only one side, and forthwith proclaimed that it was made of gold, while the second observer who saw only the opposite side was equally convinced that it was made of silver. It did not occur to either disputant that his opponent was right as well as himself. Hence it may be suggested that tuberculosis has its resemblance on the one hand to the communicable diseases, and on the other to those maladies of which impaired nutrition is the most essential feature. It may be argued with much apparent plausibility that just as some maladies, such as measles or small-pox seem to find a suitable nidus in almost everyone exposed to their influence (unless protected by a previous attack or by vaccination), and in these cases individual susceptibility offers only very slight variations, so there are other diseases, such as diphtheria, where susceptibility is relatively much more important, and there may be diseases where susceptibility is really the main question and the presence of the virus relatively unimportant. There can be little doubt that predisposition, whether of constitution or of environment, is the main feature in the etiology of tuberculosis, but we must not let this conclusion, borne in as it is upon us by such a multitude of facts, blind our eyes to the truth that predisposition is not causation.

"The suggestion of the communicability of tuberculosis and its dependence upon the specific virus naturally raised the strongest hopes of a new and fruitful departure as regards preventive and curative treatment. It must be owned that these hopes have been doomed to disappointment. The antiseptic treatment of phthisis, begun with so much hope, has not prospered, even in the hands of its warmest advocates, and is probably now being quietly dropped by the majority of those who are sufficiently unprejudiced to refuse

to become the victims of a preconceived idea. Inhalations by the respiratory passages, injections per rectum, the air of pine forests, carbolic acid, creasote, fluoric acid, and a host of other such remedies have had their trial, and the result has been disappointing. We are still forced to rely for success, mainly on measures that seek to diminish susceptibility and to increase the constitutional resistance to the disease, on tonics, high feeding, analeptic measures generally, and change of climate.

If the present attitude of the profession in this country towards the question of the communicability of tuberculosis is still one of expectancy and suspended judgment, we must be content simply to take stock of our present knowledge and to await further light. Pathology and clinical observation must go hand in hand, and it is not too much to hope that the great scientific activity of the present age may within a reasonable time succeed in removing the apparent opposition now subsisting between them in connection with the subject of tuberculosis.

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By Medical Superintendent of Vital Statistics.

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NOTE.—Owing to omission in the law as to Proof, the earlier pages of this Report did not have final correction. Besides some errors in orthography, notice the following corrections:

Page 16, Line 8, for "Durhow" read "Durham."
" 17, " 15, for "matrification" read "nitrification."
" 24, " 5 from bottom, after "subject" read "A. P. H. Asso."
" 25, " 5, " " for "contest" read "contrast."
" 28, " 4, for "demonstration" read "regulation."
" 28, last line, for "to" read "so."
" 30, 12th " from bottom, omit "either."
" 35, Line 13. ends special article on "Cities and their Needs."
" 35. " 14, after "each" insert "so."
" 45, " 14, after "action" place a period and capital F.
" 45, " 18, for "after" read "often."
" 77, " 3, read "lencocytes" for "cucocytes."
" 77, " 15 from bottom, read "nodules" for "nochules."
" 131, " —, "In Love parentis" should read "*in loco parentis.*"
" 379, " 19, read "materies" for "matenas."
" 380, " 10, read "microphytic" for "micrphytic."
" 387, " 3, read "diphtheria" for "diptheria."