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Address.

SCOPE OF PUBLIC HEALTH SERVICE.*

By WM. C. HANSON, M.D., BELMONT, MASS.,

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THE scope of public health service has become exceedingly broad. All the fields of the medical and related sciences form the foundation of public health work.

The purpose of public health work is to protect and promote the health of the citizens to the end that their usefulness may be increased.

The distinction between public health and private health is arbitrary and unimportant, although some diseases are better illustrations than others of the necessity for a public health service.

Lemuel Shattuck, a very intelligent layman, proposed to the Massachusetts Legislature of 1850 "An Act for the Promotion of Public and Personal Health." In one of the most remarkable public health documents ever written, now more than half a century ago, Shattuck said that "the great object of sanitary science was to teach people the causes of disease,—how to remove or avoid these causes,—how to prevent disease,—how to live without being sick,—how to increase the vital force,—how to avoid premature decay." "One of the most useful reforms," he said, "which could be introduced

into the present constitution of society would be, that the advice of the physician should be sought for and paid for while in health, to keep the patient well; and not, as now, while in sickness, to cure disease, which might in most cases have been avoided or prevented." Shattuck was many years too early for his time, but we are fast following the lines of action that he described with such remarkable foresight.

No branch of preventive medicine has excited greater interest of late years than the study of the effects of occupation on health and length of life. Massachusetts was the first state to begin the scientific study of the physical effects of child labor in America. Owen R. Lovejoy, secretary of the National Child Labor Committee, recognized this fact when in 1912 at the International Congress of Hygiene and Demography he said: "This public service has been to some extent developed in Massachusetts, and creditable work has been done by the State Board of Health. In other states but slight beginnings can be recorded." At this same Congress, the president, Dr. H. P. Walcott, for 25 years president of the Massachusetts Board of Health, said in regard to the prevention of occupational diseases: "We should now bend all our efforts to a course of determined and persistent administration in the hands of instructed and public-spirited officers acting with all the great powers conferred by existing statutes."

It may not be amiss in this connection, in view of the importance of the subject for the protection of the community, to state that at this International Congress the Massachusetts Board of Health was awarded a diploma for superior merit

* Read as the Annual Oration for the Middlesex South District, Massachusetts Medical Society, New American House, Boston, April 21, 1915.

for its exhibit on the hygiene of occupations. It was the only award made on the subject to any state or municipal exhibitors. The jury, appointed by the executive committee of the congress, consisted of nine disinterested persons occupying prominent public positions, the chairman of which was Major Russell of the United States Army Medical School.

Less than eight years ago the Massachusetts Board of Health took on the scope of an investigation of work and conditions dangerous or injurious to the health of children in factories. The investigation was made by physicians. They were interested in determining the facts relating to the work and health of the children, and their efforts and results undoubtedly accomplished much good. The investigations were begun without any definite idea of paying attention to more than the sanitary conditions in factories generally, but we soon realized that the best protection of the industrial workers was to look after the children and youths in gainful occupations. There was nothing flaring about the work, which by actual growth up to 1912 directed itself towards securing the greatest possible protection for the young person, who we realized had a longer life before him than the adult and who we felt ought to be insured the best possible chances of making the most of himself without any more risk from contagion of any kind or of avoidable occupational diseases or unhygienic conditions which encouraged diseases or disease tendencies than could be avoided.

As the result of the investigations, a considerable variety of occupations were practically closed to young persons under eighteen years of age and the occupations of many children changed. Many thousands of children were examined physically and conditions of ill health pointed out to their parents or guardians.

It was impossible, however, to obtain without the coöperation and assistance of women well trained in investigating the habits and interests of young workers the really practical results that might otherwise have been obtained. This is true because the services of public health nurses and social workers are necessary for the proper education and care of young persons in industry just as they are necessary in aiding progress in dispensary work by going into the homes of the sick.

The especial usefulness of women in this capacity is to follow the children along and help them live healthier and more useful lives. It will still be the function of the health physicians, however, to correlate the injurious influences of the occupation, of the home and of the habits of the individual, for these physicians are the persons who are most experienced in preventive medicine, and as public health officials are best able to judge as to the various effects of occupation or of living conditions on health.

Recently Hayhurst, for the Ohio State Board of Health, has carefully investigated the subject of occupational health-hazards in that state. He

has defined a certain number of health-hazards which he believes to be responsible for a large percentage of preventable sickness and mortality, *e.g.* tuberculosis, cancer, rheumatism, circulatory diseases, Bright's disease, and skin diseases. He believes that deaths occurring under seventy years of age from circulatory or heart diseases should be considered preventable.

"In Ohio in 1912 over one-sixth of all deaths were due to circulatory diseases and one-eighth of all deaths to organic heart disease alone. As a cause of death tuberculosis has been almost doubly outstripped by these three chronic degenerative diseases, 58% of which have occurred before 70 years of age, and 20% of which have occurred before 50 years of age." The total number of cases of positive occupational diseases and disabilities discovered by the Ohio investigation, this last year, was more than 1200.

The health department of the city of New York has within the last two weeks added to its duties the one of studying the effects of occupation on health. A division of Preventable Diseases was established, including a central occupational disease clinic and an industrial hygiene educational division. During the interval mentioned the clinical material has exceeded that of the tuberculosis clinic. It is expected that work conducted along the lines indicated will be a potent factor in the reduction of mortality and morbidity in the city.

Among the unofficial organizations interested in the prevention of occupational diseases is the American Public Health Association, which at its last meeting voted to appoint a special committee to consider and report on the subject.

What is really happening, therefore, is that through educational reforms the public is beginning to see what a few men like Lemuel Shattuck saw a great many years ago. In Shattuck's time but few persons were educated in sanitary science; now there are many persons capable of giving good sanitary advice. Sanitary professorships are being established in all of our colleges and medical schools, and the science of preserving health and preventing diseases is taught as one of the most important subjects.

Today in our community thousands of persons who are well are seeking advice as to how to keep well. Good health is being generally recognized as lying at the foundation of success for both the individual and the community.

Persons as a rule, however, are not yet ready to pay for advice as to how to keep well, except through taxation by the agencies of government.

The United States Government, state, city, and some town agencies are distributing literature free of cost to the individual on any phase of preservation of health. Some of the more common subjects of the day, for one reason or another, are: the prevention of occupational diseases; the control of the notifiable communicable diseases; the study of the prevalence and control of venereal diseases; pneumonia; cancer; circulatory and organic heart diseases; Bright's dis-

ease; diabetes; the problem of infant mortality and child hygiene; school hygiene and the examination of school children; housing conditions; rural sanitation; and the prevention of the pollution of our water supplies.

To show one way and the extent to which some states are going in educating the inhabitants in the preservation of health, one state, at an expense of a number of thousand of dollars, issues a Mother's Baby Book bound in cloth. The book is sent by the Governor with an autographed letter to each mother after the birth of her first baby. The object of the book is to give simple and plain instructions concerning pregnancy, childbirth and the care of babies. It is intended to supplement and aid the physician, and not to prescribe medical treatment. Another object of the book is to bring about a more complete birth registration which, in turn, permits a more complete record of infant mortality.

Public health service deals with law. The rights of property and persons must be guarded. On the other hand, no person shall so use his property, or allow it to be used, as to be dangerous to the public health. Furthermore, no person shall perform any act or cause any act to be performed which shall cause or spread dangerous diseases, or which shall otherwise endanger the public health. And, finally, every person should do or cause to be done all things reasonably necessary to prevent dangerous diseases, or the spread thereof, and to protect and promote the public health.

Reasonableness of action is important. Administrative authorities, local and state, must use due caution in passing ordinances, rules and regulations.

A health board to be successful must consider and weigh carefully the reasonableness of all its acts and the omission of acts. The reasonableness of acts or the omission of acts must always be based upon facts. They should never rest upon the work of any one man or class of men. The health authority of our local community is, with rare exception, in our Commonwealth the most powerful, final authority. A local board of health actively engaged and using all its powers is comparable to a court in continuous session.

The interpretation of laws enacted many years ago and their adaptation to existing conditions is often perplexing. And yet, law must be interpreted not only in the light of the knowledge existing at the time of its enactment, but in accordance with present day enlightenment, in keeping with advancing civilization. Measures which would have been sufficient and reasonable a few years ago, owing to lack of knowledge at that time, might today in the light of existing knowledge be declared unreasonable.

In order to prevent or suppress any communicable disease, we must have a knowledge of its mode of transmission. This is essential, whether for personal prophylaxis or in the general warfare against infection.

The most common communicable diseases that

show gradually diminishing death rates in our Commonwealth are: tuberculosis, typhoid fever and diphtheria. The causes for the diminishing death rate from these diseases are somewhat complex, although it is fair to give exceptional credit to (a) the use of bacteriological and research laboratory knowledge, (b) the improvement in the purity of our water supplies and in the proper removal of sewage, and (c) the combined efforts of the laity, the medical profession and sanitarians in the practical study of good hygiene and the prevention of disease.

TUBERCULOSIS.

Lemuel Shattuck in 1849 stated that if tuberculosis was "ever to be eradicated or ameliorated, it can be done only by preventive means and not by cure." Dr. Fisher of Boston, an eminent professional man of Shattuck's time, said that "preventive means, when known and fully appreciated by the community, will be adopted, to a greater or less extent, and by their adoption a vast amount of human suffering and human life will be saved." This was a true prophecy.

Hiram F. Mills, for thirty years with the State Board of Health, made in 1913 an exhaustive study of what has been accomplished in the past in the suppression of pulmonary tuberculosis, the present condition in the state of Massachusetts, and the most effective methods of acting and cooperating with all the forces engaged in the suppression of this disease. Mr. Mills' plan of campaign for the suppression of tuberculosis goes to the root of the matter by removing all conditions which cause its spread and inspiring hope in sanitary measures that will prevent its recurrence. The following statistical information is found in his report:—

"Forty years ago the death rate from tuberculosis in Massachusetts was three times as great as it is now; today it has been reduced one-half in the past twenty years.

"There is no other state in the union, in which records have been kept, where the reduction of the death rate from tuberculosis has been as great as in Massachusetts.

"Furthermore, no other country in the world has done such effective work and accomplished so much in decreasing the number of deaths from tuberculosis per 100,000 of population as has the Commonwealth of Massachusetts."

In the further suppression of this disease the work of district nurses, public health nurses and social workers under the supervision of both state and local health authorities is strongly recommended in connection with the establishment and maintenance of tuberculosis hospitals and dispensaries.

TYPHOID FEVER.

About two years ago, at the suggestion of the reader, a special committee of state health officers, acting under his supervision, in-

vestigated the prevalence of typhoid fever in Massachusetts to determine what aggressive work might be inaugurated in our Commonwealth in order to reduce the typhoid mortality rate. It was found, from figures compiled by A. J. McLaughlin in the Public Health Reports, that the typhoid mortality rate showing for this country, as compared with the rate for certain cities of northern Europe, was far from flattering. The registration area of the United States had an average mortality rate for the years 1901-1909, inclusive, of more than six times the 1910 rate for the European cities. Many European localities had reduced the average mortality from typhoid to about 4 per 100,000. The result was equally unfavorable in making a comparison with the cities of this country. Of the 50 registration cities of the United States, with a population of 100,000 or over, in 1910, but 4 had a typhoid mortality rate of 9.5 per 100,000 or less.

The Massachusetts rate for the years 1908-10, the lowest typhoid mortality rate for 25 years, was nearly three and a half times higher than the low average European rate mentioned. While, however, there are and have been in these northern European countries fewer deaths from typhoid fever per 1000 inhabitants than in Massachusetts, the death-rates in Massachusetts have decreased more than in any one of those countries, and have decreased twice as much as the average of them all.

The committee found many difficulties having to do with the agencies through which the infection is spread, and recommended state-wide legislation for bringing up to a proper standard the health work in those communities as yet not sufficiently active or organized. The proposed legislation, however, has not been forthcoming. They were of the opinion that carriers should be restrained from handling all food products whether in dairies, kitchens or dining rooms. They were also of the opinion that "the physician who does not report a case of continued fever as a probable typhoid as soon as he has eliminated other common causes, and who does not in such a case take appropriate precautions, must shoulder very serious responsibility to the community for any subsequent results in the community."

In the past twenty-five years, while the population of Massachusetts has increased 67%, the deaths per year have increased but 30% and the death rates have decreased from 19.83 to 15.42, or 4.41 per 1000 living.

In the twenty years previous to the organization of the late State Board of Health there had been but little permanent change in the death rate in the state. The average death rate in that period was 19.33 per 1000 and in the last five years of the period it was no less than the average.

In the first twenty years of the work of this board the death rate decreased from 19.83 per 1000 to 16.33, or there were at the end of this

period 16% fewer deaths per 1000 per year in the state than at the beginning.

Mr. Mills, commenting on the causes of the diminished death rate, laid the greatest stress upon the purification of our water supplies. "Other elements," he said, "have entered into the problems which have in the past been of less importance, but now that so much has been done in the improvement of water supplies, the other elements, especially the improvement of the milk supply, assume increased importance in decreasing the deaths now caused by typhoid fever and other germ diseases."

The year 1914 is noteworthy for considerable diminution in the typhoid death rate in the country. Forty-one cities had a lower rate than in 1913 and 17 a higher; 24 cities had a death rate under 10 in 1914 as compared with 19 in 1913.

The two Massachusetts cities, with a population of over 100,000 having a death rate under 5, were Worcester and Cambridge.

While there has been a steadily diminishing mortality from the disease in this state there is great need of the combined efforts of the health authorities and the public in bringing about its eradication.

DIPHTHERIA.

The discovery by Behring of the antitoxic power of the blood in animals treated with diphtheria toxin, and the successful attempts of Behring, Roux and others to produce antitoxin on a large scale, led Dr. H. P. Walcott, chairman of the State Board of Health, in 1894, to consider the advisability of establishing a laboratory for the production and free distribution, under state supervision, of this preventive and curative serum.

It is unnecessary to make more than a brief comment on the value of the prompt use of antitoxin for both its curative and preventive effect. The striking difference in the fatality from diphtheria, according to whether antitoxin is administered early or late in the disease, is well known.

In the pre-antitoxin period, for the years 1891-1894, the total fatality per cent. from diphtheria was 28.3; during the antitoxin period for the years 1895-1913 the total fatality per cent. was 10.8.

With the intelligent co-operation of the medical profession and the general public, the control and prevention of diphtheria is feasible. We must, however, have a knowledge of its prevalence and a better knowledge of its causation. We all know of the occasional outbreaks of positive bacteriological cases with no clinical symptoms, in other words, of the frequent finding of diphtheria bacilli in healthy throats. Whether such outbreaks are due to certain meteorological conditions, favoring the activity of the bacilli, seems to be a proper subject for further inquiry. Personally I am inclined to give

weight to such a theory rather than believe that all cases result from direct case-to-case infection. I believe that every case of positive culture ought to be carefully investigated by a local health official and full records kept in the local office for ready access to the state health officers, so that the efforts of the bacteriologist and investigators may be combined in the interest of more accurate knowledge as to the control and prevention of this disease.

From 60% to 70% of all deaths from diphtheria occur in children under five years of age.

All cases of sore throat should be carefully watched, and, if more than one case occurs in a family, it should be regarded as suspicious.

Immunity in diphtheria is generally incomplete and of short duration. It lasts from a month to several years, varying greatly in different individuals, and being very brief in children.

Schick has recently proposed a simple clinical test for determining whether a person is more or less immune to diphtheria or whether a state of susceptibility exists. The most practical application of Schick's test, according to Kolmer and Moshage, "consists in applying the test as a preliminary measure to all persons who have been exposed to diphtheria, and immunizing only those who react positively." The test is "based on observations of von Behring that as little as one-hundredth of a unit of anti-toxin per cubic centimeter of our serum will protect a person against diphtheria."

Bundesen of the Chicago Health Department points out that the use of the Schick test "permits a great reduction in antitoxin bills, that much needless pain and annoyance of patients is avoided, and that the possibility of anaphylactic shock is greatly minimized."

MEASLES.

In the year 1910 over 11,000 American children died from measles. This number did not include the great number of children who died from broncho-pneumonia, a disease which is so frequently caused by measles. When it is considered that measles occur most often during the school period it will be seen that thousands of children are kept from school for weeks at a time on account of this disease. Leaving out of consideration the death and suffering caused by so many children stricken with measles, the economic loss is a most serious one.

Measles is now regarded as a preventable disease, yet in Massachusetts, in 1913, there occurred 315 deaths from this cause. In Illinois, during the year previous, there occurred from measles more than 650 deaths.

W. C. Rucker of the United States Public Health Service, commenting on the ravages caused by measles, said: "It is little less than criminal to permit children known to have measles to come in contact with well children. . . It is the duty of private citizens and

municipalities to take every known measure for the prevention of the spread of this disease."

The administrative control of measles remains one of the most baffling problems with which we have to deal.

SCARLET FEVER.

The essential features of the prevention of scarlet fever consist in isolation and practical disinfection. While scarlet fever is not so highly contagious a disease as measles, both diseases must be dealt with from a public health view point in practically the same way. Until more exact knowledge is obtained concerning the channels of entrance and exit of the virus and its mode of transmission, public health authorities will be more or less handicapped in its control. The period of isolation is necessarily more or less arbitrary in scarlet fever for we have no accurate way of determining just how long a child remains infective.

WHOOPIING COUGH.

Dr. John Lovett Morse in "A Plea for More Efficient Public Regulations Relative to the Control of This Most Serious and Fatal Disease," called attention to the fact that whooping cough is almost everywhere more fatal than scarlet fever and less fatal than diphtheria. In 1911 the reports from thirty states showed that 6251 died from whooping cough, 4323 from scarlet fever, and 9579 from diphtheria. During the same period in eleven states where 1216 children under five years of age died from whooping cough, 3860 children under five years of age died from bronchitis and broncho-pneumonia. While it was impossible to know in how many cases the bronchitis and broncho-pneumonia were secondary to whooping cough, Morse pointed out that they were undoubtedly due to it in a considerable proportion of them. He showed by statistics the lack of proper regulations relating to the isolation of children ill with measles and to the exclusion from school of other children in the family; of the scanty provisions for the hospital treatment of whooping cough in this country; and of the lack of a general rule as to the management of children with whooping cough in out-patient and dispensary clinics. Morse emphasized the need of making strenuous efforts to diminish the terrible mortality from this disease. He said (1) "It is fair to assume that the disease is transmitted by the secretions of the respiratory tract and that, while most contagious during the catarrhal and early weeks of the spasmodic stage, it is also contagious throughout the whole of the spasmodic stage. (2) Since about 95% of the deaths from whooping cough occur during the first five years and the great majority of these in the first two years, the most important thing is to keep babies and young children from having the disease. (3) It can be confidently predicted that when the physicians and the public understand what

whooping cough really means, when proper regulations for its control are established and enforced, and when sufficient hospital accommodations for its care are provided, whooping cough will cease to be the scourge which it now is."

MALARIA.

Malaria is another of the most prevalent of the preventable diseases. Owing to the lack of morbidity statistics relating to this disease, however, it is impossible to make a specific statement regarding its prevalence.

Rosenau states that "despite the fact that we have more exact knowledge of malaria. . . than perhaps any other disease, despite the fact that we have accurate means of diagnosis and a ready cure, and despite the fact that we have assured measures of prevention, malaria counts its victims by the hundreds of thousands annually."

Malaria was added to the Massachusetts list of notifiable diseases last September, so that now all cases of the disease must be promptly reported by physicians to the local boards of health and all deaths from malaria are required to be reported weekly by local boards of health to the State Department of Health. We shall have soon, therefore, in Massachusetts, reliable morbidity and mortality statistics on malaria.

Among the diseases not classified in our Commonwealth as dangerous to the public health, hence notifiable to the health authorities, but claiming the attention of the public as preventable, are (1) pneumonia and (2) the venereal diseases.

PNEUMONIA.

Pneumonia is one of the most widely distributed and fatal of the acute communicable diseases. According to the U. S. census, more than 10% of all deaths in the registration area of the United States were due to pneumonia. And yet this disease now claims our attention as a *preventable* disease.

For the year 1913 there were returned to the State Department of Health of Massachusetts 6112 deaths from pneumonia and broncho-pneumonia as compared with 5965 deaths for the year 1912.

Seasonal prevalence in 1913 showed the greatest number of deaths from pneumonia in February and March and the smallest number in July and August. This shows that deaths from pneumonia occur mainly during those months when people live in closed houses. The control of pneumonia involves a careful study of the localities, including the industrial communities, and the conditions under which people live and work. The assistance of district health officers, local health officials, nurses and physicians in making such a study or survey is essential in bringing about the decrease in death rates from this disease.

VENEREAL DISEASES.

It would be difficult to mention any one disease that is of so much importance to the public welfare as the venereal diseases. The time is long since past for neglect and silence concerning them. We should institute a rational and vigorous educational campaign in order to bring into the homes ideas that cannot fail to have influence.

There is at present no method of getting accurate reports of the occurrence of cases of venereal diseases. The American Public Health Association has appointed a committee to study and report upon the problem, and the American Social Hygiene Association in New York City has been organized as a national clearing house. Dr. William F. Snow, secretary of this association, states that within the last two years important advances have been made in placing the movement on a sound basis, and that the campaign against venereal diseases has extended to such problems as the control of cancer and the promotion of mental hygiene. A number of state and city health authorities have instituted some important measures. Blaisdell quotes New York City statistics as probably representing as accurate an estimate of the amount of syphilis in a given community as any now available. During the fourteen weeks from July 4 to October 3, 1914, 25,633 infectious diseases were reported in the city of New York, with a population of a little over five and one-half millions. Syphilis stood first on the list with 6342 cases, or 28%; tuberculosis second, 5525 cases, or 21%; diphtheria third, 3370 cases, or 13%; measles fourth, 2750 cases, or 11%; and scarlet fever fifth, 1064 cases, or 4%. Blaisdell, in a study of 60 cases of fresh syphilis in the Skin Department of the Boston Dispensary, found that these 60 patients had exposed 1227 people,—134 by coitus, 442 by family or boarding house life, and 651 by occupational association. The amount of syphilis in Massachusetts today is unknown, and the only index that we have of its prevalence is from the records of hospitals and other institutions. Reports received in the Massachusetts Department of Health from 34 hospitals in the state show, for the year 1914, 4068 cases of syphilis and 3062 cases of gonorrhea.

The Boston Dispensary and some other institutions have established social service work with venereal disease cases. Michael M. Davis, Jr., director of the dispensary, believes that the reporting by public medical institutions to the State Department of Health of cases of syphilis and gonorrhea would be beneficial if properly administered. The records should not be open to public inspection and should be kept only by specified officials of the department. Davis gives three reasons why such reporting would be of value, viz.: "First, gonorrhea and syphilis can only be successfully dealt with from the public health standpoint when they are regarded as contagious diseases rather than as venereal dis-

eases; second, reporting will give the physicians, administrators, and trustees of hospitals and dispensaries a much sharper sense of responsibility for keeping their patients under treatment and for securing medical examination, and, when necessary, treatment, for the members of the patients' families who have been exposed to infection. The out-patient clinics of Boston alone receive several thousand new cases of syphilis and gonorrhea annually. That these clinics should feel their public responsibility in this matter and make it effective by proper action, as can be done in a large majority of cases without insuperable difficulty, is extremely important in the campaign against these diseases and I believe that reporting by name would be useful as a stimulus to these institutions. Third, while reporting cases merely by number would be useful because of the educational effect upon the public of the statistics gathered, and would be better than no reporting at all; reporting by name is the reasonable and ultimately necessary method, and is not open to serious objection if properly administered. E. E. Southard, commenting on a series of 6000 Wassermann tests for syphilis performed in the Harvard Neuropathological testing laboratory, states that it is clear that the percentage of outstanding syphilis is not so high as alarmists sometimes think, and that it is probably far below 23%. He gives 15% as the approximate percentage worked out for the Psychopathic Hospital intake which, he says, corresponds to the idea prevalent among dermatologists as to the general percentage in the community which they deduced from cases in skin clinics.

Southard believes the Wassermann method of diagnosing syphilis of such value to the community that a community Wassermann service might well be undertaken by a State agency. I may say that a State law with reasonable appropriation has now been enacted to enable the State Department of Health to develop such a service.

W. G. Stimpson of the United States Public Health Service reports on the treatment with salvarsan or neosalvarsan of 430 cases of syphilis, that there is no question of their great benefit to mankind. Many persons, he says, who were partially or totally disabled, have regained their health after the administration of salvarsan and have returned to work. He, however, suggests caution in using it in tertiary forms of the disease.

Frederick H. Baker, in a paper read at the January, 1915, meeting of the Massachusetts Association of Boards of Health, said in conclusion: "I should like to see appointed a committee from this association on the control of venereal diseases. I should like to see this committee, among other things, consider especially:

"1. The advisability of making syphilis and gonorrhea reportable diseases.

"2. The advisability of securing the passage of a law making these records private records.

"3. The advisability of the committee conferring with the health commissioner of this state to secure the establishment of a state Wassermann laboratory, a laboratory to which the workers in the municipal laboratories could go to improve their knowledge, and to establish a uniform technic throughout the state.

"4. The advisability of securing the passage of a law compelling public institutions to treat acute venereal disease."

Of the reportable diseases, special reference should be made to ophthalmia neonatorum and rabies; the former unprevented and untreated leading to blindness; the latter, unprevented, to a most excruciating death.

OPHTHALMIA NEONATORUM.

Ophthalmia neonatorum is a preventable disease and its prevention is a very simple matter, and yet it has been estimated that about one-fourth of all cases of blindness are due to this disease, and that the annual cost to the people of the United States to care for those who are blind from this cause is about \$7,000,000. The preventive treatment of this disease is familiar to you all,—that of cleansing the eyes of the new-born infant and dropping one or two drops of silver nitrate or argyrol solution into each eye. The state boards of health now pretty generally make such treatment available for physicians, and when it is universally employed there will be a marked reduction of blindness in children, and the country will be saved many millions of dollars.

Efforts have been made by our state physicians in Massachusetts to make sure that the infants were receiving proper medical and nursing care. Physicians have been made to account for failure to report cases of the disease. Ignorance of the law requiring such cases to be reported; ignorance of proper methods of treatment, and carelessness on the part of local boards of health, physicians, nurses, midwives and parents, have been observed. There has been noted an improved condition on the part of many boards of health and physicians as to the recognition of the seriousness of this disease and its ultimate results if neglected or improperly treated. There has been also observed an increasing tendency upon the part of some physicians, as a routine method of treating the disease when it appeared, to use the silver nitrate prophylactic provided by the State Board of Health as a preventive of this disease. In a few cases this treatment was followed by an increased activity of the inflammation. Certain physicians appeared not to consider a case as having a discharge until the eyes were literally overflowing with thick pus. The prophylactic furnished by the State Board of Health is being used more frequently. The public is fast becoming educated to the desirability of its use, and is inclined to criticize the physician for failure to use it if the eyes later become inflamed.

As the result of an energetic campaign of the State Board of Health, carried on since 1909 through the State Inspectors of Health in co-operation with the Massachusetts Commission for the Blind, the percentage of blindness due to ophthalmia neonatorum has been reduced in the state of Massachusetts at least 50%.

DOG BITE, RABIES AND PASTEUR TREATMENT.

The treatment by the Commonwealth of cases of dog bite, by dogs known to be rabid, was introduced under my supervision last summer while Acting Commissioner of Health. Cases of dog bite had been increasing in Massachusetts and many people were unable to get prompt and proper care. Persons had died from rabies without receiving the Pasteur treatment.

Since May, 1914, the State Department of Health have received notice of 212 cases of dog bite. Of this number, 68 persons were known to have been bitten by rabid dogs. Fifty-three of the 68 persons were given the Pasteur treatment by our district health physicians.

There were six fatal cases, only one of which was given the Pasteur treatment. The other five persons either did not appreciate the importance of the Pasteur treatment, or, owing to unavoidable reasons, were not reached early enough for treatment.

Arrangements were made with the Hygienic Laboratory of the Public Health Service at Washington to supply the anti-rabic virus to the State Department of Health, and in every case the virus was administered in accordance with the stipulations of the Hygienic Laboratory.

It is optional with physicians as to whether they procure anti-rabic virus from New York or elsewhere and themselves give the Pasteur treatment, or whether they desire to have the state health officers administer free the virus furnished by the United States Hygienic Laboratory.

The Washington virus, as now sent to our department, is in the form of small pieces of rabbit cord, which must be emulsified before it is used. It is hoped that in the near future the State Department of Health laboratory will make and furnish the virus in such form as to be practicable for the use of practising physicians.

Now just a word as to the protection of water supplies and the disposal of sewage; the correlation of school and community health work; improvements in housing conditions; and infant mortality and child hygiene.

WATER SUPPLIES AND SEWERAGE.

The prevention of the pollution of our domestic water supplies is an important sanitary and economic problem that receives much attention. The wastes of human life concern us especially,—feces, urine and sputum. These may enter the surface water directly in various ways.

The work of the Massachusetts State Board of

Health relating to water supplies and sewerage systems has had such a well recognized value as to need no special comment.

THE CORRELATION OF THE WORK OF SCHOOL PHYSICIANS AND LOCAL AND STATE HEALTH OFFICIALS.

It is essential that there be a thorough and well-supervised system of school health work. It is further essential that there be a practical correlation of the school and community health work.

One of the most practical questions that arises during epidemics of disease is the question, "Shall we close the schools?" In the current Bulletin of the United States Bureau of Education containing contributions from American medical journals on "The Health of School Children," Francis George Curtis concludes from his experiences "that keeping the schools open offers the best chance of safety for the scholars, both collectively and individually." "If the schools are kept open," he says, "and the children continue in the class-rooms as usual, they are under strict observation and examined daily by the school physician, suspicious and infected cases being sent home for observation or treatment." In this way, Curtis believes, "many children are sent home before they have had an opportunity to infect others, thus reducing the probability of spreading infection. Further than this, the attention of the parents is called to the fact that the child is feeling ill and he is brought under treatment earlier."

Among some of the urgent problems of the day are those relating to (a) the medical inspection of children in rural schools, (b) the age and seasonal incidence of diseases of children, (c) the prophylaxis of measles, (d) vaccination, (e) cardiac disease in childhood, (f) tuberculous bronchial glands in children, and (g) the care of the eyes of school children. These and all such problems indicate the need of state advisory supervision of school and community health work. It would insure local supervision of the medical inspection of schools, regardless of whether that work is controlled by the school committee or the board of health; it would preserve local interest and initiative in all health work; and it would bring the state educational and health authorities together on a problem that demands combined action in the interest of the public welfare.

HOUSING CONDITIONS.

Closely allied to the study of infant mortality is the one of providing sanitary homes for the least resourceful people. The question, "What constitutes a home unfit for human habitation?" is one that health officials everywhere would do well to keep constantly in mind.

Time and again, as Kober has pointed out, it has been shown that high mortality rates have appeared hand in hand with unsanitary

and overcrowded homes. "In some cases the general death rate for large groups of population living in unsanitary dwellings amount to double or even treble what might be called the normal death rate. On the other hand the vital statistics of London show that the death rate in the improved dwellings for wage earners is far below the general mortality of the city, and the experience of housing companies in the United States, notably in Washington, D.C., is quite as gratifying."

We cannot but view with satisfaction the great developments that are taking place in municipal housing. Improvements in housing conditions and sanitation generally give rise to the best results in checking the ravages of tuberculosis and many other infectious diseases. As Thomas Gibson, of England, tersely says: "Clean houses, clean courts and streets, clean drains and clean sewers, clean water and clean food, clean air and clean bodies represent the consummation of the sanitary ideal."

INFANT MORTALITY AND CHILD HYGIENE.

Second to none in importance is the branch of public health work which reduces infant mortality. In carrying out this work we must have correct vital statistics. Unfortunately our infant mortality rates are not in general of a character which make it possible to arrange, analyze, combine and obtain proper deductions and conclusions from them in such form as will contribute most to the improvement of practical life. Some communities, however, possess statistics accurate enough to enable competent observers to draw conclusions which show results of an encouraging character.

Among the specific problems of infant mortality must be mentioned those relating to the production and distribution of clean milk, artificial versus breast-fed children, imperfect feeding and drugging of infants, married women workers in factories, maternity and factory labor, and housing conditions.

The Visiting Nurse Association of Boston did pioneer work on such prenatal care, having begun in 1901 to instruct pregnant women in suitable care and hygiene.

Emmons and others are emphasizing the fact that prenatal care is fairly to be considered a part of preventive medicine, and that the health authorities should lay plans for the prevention of death, disability and weakness from inefficient care during pregnancy and confinement. Emmons reports that Pittsburgh has recently been given \$3,000,000 to equip a maternity plant consisting of a modern hospital with local dispensaries and all the necessities for a complete service to the city.

Williams, in a study of 705 fetal deaths occurring among the white and colored races, in 10,000 consecutive admissions to the John Hopkins' Hospital, found that syphilis was the most common single etiological factor concerned, in that it was accountable for 186 of the 705 deaths

26.4%. He observed that it was more frequent in the colored than in the white race, the incidence being 35% and 15%, respectively, and that it must receive important consideration in the reduction of infant mortality.

Holt and Ellen C. Babbitt in a report on 10,000 consecutive births at The Sloane Hospital for Women, New York City, state that congenital weakness and atelectasis together made up 58% of the total deaths, that still-births must be reckoned as one of the large problems in infant mortality, and that except for the larger rôle played by syphilis, the causes of still-birth in no way differ from those which produce death during the first days of life. They believe that the great number of deaths from congenital weakness can be reduced only by care of the mother during her pregnancy. The only important disease developing after birth was pneumonia. Holt says that the campaign to reduce infant mortality is essentially a campaign of education and that the two greatest agencies are: (1) the visits of the nurse to the home and (2) the attendance of the mother at the infant welfare station. In New York City, he says, there has been a reduction in infant mortality of 30% in five years and a steady fall among infants in the summer.

Knox of Baltimore states that "tuberculosis is only two-thirds as destructive for people of all ages as are the conditions which produce the high death-rate during the first year of life." He mentions three fundamental rights of infants which if allowed will save thousands of babies now born weak or prematurely. These rights or conditions are: (1) that the parents must be healthy, (2) that the mothers should be better cared for during pregnancy, and (3) that the labor must be skillfully conducted.

While many other diseases or affections might have been referred to, and many problems relating to health considered, as for example, the use and abuse of foods and drinks, habits of living and other influences on health and longevity, I have aimed to present in a general way such a number and variety of problems as are now dealt with by the majority of public health officials in communities like our own.

The so-called "new idea" of securing health and happiness through public hygiene and preventive medicine is but an awakening of the general public to the value of being taught the causes of disease with the view of removing or avoiding these causes and living without being sick.

"The public," as Lovejoy declares, "must put an end to incompetence or self-interest in its public-health service, and we submit that medical associations, state boards or departments of health, physicians, and experts in hygiene,—those who best know the facts,—must serve as pioneers in demanding that the public health department shall be elevated to its rightful place, and be made the most important arm of city, county or state government."

Health work is not a matter of merely local, but of national and international, interest and importance. Local interest, however, comes first and must be maintained. The modern tendency in health administration is from local to national and international rules and regulations which insure uniformity of action. "Health work," as the Public Health Committee of the New York Academy of Medicine recently declared about quarantine work, "is essentially scientific in its nature, and cannot be carried on efficiently unless tenure of office is independent of changes in administration and of politics."

Original Articles.

THE OPERATIVE TREATMENT OF FRACTURES.*

BY CHARLES L. SCUDDER, M.D., BOSTON.

THE presence of practitioners of both medicine and surgery at this 70th Annual Meeting of the Medical Society of the State of Ohio offers a fitting occasion for the consideration of the treatment of fractures of bone.

Several important events have profoundly influenced the treatment of fractures. The introduction of ether anesthesia in 1846 made possible painless attempts at the setting of fractures. About twenty-five years later the development of asepsis assured the safe care of compound fractures. Still twenty-five years after this the Roentgen ray demonstrated to surgeons that the supposed complete reduction of a fracture was in many cases but a caricature of reduction. And again, after twenty-five years, autogenous bone grafting is affording a sure treatment for ununited fractures.

Thus these four general factors—anesthesia, by producing painless relaxation; asepsis, by preventing infection; the x-ray by visualizing the fractured bones; and bone grafting, by stimulating the reparative process—these four factors have had a direct bearing upon the development of fracture treatment during the past seventy years.

This is not the time or place to enter upon a discussion of the technical details of fracture treatment, however much there may be of interest and of practical value in such discussion. I would call your attention rather to certain general considerations in order that we may better understand the trend of the treatment of these injuries to bone, and that we may thus arrive at conclusions which will prove helpful in establishing a better therapy.

It is unnecessary to demonstrate to this audience that the present methods of treating frac-

tures are unsatisfactory. We are aware of this fact from our own private experience. Those of us fortunate enough to be connected with hospitals where such injuries are received for treatment are convinced that this is true from our larger hospital experience.

Why are present methods of treating fractures unsatisfactory? The answer is—Because the functional results are so often poor. We all know of this from common observation.

Previous to a few years ago all fractures were treated by a non-operative expectant method. The x-ray finally disclosed that the real reason why the functional results were so poor was the faulty setting. Surgeons were not then acutely aroused by this disclosure of the x-ray. The surgical mind has been occupied during recent years with many other problems brilliant in prospect and remarkable in achievement. The study of methods for the improvement of fracture results has therefore been postponed. There has been little real interest on the part of the profession in this subject. Consequently the results have continued poor.

Certain events have directed attention to fractures. The large social movements for betterment have stumbled upon many poor results of fracture. Familiarity of the layman with x-ray plate interpretations has led the fracture patient, often improperly, to demand a better setting of the fractured bone. The admission of the x-ray plate as evidence in court has undoubtedly had a compelling influence. The Workmen's Compensation Act has directed attention to the financial loss due to fractured bone. It is necessary under the law to determine the elapsed time between the accident and the return to normal work. This time away from the earning of a living wage is the economic measure of the efficiency of fracture treatment.

The esthetic standard of the past and the perfunctory record of accomplishment must give place to the economic standard of early functional usefulness and the accurate record of events and conditions from the receipt of the injury to the resumption of full time work.

In other words, a demand has been made upon the surgeon by the laborer and the employer of labor for better results following all fractures of bone. There is today a demand arising from the surgical profession itself that more accurate and scientific work be done in this field of surgery. There is thus a demand from without and a demand from within, both of which must and will be recognized.

What are the methods available for the treating of fractures today? These methods are the non-operative and the operative.

By the non-operative treatment I understand the use of traction and counter-traction of all kinds, including Steinman's and Codivilla's nail extension, manual manipulation for reposition, massage, and fixation by splints and external apparatus. This treatment has its most faithful exponents in Professor Bardenhauer, Gräfsner

* The Oration in Surgery delivered at the annual meeting of the Ohio State Medical Association, Cincinnati, May 6, 1915.