thority connected with the census office, William King, that this figure is 30 per cent. too low. This would make 143,000, or about 210 to each 100,000 inhabitants. It constitutes about one-ninth of the total death-rate. In the city of Chicago it constitutes one-eighth of the total death-rate.

I offer the following conclusions:

1. Every animal having tuberculosis is a center for the maintenance and spread of tuberculosis. We must admit great variance in danger, according to the animal affected. The danger from the cow, by reason of the fact that we drink milk unboiled, is great. The danger from the horse is much less. In spite of this variance the proposition commends itself. Each of the excretions may contain tubercle bacilli. These go either directly into man, there to run the gamut of his defense, or into the world, there to perish, as a usual proposition, but, sometimes, to persist and threaten men and other animals.

2. Animal, and even aviary, tuberculosis is not identical with, but is related to, human tuberculosis. The translation of human into animal and aviary tuberculosis is also possible. A great deal of accurate, painstaking work has been done on the question of the transformation of human into bovine and avian tuberculosis, and vice versa. I mention the work of Theobald Smith and that of Nocard. Theobald Smith's work seems to me to show that while there are structural and biologic differences between the bovine and the human bacillus, the differences are not of great pathologic importance. This is borne out by cases of infection of people by bovine bacilli and of cows by human bacilli. In a short search of the literature I have found cases cited by Strauss, Bang, Colin, Nocard, the Illinois Board of Stock Commissioners, Bray, Crosse of Geneva, Cadeac and Bourney. The observations of this nature are far too numerous for recital. Nocard's work showed that human tubercle bacilli could be transformed into the avian form.

3. Inhalation and ingestion are the most frequent means by which tuberculosis is spread from man to man, from man to animals, and from animals to man.

4. The geographic distribution of tuberculosis is proof that the organism's extracorporeal or saprophytic life is of secondary importance. Argument in support of this proposition is found at every step by the bacteriologist. If this bacillus is found regardless of temperature, of soil moisture, of total rainfall, of elevation from the sea level, of prevailing winds, then it must follow that its essentials are resident in the animal body, where environment is more uniform. Nuttall's observation that the number of tubercle bacilli expectorated in the twenty-four hours is about three billions, would prove that only an infinitesimal number live outside the bodies of animals. The lesser number of cases of tuberculosis at high altitudes, away from cities, in dry climates, etc., is due to the improved condition of the people and of their hygienic conditions, such as lack of crowding, well-ventilated habitations, out-of-doors life, vigorous existence, etc., rather than difference in bacilli or in the effect of extracorporeal environment on bacilli. However, we can not altogether deny the power of sunshine and drying on the bacilli that lie exposed.

5. There is abundant evidence that the bacillus is modified by the bodies through which it passes. Such is the teaching of the work of Bang, of Smith, of Nocard, of Jones and many others.

6. While Proposition No. 5 is incontestable, there is no evidence that the disease will disappear by reason of

a general immunity. In the contest waged between the system and this bacillus, the wandering cells and the chemical substances of the body play a lesser part than in almost any other of the infectious diseases. Protection is had by reason of the activity of the fixed tissue-cells of the body. In those diseases which are due to organisms violently poisonous to the human body, the reaction is sharp, the death or cure speedily results. The very mildness of tuberculosis is responsible for its ultimate severity. The fact that the system takes so little cognizance of it constitutes the difficulty. In consequence, immunity is less a factor than in any other infectious disease. By this, I mean special immunity. The general immunity that comes from great good health and resisting power must be allowed by all.

7. The decrease in the death-rate from tuberculosis is more apparent than real. I want to reassert my statement made in this section last year that, while fewer people seem to be dying of tuberculosis than formerly, the proportion between the death-rate from tuberculosis and that from other diseases is not decreasing. In this connection we must bear in mind the fallacy of taking, without great caution, statistics that antedate 1880. If we limit our comparisons to the period since 1890 we will not find any material decrease.

8. Tuberculosis is above all a disease of crowding, and therefore a disease of cities. The disposition of the age is toward city life, and therefore a slight decrease, or even no decrease, in tuberculosis constitutes a gain.

9. At some future date, in determining the question of favorable location in order that a man may escape tuberculosis himself, shield his family from it or get well, once the disease has been contracted, we must ask the following questions: *a.* What is the altitude? *b.* What is the percentage of sunshine and cloud? *c.* What is the soil moisture? *d.* What is the atmospheric moisture? *e.* What is the population per acre? *f.* What is the amount of tuberculosis present in men? *g.* What is the amount of tuberculosis in animals and birds? *h.* Is the mean temperature approximately that of the district from which the man is to go?

103 State Street.

TUBERCULOSIS IN PENNSYLVANIA.*

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PHILADELPHIA.

Pennsylvanians are beginning to take more interest in the subject of tuberculosis. In a state in which about eight thousand persons, nearly all of them in the prime of life, die of this disease each year, it ought to receive much more attention from those who have it in their power to reduce this unnecessary sacrifice of life. The first and last systematic study of consumption in Pennsylvania was made by the late Dr. William Pepper and the writer in 1886 for the American Climatological Association and was published in the Transactions of that society. It developed the fact that there is a great inequality in the distribution of this disease throughout the state. There are seventy counties in Pennsylvania. Some of them are sparsely inhabited, are deeply wooded; the country is wild; the elevations range in the neighborhood of two thousand feet or over. The children "born and raised" in these counties have purer air to

* Presented in a Symposium on Tuberculosis, to the Section on Hygiene and Sanitary Science, at the Fifty-first Annual Meeting of the American Medical Association, held at Atlantic City, N. J., June 5-8, 1900.

breathe, purer water and milk to drink, a better chance to develop their sturdy chests, for they drive the cows to pasture, trudge to school in cold weather and help on the farm in summer. Neither they nor their parents may realize it, but they are, from our standpoint, the favored class in the general population. They are the survivors of representatives of the hardy pioneers who developed the natural resources of Pennsylvania.

In twelve or thirteen counties, such as Pike, Sullivan, Montour, Union, McKean, Forest, Elk and Cameron, there is only about one-fourth as much pulmonary tuberculosis in proportion to the population as in some of the more populous counties. At the other extreme we have Philadelphia, Delaware and Lancaster counties. These lie in the southeastern corner of the state. The air is warmer and more moist; the country is less than five hundred feet above sea-level. The soil contains a

It will be noticed that the deaths from this disease in ten years exceed twenty-seven thousand, about equaling the combined deaths from diphtheria, typhoid fever, apoplexy, scarlet fever, smallpox and inflammation of the stomach and bowels. Between 1870 and 1897 there was a constant fall in the number of deaths from pulmonary tuberculosis in proportion to the population, but the proportion rose slightly in 1899. In fifteen years the percentage of deaths from pulmonary tuberculosis has fallen from 14 per cent. of all deaths to only 10 per cent. This has been a great gain. Just why the rise occurred in 1899 it is not possible to say precisely. It has been suggested that the better methods of diagnosis now in vogue show more cases to be tuberculous. Every hospital and outdoor clinic has its bacteriologic laboratory and the bureaus of health in Philadelphia and Pittsburg render valuable services to physicians uncon-

Diagram Showing Comparative Mortality by Deaths from Thirteen Prominent Causes of Death in Philadelphia, for the Ten Years, 1884-1893, inclusive.

considerable quantity of clay. The water-supply, for the cities at least, is from rivers that are contaminated, and the environment of the inhabitants of Philadelphia, Reading and Harrisburg is not conducive to the development of that bodily vigor that we find in the highlands of Pennsylvania. A glance at South street, Bainbridge or Fitzwater street, with poverty, vice and filth on every side, is explanation enough for the prevalence of tuberculosis. Children born and brought up amid such surroundings are an easy prey to any infectious disease.

In addition to moral and physical degeneration, the general lack of proper ventilation of city dwellings is a great predisposing agency in contracting consumption.

Atmospheric conditions in southeastern Pennsylvania favor the development of tuberculosis. The air is more humid, the rainfall is greater and the alternations of warm and cold weather throughout the winter and spring produce bronchitis and give rise to more colds than in the portion of the state where snow lies on the ground all through the winter and where the seasons are more sharply defined.

The prevalence of pulmonary tuberculosis compared with other diseases during a period of ten years is seen from the accompanying chart.

Chart Showing the Steady Reduction in Deaths per thousand of Population, Philadelphia, 1870-1899.

nected with the hospitals. In 1899, 675 examinations of sputum were made by Dr. A. C. Abbott and Dr. Stetson in the laboratory of the board of health of Philadelphia. Cases which might have been returned as having died of bronchitis, for example, were doubtless thus found to be tubercular. This may account for the remarkable reduction of the number of deaths recorded from bronchitis; last year they numbered only 389, but in former years they were five or six times that number. In the first six months of 1900 there were 1434 deaths from pulmonary tuberculosis, while in 1899 for a corresponding period there were 1507. A reduction in the rate will no doubt continue.

As physicians take advantage of the newer methods of diagnosis, including sputum examinations and X-rays, cases will be earlier recognized and cures accomplished in the incipient stage. The medical profession is justly entitled to claim more credit in this field than is usually accorded even by its own members. Physicians work harder and more hopefully in a given case of pulmonary disease than they did twenty-five years ago. Soundings are taken much oftener on the dangerous coast and the patient is not so often allowed

to drift and go to pieces on the treacherous reefs without one word of warning.

People are not so ignorant nowadays of the means of prevention of consumption and they have been educated not a little by physicians and by newspapers and special publications as to what should be done to limit the scourge. There may never be a time when there shall be no shipwrecks; there may never be a time when there shall be no consumption, but there is every prospect that some day deaths from this cause will be comparatively few.

The Pennsylvania Society for the Prevention of Tuberculosis was the first to be organized in this country, at least, with this particular end in view. It was organized on April 10, 1892, and incorporated in 1895. It has endeavored to educate the community in a knowledge of the true nature of consumption and the means now considered necessary to control or conquer this disease. The means by which this end is sought to be obtained are: by the publication and distribution of pamphlets; by constant efforts to induce those in influential positions to use their earnest efforts to prevent the spread of the disease; and by striving to obtain the requisite conditions whereby those early afflicted may be restored to usefulness, or for those far advanced, the safeguarding that will prevent the communication of infection to others. Between seventy-five and eighty thousand copies of tracts or pamphlets have been issued, principally for distribution in Pennsylvania. They have been forwarded, on request, to various states from Maine to Oregon and California, and even to Hawaii,¹ and have been reprinted, with slight changes, and circulated widely. No. 1 is entitled "How to Prevent Contracting Tuberculosis (consumption)." No. 2, "How those Suffering from Tuberculosis Can Avoid Giving it to Others." No. 3, "How Hotel-keepers Can Assist in Preventing the Spread of Tuberculosis." No. 4, "How Storekeepers and Manufacturers Can Help to Prevent the Spread of Tuberculosis." No. 5, "Predisposition to Disease." No. 3 has been translated into Hebrew for circulation among the Jewish population. These leaflets can be easily handed to those attending dispensaries and are always well received and additional copies are frequently asked for. This society will always furnish copies of its tracts free to those applying for them, or in large quantities at the cost of paper and printing.

A committee of the society has gone twice to Harrisburg, and has urged the committees on appropriations at two legislatures to provide for a hospital or sanitarium to be erected by the State of Pennsylvania in some mountain region suitable for this purpose. These measures have on both occasions been favorably recommended by the Board of Public Charities after full investigation and have been apparently well received by the committees on appropriations, much sympathy being shown by individual members. Other influences, however, including a false sense of economy and immense losses to the state through bank failures and dishonest officials have rendered our appeal futile. In the city of Philadelphia we have been confronted by a similar state of affairs. The apathy shown at home is in strong contrast with the enlightened and advanced attitude of foreign governments, which have established many institutions of their own and generously given aid to others. America is far behind England, Germany and France in this regard. While it is humiliating to acknowledge our deficiencies we must make them known

in order to secure their correction by encouraging public-spirited men and women of our country to grapple with the herculean task.

The Pennsylvania Society for the Prevention of Tuberculosis requested the Board of Health to consider the advisability of issuing circulars or public notices, to be properly distributed, warning against the uncleanly, unnecessary and reprehensible practice of spitting in public places and conveyances. Such a circular was issued by the Board in 1895, and thousands of copies were widely distributed. Every one of the 1500 street cars in Philadelphia is provided with a conspicuous sign authorized by the Board of Health forbidding the practice of spitting on the floor. There is, however, no law in Pennsylvania under which any one can be arrested and punished for such an act on the streets or elsewhere, but the presence of the order of the Board has done a great deal to improve the appearance of the sidewalks and street cars.

In caring for the tuberculous three special corporations are devoted to this purpose. The oldest of these,

Administration House and Powers' Cottage, Hospital for Diseases of the Lungs, Chestnut Hill.

the Protestant Episcopal City Mission, has conducted for twenty-three years the Hospital for Diseases of the Lungs, at Chestnut Hill, about ten miles from the center of Philadelphia. It is devoted to the treatment of consumptive women. Sixty-five patients, in all stages of the disease, were admitted in 1899. The capacity is for 45, on the separate principle. Six were reported cured, 18 improved, 9 unimproved and 36 died. A department for men, called the "House of Mercy," at 411 Spruce street, in the heart of the city, admitted 45 during the year. Since their organization these institutions have cared for about 2900 patients. Dr. J. Solis-Cohen, Dr. Wm. M. Angney, Dr. C. A. Currie, Dr. F. W. Thomas and Dr. Robert H. Bolling are the attending physicians.

The Rush Hospital for Consumption and Allied Diseases was opened in 1892, and in 1895 occupied a site at 33d Street and Lancaster Avenue, West Philadelphia. It has a capacity for forty patients in wards, but its means at present do not admit a provision for more than 20. It has received annually \$5000 from the State of Pennsylvania since its organization. There are two free

¹ The number of deaths from pulmonary tuberculosis in Honolulu has more than doubled in the last five years.

beds, a dispensary is attached and fulfils an important work.

The Free Hospital for Poor Consumptives was organized in 1895 and incorporated in 1897. Its object is to give hospital treatment to the consumptive poor. It has not yet procured its own home, because all the money it has been able to raise has been expended for the pressing needs of cases which have presented themselves; it pays their board in existing hospitals in Philadelphia and elsewhere. These include St. Agnes', St. Mary's, the German, the Rush, the Hospital of the University of Pennsylvania and the Sanitarium Gabriels in the Adirondack mountains. During the five years of its existence, the Free Hospital for Poor Consumptives has paid out over \$20,000 in board for urgent cases. Over \$6000 was thus expended in 1899, and 124 persons received hospital treatment. The fund is supported by contributions of small amounts, and there are 320 glass globes placed in drug stores, banks and other available places, yielding a bountiful supply from those who could

Hospital for Diseases of the Lungs, Chestnut Hill, Philadelphia

not be easily reached, and anonymous donors who would be unlikely to make formal subscriptions.

Steps are being taken to secure a desirable out-of-town property for the needs of this charity. Its president, Dr. Lawrence F. Flick, has shown indefatigable energy in creating an interest in its work. The receipts for the charitable work of the Free Hospital are now over \$10,000 a year. It affords prompt relief and has a record of not one case of consumption having been turned away.

These four organizations, expending their effort in three different fields, supplement each other's work for the restriction of consumption. The Pennsylvania Society for the Prevention of Tuberculosis directs public attention to the principles underlying the nature of the disease, the reasons why a fight against tuberculosis is perfectly rational and its extinction almost within our grasp. Its work is to teach, to encourage private and to urge public action. It will gladly co-operate in all possible ways to advance the interests of hospitals for consumption.

The Hospital for Diseases of the Lungs, at Chestnut Hill, and the Rush Hospital receive cases and treat them as they present themselves and as their very limited endowments render possible. The Hospital for Poor Consumptives co-operates with every hospital in Philadelphia that will receive such patients and pays their way in existing institutions. It makes its plea to the public for support on the ground that the disease being contagious, the lot of the consumptive in these latter days has been growing harder and the only protection the well have against infection is by the hospitalization of the consumptive population. Besides the idea of personal protection is the fundamental idea of unselfish charity, which is the principal motive of the organization.

The best method of dealing with tuberculosis in cattle is a much simpler proposition. The Pennsylvania State Live Stock and Sanitary Board in the last two years has examined and tested with tuberculin at the expense of the state over 34,000 cattle, and of these over 5000 have been condemned and destroyed. The law provides that farmers shall be reimbursed, in order that hardship may not result. They receive an average of \$22.30 per head; or not over \$50 for registered stock and not over \$25 for unregistered stock; in this way nearly \$150,000 has been expended. To carry out this important work nearly 60,000 doses of tuberculin have been administered by authority of the state veterinarian, Dr. Leonard Pearson, of the University of Pennsylvania. He has encouraged the state to advance the funds to carry on the work; he has interested veterinarians all through Pennsylvania in the extermination of tuberculosis among cattle, by furnishing them the means of testing herds and inducing farmers to exercise greater care in preventing the spread of the disease throughout their herds and from animals to man. For the systematic, intelligent, far-reaching work which Dr. Pearson directs, and for his activity in ensuring conformity to the laws governing the importation of cattle into the state and the sale of meat and milk, every man, woman and child in the commonwealth is under obligation.

Pennsylvania may justly be proud of this feature of the struggle against tuberculosis, in which she takes a firm and liberal stand, yielding the palm to none.

3943 Chestnut Street.

MUNICIPAL REGULATION OF THE SPITTING HABIT.*

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Charles Dickens decided that, as a people, we lack the national instinct of cleanliness. He therefore designated Americans a nation of spitters. We no doubt deserve the designation, as the enlightened nations of Europe regard spitting on the floors and sidewalks as not only unsanitary, but an evidence of ill-breeding.

Five years ago the writer read a paper before the Allegheny County Medical Society recommending restriction and regulation of the spitting habit. Nine out of ten members who took part in the discussion agreed that restriction and regulation were needed. Six, however, of the nine thought any regulation impossible. "Women can, but men can not, change their filthy spitting habits."

* Presented in a Symposium on Tuberculosis, to the Section on Hygiene and Sanitary Science, at the Fifty-first Annual Meeting of the American Medical Association, held at Atlantic City, N. J., June 5-8, 1900.