at home is also considered. Besides this, an oculist makes it his duty to look after every child's eyes. In North Carolina the work of medical supervision advocated here has been in operation for the last three years, and it is working almost perfectly. This year there has not been a case of typhoid fever, diphtheria or other infectious disease in the schools. People are becoming educated to the needs of sanitary individual health regulation in schools. In Asheville, schools are being built on modern lines, adapted to the needs of the times and within the principles of sanitation advocated in the Section. And all that is done under the supervision of three physicians and a sanitary engineer.

DR. LISTON H. MONTGOMERY, Chicago, said that in Chicago there is a board of education, composed of supposed non-politicians, women, ministers and lawyers, as well as politicians, with occasionally a physician, but it is supposed to be a non-political body. According to the law, each child shall attend school up to the age of 14 years, beginning at 5 or 6 years and attending, perhaps, the kindergarten first, and he is not supposed to be employed by any firm until the age of 14 has been reached, whether the child be a girl or a boy.

DR. RICHARD COLE NEWTON, Montclair, N. J., said that a great deal is being done in all directions in the matter of the physical care of school children, but the medical profession as a body has not shown that absorbing interest in the question that they ought to show and which he thinks they will have to show. We must have medical experts in education. Such questions must be solved as to how much physical exercise is to be allowed, at what age it should begin, and what the dangers are, if any, that may complicate physical exercise in young children. That will be an important part of the duty of the physical expert who shall have charge of this branch of education. Without such experts many of these problems can not be solved. Dr. Newton said that he knows what Dr. Knopf said about the immense interest taken in the public schools by all sorts of societies to be true, but before the problems come to a final solution they must be studied carefully by a special body of experts.. When such a body shall have been established an enormous advance in civilization will have been made.

THE STATE CONTROL OF INLAND WATERS.*

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MINNEAPOLIS.

The desirability of state control over inland waters, I am sure, will be recognized by every careful thinker as an absolute necessity. Of course there are some selfish individuals who wish to use a waterway for their own convenience, urging that streams are Nature's sewers. But even these individuals run to cover when their personal comfort is jeopardized by their neighbors following out this line of argument.

For many years England permitted the pollution of streams, but a time came when such conditions were beyond endurance. It then cost millions of pounds to remedy the evil. The older states in our own country tolerated stream pollution until conditions became unbearable, and then, following in the steps of England, undertook to remedy an evil which never should have been permitted to exist. The newer states seem to be following in the footsteps of the older countries so far as these evils are concerned. In my state, Minnesota, it is by no means uncommon to hear people argue that the proper place for sewage is in streams, and this argument is too often advanced by medical men who should know better. There are lawmakers even in Minnesota, and I presume in other states, who, considering their own selfish interests and the selfish interests of their constituents, use their legislative authority to prevent the passage of laws looking to the protection of streams, lakes, etc., from pollution. These selfish individuals represent a class of people who are interested in the present rather than the future; who care nothing for posterity; who will not stop to consider that a dollar well spent now may save an expenditure of hundreds of dollars later. Unfortunately the world at large is governed by selfishness, and legislators are often no exception to this rule.

If there is no state control of inland waters we have as a result a general pollution of such waters as the population of a district increases. Such pollution may result from the discharge of domestic sewage or of industrial waste, and may become a nuisance or a cause of disease. It is a remarkable fact that a cause of disease among human beings will be tolerated much longer than a nuisance which is offensive or a cause of disease among animals which results in a direct financial loss to their owners. This is demonstrable, for all of us realize that a known infected public water supply may be continued in use indefinitely by a municipality or company. On the other hand, an intolerable stench, which in no sense need be injurious to health, calls forth protests that will result in its suppression regardless of cost. The farmer who thinks that his cattle are suffering as the result of drinking impure water will, by injunction, promptly restrain the offending parties from further endangering the lives of his stock.

It would seem that the short-sighted policy of the past in the older countries, in dealing with stream pollution would be so evident to all concerned as to call forth vigorous efforts on the part of interested parties to pursue a wiser course from this time on. It is not a difficult problem to care for sewage properly. Its discharge without purification into streams or other bodies of water is simply an evidence of shiftlessness.

If there is to be state control of inland waters the question is at once raised as to whom should have charge of such matters. Bearing on this point I wish to quote extensively from an editorial in the *Engineering News*, March 29, 1906, as follows:

> The proposal for a joint metropolitan sewerage commission for New York and New Jersey, made by the New York Bay Pollution Commission, and the conference on the pollution of the Delaware river held by representatives of the states of New Jersey and Pennsylvania, resulting in a proposal for joint action by those two states and by New York to prevent the pollution of the Delaware, suggest a brief consideration of the governmental machinery already existing in the several states to deal with questions of water pollution.
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> New York now has a State Department of Health, a State Water Supply Commission (both of which are permanent), and for two years past there has been in existence the New York Bay Pollution Commission.
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> New Jersey has a State Board of Health, a State Sewerage Commission, and a Passaic Valley Sewerage Commission, each of which is a permanent body.
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> Pennsylvania has a State Department of Health and a State Water Supply Commission.
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> The question naturally arises whether this machinery is not more than adequate to deal with water pollution questions. By saying "more than adequate" we mean to suggest that it might be far better to consolidate some of the existing commissions in the several states rather than to provide a new one, and after such consolidation was effected to refer all matters of interstate pollution to the single strong commission that might be hoped for in each state, thus securing such joint action as might be necessary.
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> The proposal recently made by the New York Bay Pollution Commission does not presuppose the creation of any new body,

* Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-eighth Annual Session, held at Atlantic City, June, 1907.

of necessity, in New Jersey; but it does contemplate the continuation of a third commission in New York state. Is this necessary or desirable? There may be local conditions in each of the states named requiring the three separate commissions in New York and New Jersey, and the two commissions in Pennsylvania, but on broad general grounds a reduction in number is certainly desirable.

In Massachusetts nearly all the matters entrusted to the several commissions noted above have been most successfully handled by the State Board of Health. We think that in the case of New York and New Jersey, at least, it would have been better to have strengthened the state health departments rather than to have created one, at least, of the additional commissions. There were, however, some special reasons for the course pursued. In New Jersey there was some justification for establishing the Passaic Valley Sewerage Commission, on account of the fact that large construction work was necessary in the Passaic valley. It might have been well, however, to have deferred the appointment of a commission for construction work until the problem of final disposal had been more thoroughly worked out. As matters stand, the New Jersey State Sewerage Commission have been costing the people of New Jersey some $20,000 a year or more, and thus far have accomplished comparatively little. A small part of this sum entrusted to a properly organized and equipped state board of health each year, it seems to us, might have yielded far better and more permanent results. There was much to justify the creation of a separate commission for the study of the pollution of New York Bay, but in this case, also, assuming a properly organized and equipped state board of health, it is questionable whether the work might not better have been entrusted to the latter. The state water supply commissions of both New York and Pennsylvania were created in large part to deal with matters not properly pertaining to health departments. The New York commission adjusts conflicting interests between different communities seeking to draw water from the same drainage areas, and to it is also entrusted the matter of seeing that water and land interests are properly protected when a city reaches out into the rural districts for a supply. Thus far the Pennsylvania commission has seemed to do little work except to pass on applications for charters. The New York Water Supply Commission has mapped out a very ambitious program of investigation of both the water supplies and sewerage systems of the entire state. To a large extent this program covers the very field that seems naturally to pertain to the State Board of Health.

The New York State Health Department, as shown by its last annual report, is very poorly equipped for its work, owing to limited appropriations. This applies particularly to its investigations of water supply and sewerage questions. It seems fair to ask whether the State Health Department of New York is not being starved to provide funds for the other commissions. We do not suppose that this is actually the case, but the overlapping of work must make it difficult for the several commissions to secure the necessary appropriations. Certain it is that in Massachusetts, where all the sanitary work naturally falling to the State Board of Health has been continuously entrusted to such a board, highly gratifying results have been secured. In several other states where the experiment of splitting up the work has been tried long enough to see how it works, the results have been, in many respects, disappointing.

Connecticut, some will remember, launched a state sewerage commission a few years ago, but after doing some good work with a very limited appropriation it came to an untimely end. If the small sum of money appropriated to it had been given to the State Board of Health, it seems very likely that the appropriation might have been continued to the present time, and perhaps increased slightly from year to year.

About the same time that Connecticut split up its work of sanitary investigation, Ohio entrusted to its State Board of Health an investigation of the sanitary condition of the waters of the state. This work has increased from year to year, both in amount and efficiency, until Ohio is one of the leading states in the union in its supervision of public water supplies and sewage disposal. Only recently an appropriation of $15,000 has been made for an investigation by the State Board of Health on the actual workings of water and sewage purification plants within the state. Here, as in Massachusetts, concentrating sanitary investigations in the State Board of Health has worked admirably.

We are well aware that many troublesome questions are raised by the foregoing discussion, or would be if those who know the facts spoke frankly, but is it not high time that they were raised, and, if possible, settled? The questions center around the competence of certain state boards of health in the past; the degree of confidence with which their work and their personnel has inspired the public; the proper domain of a state board of health; and the persistent tendency of all governments to appoint new commissions and enact new laws instead of making the most of existing commissions and laws.

It is not necessary, I am sure, to apologize for this extensive quotation, for it is an able argument in favor of concentration of work, economy, and the greatest efficiency in matters pertaining to the protection of inland waters. Adopting this as an argument in favor of placing pollution of streams under the control of state boards of health, let us review the situation and note the present condition throughout the United States:

GEORGIA, under date of April 12, 1907, reports no laws on this subject and apparently no prospect of securing any satisfactory laws bearing on the protection of inland waters in the near future. The secretary of the State Board of Health, reporting this condition of affairs, says: "Of course I am very much opposed to the pollution of our streams in this way."

A report from FLORIDA, dated April 16, 1907, states:

A bill now pending before the legislature, if it passes (and there seems to be a good prospect of its doing so), will give the State Board of Health ample authority to deal with such matters.

It is to be hoped that this bill passed.

NORTH DAKOTA not only does not prevent the pollution of waters, but it actually gives permission so to do. Section 2771 of the Revised Code of 1905 says:

Any city may empty or discharge its sewage into any river, but when a dam on such river is situated within the corporate limits of any city, the sewage shall be discharged below the dam.

IOWA has no law bearing on the protection of inland waters, but some of her citizens have protected themselves from the pollution of waters in which they were specifically interested by enjoining offenders. At different points in the state, municipalities and others have been compelled to provide sewage purification plants before discharging sewage into certain streams.

A report from VIRGINIA, dated April 15, 1907, says:

We made a strenuous effort to secure the passage of a bill, during the last legislature, relative to the pollution of the potable waters, but met with defeat.

MICHIGAN, while one of the leading states in general matters pertaining to sanitation, has up to date no important laws bearing on the protection of waters. One of its officials, under date of April 16, 1907, says:

This is certainly a most important question and its magnitude is impressed on us in a very striking manner when we stop and consider the deaths that result annually through causes directly traceable to polluted water.

The Revised Statutes of MAINE, as amended in 1907 (Chapter 129), state:

Whoever knowingly and wilfully poisons, defiles or in any way corrupts the waters of any well, spring, brook, lake, pond, river or reservoir, used for domestic purposes for man or beast, or knowingly corrupts the sources of any public water supply, or the tributaries of said sources of supply in such manner as to affect the purity of the water so supplied, or

knowingly defiles such water in any manner, whether the same is frozen or not, or puts the carcass of any dead animal or other offensive material into said waters, or on the ice thereof, shall be punished by a fine not exceeding $1,000, or by imprisonment not exceeding one year.

This, if given its broadest interpretation, would seem to provide ample protection for the waters of Maine from pollution.

In MARYLAND the law prohibits the discharge of any sort of waste into any stream or other source of water supply, whereby the drinking water of any person living on that stream is fouled or rendered unfit for drinking or domestic consumption, and provides a penalty for the violation of this provision. The construction of the law is such, however, that it does not become operative until after the act of pollution has occurred and its consequences are possible of demonstration.

Many other states are in the same position as Maryland in relation to the necessity of demonstrated pollution before any action can be taken. This is certainly a most unwise and oftentimes expensive condition of affairs. It means that instead of some responsible body giving advice which can be enforced before the construction of sewerage systems or waste disposal plants, individuals or municipalities may spend considerable sums of money on such systems or plants which the state may later condemn at great financial loss to the individual or municipality.

In CALIFORNIA the responsibility of protecting the waters of the state is not placed on any board or commission. There are no direct laws bearing on the protection of inland waters, but something has been gained during the last winter looking to the protection of domestic water supplies. An official, reporting on conditions in this state, says:

I have no sympathy with the idea so often expressed that the streams are the natural sewers. In Nature people do not congregate in vast numbers on water courses or concentrate their filth to pollute them. The streams are our natural water supplies and should be kept clean. There is no doubt in my mind that both the disposal of sewage and the control of water supplies should be governed by some board. Naturally the State Board of Health is the one to be clothed with such authority, and it should be supplied with ample funds for the performance of its duties along these lines. If communities are left to themselves they will dispose of sewage in the easiest way possible, regardless of the well-being of others. My experience leads me to believe that this is a cause of a great deal of sickness. Water supplies are established that are entirely unfit for use, due consideration not having been given to the source from which the water is taken. If such matters were placed under state control I am sure that the expense involved would be repaid many fold in better health and lower death rates.

A report from COLORADO, dated April 15, 1907, says:

The law bearing on the pollution of streams is inadequate to the needs of this state. There is no legal supervision over the inland waters. Denver claims jurisdiction over the watersheds from whence it derives its supply, and this district covers territory to the extent of seventy-five miles. The only protection given is under Section 1376, Mills Annotated Statutes, Vol. 1, page 949, which reads as follows: "If any person or persons shall hereafter throw or discharge into any stream of running water, or into any ditch or flume in this state, any obnoxious substance, such as refuse matter from slaughterhouses, or privy, or slops from eating-houses or saloons, or any fleshy or vegetable matter which is subject to decay in water, such person or persons shall on conviction thereof, be punished by a fine of not less than $100, nor more than $500, for each and every offense so committed." The same volume, page 943, states: "If any person shall obstruct or injure, or cause or procure to be obstructed . . . or shall in anywise pollute or obstruct any water course, lake, pond, marsh, or common sewer, or continue such obstruction or pollution so as to render the same offensive or unwholesome to the county, town, village, or neighborhood thereabout, every person so offending shall on conviction thereof be fined not to exceed $300, and every such nuisance may by order of the district court before whom conviction may take place, be removed and abated by the sheriff of the proper county."

In INDIANA there are two distinct laws concerning the pollution of streams, but neither of these prevents the use of streams in the disposal of sewage. An official, speaking of conditions in Indiana, says:

The discharge of sewage into streams, lakes, etc., is certainly an uncivilized act. Now that sanitary science has demonstrated safe methods for the disposal of sewage, it is almost a crime to use the streams (especially when they are small) as carriers for sewage. In Indiana this question is of the greatest importance, for with the exception of the Ohio and the Wabash rivers, all the streams are small. Four good sized cities, one of which is Indianapolis, discharge their sewage into a creek called White River. The state will be compelled, sooner or later, to take action in regard to this matter. The question is, shall we wait until loss of money, disease and death force us to act? As for state control over public water supplies, there is no doubt but that this will be necessary in the near future. It is frequently shown that municipalities have blundered greatly in securing their water supplies. Money is lost and health and life endangered simply because scientific supervision has not been provided by the state. The public sentiment in Indiana is strongly in favor of the enactment of laws regulating the discharge of sewage, the construction of sewers, and the purification and filtration of public water supplies. The health authorities all over the state, the State Engineering Society, and the State Medical Society, have spoken emphatically in favor of state control.

An official from KENTUCKY, under date of April 18, 1907, says:

The subject of the protection of inland waters presents the greatest problem that is before the sanitary authorities of the country at the present time. The magnificent work done by the State Boards of Health of Massachusetts, New York and Pennsylvania should be repeated on a larger scale by the more rapidly growing western states. It is comparatively cheap and easy to prevent the pollution of a stream, and it is enormously expensive to stop such pollution after it has been going on for many years.

An official, under date of April 15, 1907, speaking for RHODE ISLAND, says:

I believe that the State Board of Health should have complete autocratic control of all water supplies used for drinking purposes, and of all streams that are liable to be polluted with manufacturers' wastes. The installation of any plant for the purpose of obtaining a supply of drinking water and the method in handling the same, also the manner of conducting any industry which is liable to pollute streams, should be under the control of the state board.

An official, reporting for NEW HAMPSHIRE, under date of April 29, 1907, says:

A few years ago the legislature conferred on the State Board of Health authority to establish rules and regulations for the protection of public water supplies under certain conditions. The board has already prohibited the discharge of sewage into many ponds and lakes that before were unprotected. The attorney-general has rendered a decision to the effect that the board has jurisdiction over other public waters than those from which municipal supplies are taken, and under this decision we have recently protected two of our famous lakes from pollution. These facts are given simply to show that the State Board of Health has authority which is recognized. The board has an indirect authority over the construction of waterworks and sewerage systems, for it may prohibit any municipality or corporation from supplying water for public use if the quality of the water is not satisfactory to the board, or in

other words, if the source appears to be a dangerous one. The courts are authorized to issue an injunction against the use of such waters on request from the State Board of Health, thus making this law most effective. My personal views are that the discharge of sewage into streams, lakes, etc., should be prohibited, and that the filtration of public water supplies is to be recommended whenever there is danger of sewage pollution.

In MINNESOTA the law provides:

No sewage or other matters that will impair the healthfulness of water shall be deposited where it will fall or drain into any pond or stream, used as a source of water supply for domestic use. The State Board of Health shall have general charge of all springs, wells, ponds, and streams so used, and shall take all necessary and proper steps to preserve the same from such pollution as may endanger the public health. In case of violation of any of the provisions of this section, the state board may, with or without a hearing, order any person to desist from causing such pollution, and to comply with such direction of the board as it may deem proper and expedient in the premises. Such order shall be served forthwith on the person found to have violated such provisions.—R. L., 1905, Sec. 2147.

Every person who shall deposit or cast into any lake, creek, or river, wholly or partly in the state, or who shall deposit on the ice of any such lake, creek, or river, the offal from, or the dead body of any animal, shall be guilty of gross misdemeanor, and punished by a fine of not less than $100, or imprisonment in the county jail for not less than three months, nor more than six months.—Sec. 5007.

This law, so far as it goes, is excellent, but it is on the general plan of locking the door after the horse is stolen. Municipalities and individuals can ignore the advice of the State Board of Health, so far as relates to the pollution of waters, but after the pollution can be demonstrated the State Board of Health is then in position to put such offending parties to considerable expense in correcting their errors.

KANSAS seems to be coming to the front in sanitary matters. An official, under date of April 15, 1907, says:

Our last legislature passed a law looking to the preservation of the natural waters of this state. This law places the waterworks systems, as well as the sewerage systems, under the control of the State Board of Health. The new law contemplates the prevention of the discharge of untreated sewage into streams, etc., but permits sewerage systems now in operation to continue discharging into streams unless the State Board of Health deems it to the interests of the public health that such be discontinued.

NORTH CAROLINA appears to have good laws relating to the protection of water supplies. In addition it gives the State Board of Health certain authority under Chapter 214, Laws of 1893, as amended. Section 18 provides:

The said board shall from time to time consult with and advise the boards of directors of all state institutions, the authorities of cities and towns, corporations or firms already having or intending to introduce systems of water supply, drainage or sewerage, as to the most appropriate source of supply, the best practicable method of assuring the purity thereof, or disposing of their drainage or sewage, having regard to the present and prospective needs and interests of other cities, towns, corporations, or firms which may be affected thereby. All such boards of directors, authorities, corporations and firms are hereby required to give notice to said board of their intentions in the premises and to submit for its advice outlines of their proposed plans or schemes in relation to water supply and disposal of sewage, and no contract shall be entered into by any state institution, city or town, for the introduction of a system of water supply or sewage disposal until said advice shall have been received and considered.

VERMONT, under its laws of 1902, provides:

The State Board of Health shall have the general oversight and care of all waters, streams and ponds used by any cities, towns, villages or public institutions, or by any water or ice companies in this state as sources of water supply, and of all springs, streams and water courses tributary thereto. It shall have power to call for, and when it calls for it shall be provided with maps, plans and documents suitable for such purposes at the expense of such city, town, village, public institution, water or ice company, and shall keep records of all its transactions relative thereto. Said board shall have authority to prohibit any town, city, village, public institution, individual or water or ice company from using water or ice from any given source whenever in its opinion the same is so contaminated, unwholesome and impure that the use thereof endangers the public health. The court of chancery shall have jurisdiction and power, on application thereof by the State Board of Health, to enforce by proper order and decree any order, rule or regulation which said board may make under and by virtue of this section.

In WISCONSIN the law provides (Laws of 1905, Chap. 433, Sec. 3):

Before any city or village shall institute a water system, or system for water supply for the domestic use of its inhabitants, or a system of sewerage for the disposition of its sewage, such city or village shall submit to the State Board of Health the plans and specifications for such system, and both of the water system and the sewerage system, if a sewerage system exists or is proposed, and the State Board of Health shall examine such plans and specifications for the proposed system and the sanitary and hygienic features thereof; and no such system shall be installed or put in operation until the State Board of Health shall issue its certificate that such proposed system will not be in any respect insanitary or dangerous to the public health.

An official, under date of April 16, 1907, says:

Wisconsin, like many other states, is confronting a serious proposition concerning her methods in the past of obtaining water supplies for domestic purposes and the disposition of sewage. All of our lake cities have been in the habit of, and are still disposing of sewage into the same body of water from which they obtain their water supply. It is an indisputable fact that the water in all of these cities from time to time is polluted and that serious epidemics of typhoid fever and other bowel troubles result from such pollution. We must either do away with the present method of obtaining the water supply entirely from these great lakes or we must cease emptying the sewage into these bodies of water. Since the passage of the law of 1905 we allow no sewage to go untreated into any of the streams, lakes or rivers of the state. In all instances we require some system of treatment, at least the septic tank, and in some cases filtration in addition. Our conclusions in each particular are based on local conditions. We are strongly urging the necessity of pure water to begin with, rather than the purification of polluted waters.

In CONNECTICUT there is no legal supervision over the construction of waterworks and sewerage systems, although the State Board of Health is frequently called on to advise in these matters and is always ready to do so. An official, under date of April 18, 1907, states:

As the population grows more dense it becomes more and more necessary to adopt some method of sewage purification. Several cities of the state, such as Waterbury and New Britain, which formerly turned their crude sewage into the rivers nearby, have been compelled to stop the practice because of injunctions brought against them by people living below on the streams. The filtration of drinking water is also constantly becoming more and more of a necessity in this state.

In the DISTRICT OF COLUMBIA the pollution of streams by sewage is forbidden unless such pollution is sanctioned by the commissioners of the district. The right of the commissioners to sanction such pollution is limited (30 Stats. 231, Sec. 13). Applications for permission must be in writing to said commissioners and must be accompanied by detailed plans of the system

which it is proposed to construct and maintain, and no permit shall be issued until the commissioners are satisfied that such system can be maintained without nuisance or danger to the public health. Other precautions are taken to protect waters against pollution. While the protection of the waters of the district is directly under the control of the commissioners, the health officer of the district is directly responsible, so far as relates to sanitary consideration. The engineering department has the controlling voice in matters relating to structural features.

Probably the most advanced states at the present time in dealing with the protection of inland waters are Massachusetts, New Jersey, New York, Pennsylvania and Ohio. It is not necessary to spend time in discussing conditions in MASSACHUSETTS. That state has been in the forefront for years. The State Board of Health has general oversight and care of all inland waters and of all streams and ponds used by any city, town or public institution, or by any water or ice company, as sources of water supply, and of all springs, streams and water courses tributary thereto. The board may make rules and regulations to prevent the pollution and to secure the sanitary protection of all such waters as are used as sources of water supply. Such board shall consult with and advise the authorities of cities and towns and persons having, or about to have, systems of water supply, drainage or sewerage as to the most appropriate source of water supply, and the best method of assuring its purity or as to the best method of disposing of their drainage or sewage with reference to the existing and future needs of other cities, towns or persons which may be affected thereby. It shall also consult with and advise persons engaged or intending to engage in any manufacturing or other business whose drainage or sewage may tend to pollute any inland water as to the best method of preventing such pollution, and it may conduct experiments to determine the best methods of the purification or disposal of drainage or sewage. Cities, towns and persons are required to submit to said board for its advice their proposed system of water supply or of the disposal of drainage or sewage, and all petitions to the general court for authority to introduce a system of water supply, drainage or sewerage must be accompanied by a copy of the recommendation and advice of said board.

NEW JERSEY is following closely along the lines pursued in Massachusetts. A law approved March 17, 1899 (P. L. 1899, page 73), prohibits the pollution of waters which may be used for domestic purposes and gives the State Board of Health general supervision, with reference to their purity, of all rivers, brooks, streams, lakes, ponds, wells, springs or other reservoir in this state, the waters of which are, or may be used as, the source or sources of public water supplies for domestic use, together with the waters feeding the same, etc. The same year a bill was passed establishing a State Sewerage Commission (P. L. 1899, p. 536). It is unlawful for any person, corporation or municipality to build any sewer or drain or sewerage system from which it is designed that any sewage or other harmful and deleterious matter, solid or liquid, shall flow into any of the waters of this state so as to pollute or render them impure, except under such conditions as shall be approved by the state sewerage commission. The plans of sewage disposal plants must also be submitted to the state sewerage commission in advance of their being built.

In NEW YORK the State Commissioner of Health has power to take action regarding the pollution of streams, lakes, etc., by sewage, and any changes or alterations in the sewerage systems as they existed prior to 1903 must also be submitted to said commissioner for his approval. Power is also given to make rules for the protection of watersheds when asked to do so by a municipality or by any of its citizens who are interested in any particular supply. Dr. E. H. Porter, state health commissioner, in his report to the legislature, 1906, says:

> It is very probable that during the year 1906 2,000 deaths have occurred of typhoid fever in the state of New York. As the estimated mortality of this disease is about 10 per cent., it needs no expert mathematician to figure out the distress, suffering and grief, the enormous loss—mental, physical and financial—that these thousands of cases of typhoid fever have cost. And yet we know that it is almost entirely a preventable disease. We know it to be, in great part, a water-borne disease. Two hundred and fifty epidemics of typhoid fever have been collected and analyzed in Great Britain, and in every one the pollution of the water supply was the source of the evil.
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> The main pollution of our streams and lakes comes from the sewage of cities and towns, but to this must be added the pollution from drains, cesspools, refuse, manufacturing waste, etc. These conditions are inexcusable and shameful. They have existed for years; they should not exist another day.

The laws of New York (Chap. 661, 1893) provide that the State Board of Health shall make rules and regulations for the protection of water supplies. New York, following the example of Massachusetts, now employs a competent and increasing force of sanitary engineers.

OHIO is far in the lead of all other states west of Pittsburg in matters pertaining to the protection of inland waters. I believe it is the only state of the middle western group that has authority to compel the submittal of all plans for water and sewerage systems for approval by the State Board of Health before their construction. It is one of the leading states in the study of the purification and proper disposal of sewage. The State Board of Health in Ohio, patterning after Massachusetts, is doing excellent work in matters pertaining to the protection of its water supplies. It has in its employ a competent corps of sanitary engineers.

PENNSYLVANIA is the most recent state in the onward march for the protection of inland waters. This state has a typhoid fever record of which it may well be ashamed. The recent epidemic at Butler seems to have inspired the legislature with a desire to improve the sanitary conditions of the state. In 1905 it not only revised its Department of Public Health, but it also passed a law "to preserve the purity of the waters of the state." Section 3 of this law states:

> No municipal corporation, private corporation, company or individual shall construct waterworks for the supply of water to the public within the state, or extend the same without a written permit, to be obtained from the commissioner of health, if, in his judgment, the proposed source of supply appears to be not prejudicial to the public health. The application for such permit must be accompanied by a certified copy of the plans and surveys for such waterworks, or extension thereof, with a description of the source from which it is proposed to derive the supply; and no additional source of supply shall subsequently be used for any such waterworks without a similar permit from the commissioner of health.

Section 5 of the same law also places the construction of sewerage systems under the control of the State Commissioner of Health.

Since Pennsylvania has awakened to its responsibilities it has created an engineering department consisting of one chief engineer, three assistant engineers and

eighteen inspectors to look after the sanitary needs of the state as relate to water and sewage.

The subject of pollution of streams was thoroughly discussed at the conference of State and Territorial Boards of Health with Surgeon General Wyman at Washington, May 23, 1906. In response to a roll call of states represented at this conference the condition in the various states is shown as follows:

Colorado—State board has control.
Delaware—State board has control.
District of Columbia—Health department has no control.
Florida—Only advisory powers.
Kansas—Only advisory powers.
Louisiana—No control.
Maine—No control.
Maryland—No control.
Massachusetts—State board has control.
Michigan—No legal control.
Minnesota—State board has control.
Missouri—No control.
Nebraska—No control.
New Jersey—State has control, but only partially under State Board of Health.
New York—State health department has control.
North Carolina—Advisory control only.
North Dakota—No control.
Ohio—State board has control.
Porto Rico—State board has control.
Rhode Island—Has control over water supplies but not over sewage disposal.
Tennessee—No control.
Utah—No control.
Vermont—State board has control.
Virginia—No control.
Washington—No control.
Wisconsin—State board has control.

From the foregoing it is to be noted that states are gradually awakening to their responsibilities in the protection of inland waters, and that almost universally the responsibility of protection is placed on state boards of health or state health commissioners. In certain instances special commissions have been abolished and the work formerly carried on by them placed under the control of state boards of health.

In states not already enumerated the only protection for waters is that given by the law which governs personal and property rights.[1] The Roman law held that rivers belong to a class of things *utilitatis innoxiæ*, and that, of natural right, flowing water is common property, that all rivers that flow perpetually are public and that property in flowing water can not be taken to belong to any one. The English common law held that while land is the subject of private property, flowing water is not. The same principles are the foundation of the American law of pollution. The existence of a remedy in the law for injuries caused by pollution of waters is guaranteed by the fundamental rule that for every injury there is a remedy. The right to an injunction and to damages on account of the discharge by cities and individuals of sewage into streams, thereby polluting them so as to render them unfit for ordinary uses, has been clearly established.

From this review of conditions in various states it will be seen that provisions for the protection of inland waters is nothing new. The question involved at the present time is whether such protection shall be through civil action or criminal prosecution. The general trend seems to be to place the protection of such waters under the control of sanitary authorities, and to anticipate in their protection rather than to wait until pollution has taken place before action is begun.

The old idea that pollution may be permitted up to a certain dilution has reference only to the creation of a nuisance and has no place in efforts to prevent the transmission of water-borne diseases. Another old idea of stream self-purification within a comparatively short distance is no longer tenable.

The protection of inland waters should be under the control of state boards of health in all states, as is now the case in Massachusetts, New York, New Jersey, Pennsylvania and Ohio. This is important both from the economic and the sanitary point of view.

1. Taken from "A Summary of the Laws Relating to Pollution of Waters of Lakes and Streams," by Rome G. Brown, attorney at law, Minneapolis. See also "A Review of the Laws Forbidding Pollution of Inland Waters in the United States," by Edwin B. Goodell, Water Supply and Irrigation Paper No. 103, U. S. Geological Survey.

DISCUSSION.

DR. HENRY D. HOLTON, Brattleboro, Vt., said that state boards of health are the proper ones to have charge of the waters of a state. In Vermont five years ago the legislature placed all the streams, lakes and bodies of water under control of the State Board of Health and gave them power to prohibit the pollution of any stream or body of water; the law provides a penalty for the placing of dead animals, or animal substances, not only in the stream and the immediate border of the stream, but in such proximity that it may be washed into or drawn into the stream. It also requires the board to exercise its authority and give its advice to towns or municipalities which are introducing water systems, and advice with regard to their sewerage systems. That law, during the last two years, prohibited, in five different towns, the use of a water supply polluted by sewage. The warning notice to three towns sufficed to make them provide pure water—or to take steps to do so. It takes time, of course. One or two towns had no authority to raise money for the purpose; and the last legislature gave them the power to bond for water purposes. So in two cases an order had to be issued prohibiting the use of the water. If that order shall not have been complied with, Dr. Holton said that the court of chancery will be asked to enjoin the towns; and then any one who uses the water after that is in contempt of court and may be fined accordingly. It seems to be working admirably; and public opinion in the state sustains the board in any action so far taken. Dr. Holton spoke of this as showing that the people are ready for action to correct the pollution. The question comes up, what rights, if any, a community or an individual has acquired in discharge of its sewage for a series of years into some stream or body of water. In Vermont it has been ruled that an individual or a community has no right to perform any act that shall be deleterious to the purity of the water or the public health of the community; that it can not acquire a right by any length of time in the doing of this wrong act in that manner. No case has yet been brought before the courts to prove that; but Dr. Holton has no doubt what the decision will be if any one should have the temerity to do so.

DR. J. H. STOLPER, Krebs, Okla., said that the suit of the State of Missouri against the city of Chicago, for emptying sewage into the Illinois River, has shown that the question of how far pollution will extend is not settled. Courts, as a general rule, are confused when it comes to questions of expert medical testimony.

Strange to say, the question of control of sanitation on railways has received little attention at the hands of the medical profession. For five years different railways have tried to have some system of sanitation, without any support from any board of health; and to-day, as far as Dr. Stolper's knowledge extends, there are only the states of Texas, Kentucky, Wisconsin (and Minnesota is falling in line) with some legal requirements in regard to railway sanitation. He thought that the matter of the spreading of infection by passenger trains should demand the attention of this Section; and he suggested that a symposium on railway sanitation be arranged next year.

COL. WILLIAM C. GORGAS, Ancon, Canal Zone, Panama, said that the water supply at Panama is entirely under the control of the commission, which can pass any law considered necessary with regard to it. The isthmus is a mountainous country, rolling, with very precipitous hills, and mountain streams come down to join the Chagres in every direction. Three or four of these streams have been dammed, so as to give a large supply, with a reservoir containing about 800,-

000,000 gallons, for the city of Panama. There is one nearly as large at Colon, also two or three smaller ones for the little villages along the canal. They seem to give a very good and a very pure supply. The disposal of night soil has been a problem. The Zone now has a population of about 100,000 people, whose sewage is, roughly speaking, disposed of about as follows: That of the city of Panama empties into the Pacific Ocean; of Colon, into a canal that is cut through a little island and eventually gets into the sea; and along most of the towns, spoken of as camps—consisting of frame buildings, more or less temporary—various expedients for sewage disposal have been devised; but four-fifths of these camps have sewerage systems emptying into the little streams contiguous. That was allowed from the fact that the construction had been considered temporary. All these towns will, of course, be abandoned. None of said streams is used as water supply for the population.

DR. C. HAMPSON JONES, Baltimore, said that in Baltimore there had been for a number of years a struggle to maintain the purity of the water supply, which comes principally from the Gunpowder River. The pollution of this stream—to a slight degree at all events—is undoubted. Baltimore, led by the State Board of Health in the person of Dr. Fulton, attempted some years ago to get rid of certain known polluting sources. The judgment of the law and the judgment of the facts being in the hands of interested parties, it invariably resulted in defeat. The board, however, has been able to get rid of a number of nuisances, more by persuasion than by law. It seemed to him that there is nothing left but to place the power absolutely in the State Board of Health, and also to educate the people up to the point of supporting that board of health. If it is left to the question of law, with the power of a few people to turn aside the law in its action, just so long there will be trouble similar to that in Maryland.

DR. G. T. SWARTS, Providence, R. I., said that water may be polluted by waste from factories so as to become a nuisance, even if not used for drinking purposes. A nuisance ranks very high along with the question of health, and appeals very frequently to the populace and to legislatures, perhaps, more powerfully than the question of health. If a state looks out for the pollution of its own supplies or its own waterways, it will often be doing a great benefit to the neighboring state; and there is one of the difficulties that must be contended with—that while one state keeps its waterways uncontaminated, an adjoining state may be polluting its sources in such a way as to contaminate the waters of the other state which has no means of redress. There is where the U. S. Public Health and Marine-Hospital Service or some national board should have jurisdiction so as to prevent pollution.

In Rhode Island it is a difficult matter to obtain laws, owing to the conservative ideas passed down from ancestors; and to ask for the cessation of pollution from the industrial sources is to attack the industries, which, of course, are influential factors. Dr. Swarts said that they have undertaken, therefore, to meet them on their grounds by joining forces with the United States Hydrographic Bureau; and during the past nine months have combined our laboratory and chemist with the chemist of the Hydrographic Bureau to determine the amount of pollution coming from the various industries for the purpose of inducing them, by request and by cooperation, to stop that pollution; and, by taking no aggressive steps in the matter, they have had the cooperation, so far, of almost all of the industries polluting the small streams of Rhode Island. It has developed in many cases that there is a certain amount of recoverable matter from the refuse material which, in the course of a year or two, would be a source of profit to the industry. He thought that, if the Hydrographic Bureau could extend its influence or powers still further, so that other states would take advantage of it, it would be a great benefit. All interested in hygiene should urge their representatives to encourage this work of the Hydrographic Bureau, which is the cessation of the pollution of streams.

DR. WILLIAM H. SANDERS, Montgomery, Ala., said that it is hoped in Alabama to lay, very soon, the foundation for placing the control of the pollution of streams under the authority of the State Board of Health. A necessity for the creation of a national board of health lies in the pollution of streams that flow out of one state into another state or through several states. Of course, one state can only protect its streams within its own borders, and can have no authority whatever over a stream coming out of an adjoining state into it. Recently Dr. Sanders had had occasion to look into the law of nuisances. A legal book of five or six hundred pages has recently appeared which refers to a great many decisions on the pollution of streams; and very uniformly the courts have upheld the principle that no persons, corporations or what not have any right to pollute streams of water. This principle is upheld: That a man who buys property on a stream below a point at which the stream becomes polluted, although the pollution existed before he acquired the property lower down on the stream, is not by that fact prevented from bringing suit in the courts for damages although the nuisance existed at the time he acquired property and built his premises lower down. Dr. Sanders had previously supposed, that this principle would not hold; that if a man with his eyes open acquired property on the stream below the point at which it was polluted, he was estopped from making any complaint, but numerous decisions uphold the principle that health and life are superior to private and material interests.

DR. LISTON H. MONTGOMERY, Chicago, said that he would go a step farther, so as to have such supervision of the inland streams, canals, rivers and lakes, as to prevent the granting of franchises to various corporations—gas and electric light companies, railroads, manufactories, etc.—as they become careless and tend to undo this very important reform by permitting their employés to pollute streams. The Chicago water supply is derived from Lake Michigan, a few miles from the shore, and most of the sewage goes down the drainage canal into the Illinois River, and thence into the Mississippi River. Dr. Montgomery thinks that a national board of health has been already too long delayed; it is the imperative, paramount duty of our government to protect the welfare of the people in public health matters, as our government was instituted to promote the welfare of mankind. It should have the cooperation of all powers, national, state and interstate, throughout the Union.

DR. W. H. DONALDSON, Fairfield, Conn., said that those who live in manufacturing districts desire light on some practical sanitary way of disposing of factory wastes which are now such a large factor in stream pollution. How health authorities can instruct owners of large factories, located on streams, to dispose of their sewage, wash waters, dyestuffs, etc., with the intake and discharge in close proximity, is a problem separate from ordinary sewage disposal.

STREAM POLLUTION AND ITS PREVENTION.*

X. G. GOODNOUGH.

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BOSTON.

The various sources of stream pollution are so well known that it is unnecessary to describe them in any considerable detail to an association like this.

The effect of stream pollution, so far as the sanitary questions involved are concerned, may be considered from two points of view: 1, the use of the stream as a source of water supply; and, 2. the influence of its condition on the health and comfort of those living in its neighborhood.

It is not the purpose of this paper to consider the pollution of streams and its prevention from the point of view of their use as sources of public water supply. While a great many cities and towns in this

* Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-eighth Annual Session held at Atlantic City, June, 1907.