Sanitation in 1890 : address delivered before the American Public Health Association at the annual meeting held at Charleston, S.C., December 16, 1890 / by Henry B. Baker.

SANITATION IN 1890.

ADDRESS

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AT THE ANNUAL MEETING HELD AT

Charleston, S. C., December 16, 1890,

BY

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ADDRESS.

MEMBERS OF THE ASSOCIATION, LADIES AND GENTLEMEN:—In accordance with the custom in this Association, this address is now presented in order to supply a general view of the present status of public health work in this country, to bring briefly before us a review of some of the progress made, especially since the last meeting of this Association, and to suggest directions in which effort seems to be needed in order that progress shall be most satisfactory and promising for the future.

Many of you are as familiar as I am with these several topics, but as each member of our Association views them from a different stand-point, there is reason for a hope that what is presented in this address may not be tiresome, and I do not forget that there are some present to whom public health topics must be new. To such persons I may say, that although many of its members are physicians, this Association is not a medical association. Although many of its members are especially well informed on subjects relating to personal hygiene, yet personal hygiene is not the subject which is uppermost in the minds of members of this Association. If you ask, What, then, are the objects of this Association? the reply is found in its name, "The American Public Health Association," and in its constitution, wherein it is stated, "The objects of this Association shall be the advancement of sanitary science, and the promotion of organizations and measures for the practical application of public hygiene."

The founders of this Association recognized the fact that in civilized society the life and health of every person are more or less bound up with the life and health of every other person; that not only is man his "brother's keeper," but on each person there rests some responsibility for the welfare of all, some responsibility for the public health; and each person has a vital interest in the public health, because of its bearing upon self-preservation.

We have all heard that "self-preservation is the first law of nature;" but I think we must admit that it is not the first, but more frequently the last, law of the law-maker. Laws for the preservation of human life and health, in accordance with sanitary science, are of slow growth, and an

important object of this Association is "the promotion of organizations" "for the practical application" of sanitary science for the public good; and such organizations for the public good can, as a rule, best exist only through public law, and the ordinary governmental methods.

Governmental methods differ somewhat in the different parts of America, and we must remember that this Association includes representatives not only from the several states of this Union, but also from the Provinces and the Dominion of Canada; and I am happy to say that this year marks a new epoch, for we have with us officially appointed representatives from the general government of Mexico, eminent members of its Superior Council of Health.

If, then, this address is to deal with those objects for which this Association was organized, it must deal with the advancement of sanitary science and the promotion of sanitary organizations; and, in the United States, the most perfect "organizations" for the practical application of measures for the public good must conform to our form of government, "of the people, for the people, by the people." In my opinion, there should be such a sanitary organization for the United States and for each other general government, for each of the several states and provinces, and for each of the numerous local governments.

Advancement of Science. The Causation of Diseases.—It seems evident that no great and substantial progress can be made toward the prevention or avoidance of a disease until we have knowledge of its causation. Therefore the work which it is most important shall be first accomplished is that which shall yield us knowledge of the causation of each disease. Within recent years much progress has been made in this important fundamental knowledge, thanks especially to two enlightened governments, Germany and Great Britain.

It should be clearly held in mind that there are seldom less than three important factors, neither of which can be neglected in studying the causation of a disease. For instance, there is (1) the "specific" cause, (2) what (when dealing with atmospheric conditions) I have called the "controlling" cause, and (3) the "predisposing" cause.

Causation of Consumption.—By all means the most important addition to our knowledge in this field is that for which we are chiefly indebted to Dr. Robert Koch, of the Imperial Board of Health of Germany,—the definite knowledge of the tubercle bacillus—the "specific" cause of consumption, the disease which causes the greatest mortality in this country and throughout the world.

Every year there is being rapidly added to our knowledge, details of the controlling conditions, predisposing causes, and modes of spread of that most important disease—knowledge which will enable us to explain the methods by which this most dread disease may be prevented.

Causation of Pneumonia.—The necessity for further knowledge of the causation of a disease than is supplied by knowledge of its "specific" cause is exemplified in the case of pneumonia, which disease, it is believed, can be artificially produced in lower animals by means of its

specific cause,[1] yet the causation of which in man and in animals is certainly proved (by statistics and by direct experiments) to be controlled, in great part, by conditions of the atmosphere.[2]

One attempt to harmonize the facts from these two very different sources is that by Dr. William B. Canfield, who says,—"In the light of recent studies made by Metschnikoff,[3] Baumgarten,[4] Osler,[5] and others, it is more than probable that the phagocytes in a healthy individual, having healthy movements, are able to seize and assimilate the invading organisms, and it is only when an individual not well when the phagocytes lose the power to battle against the specific organism of pneumonia from prolonged exposure to cold, that pneumonia sets in."[6]

But experiments more recent than those referred to by Dr. Canfield, by Nutall, Buchner, Nissen, Lubarsch, Prudden, and others, indicate that the blood serum, even more than the leucocytes, is concerned in the destruction of pathogenic microörganisms.[7]

Causation of Diphtheria.—Evidence has been accumulating, and it now seems to be established, that the bacillus discovered by Lœffler is a specific cause of diphtheria. Dr. Klein, F. R. S., London, has demonstrated that in the cow, inoculated with diphtheria, the bacillus passes into the milk. This may account for the spread of diphtheria in some cases, otherwise unaccountable. In the trachea of cats the bacillus is alleged to have caused pneumonia,[8] which was, I suppose, diphtheritic. Some experiments with doves by Babes and Piscariu[9] seem to have been especially well planned, and to have yielded results especially important. They found that the bacillus—the specific "germ"—promptly caused diphtheria in doves whose throats were scarified before the application of the bacilli, but did not cause the disease in doves with perfectly healthy throats. That something analogous to this is true, as a rule, concerning diphtheria in man, was claimed to have been indicated by myself some years ago, especially in my paper on the "Causation of the Cold Weather diseases."[10] The hypothesis which I then published I still believe to be the true explanation, as to the way in which the throat is irritated and made sore, and consequently susceptible to diphtheria and other diseases, by exposure to the inhalation of air unusually cold and dry. But Dr.

[1] Report of Sec. of the State Board of Health, Mich., 1886, p. 315; also Il Morgagni, Oct., Nov., Dec., 1888; also Trans. Md. Med. and Chirurg. Fac., April, 1889, p. 112; also Bulletin Général de Thérapeutique, Paris, Dec. 15, 1889, p. 520; also Boston Med. and Surg. Jour., Jan. 23, 1890; also Therapeutic Gazette, vol. xiv, No. 2, Feb. 15, 1890, p. 142.

[2] "The Causation of Pneumonia," Report Mich. State Board of Health, 1886, pp. 246–324; also Reports and Papers, Amer. Public Health Assoc., 1887; also Bulletin Général de Thérapeutique, Paris, Dec. 15, 1889, p. 520; also Boston Med. and Surg. Jour., Jan. 25, 1890; also Therapeutic Gazette, vol. xiv., No. 2, Feb. 15, 1890, p. 142.

[3] Virchow's Archiv., vols. xcvi and xcvii.

[4] Zeitschrift f. Kl. Medicin, Bd. xv., 1 and 2.

[5] N. Y. Medical Record, April 13, 1889.

[6] Trans. Md. Med. and Chirurg. Fac., April, 1889, p. 112.

[7] T. Mitchell Prudden, M. D., in Med. Record, N. Y., Jan. 25, 1890.

[8] "Public Health," Minnesota State Board of Health, vol. vi, No. 4, June, 1890, p. 33.

[9] Zeit. für. Hygiene, vol. viii, part 3d; The Sanitary Inspector, Maine, July, 1890, pp. 6, 7.

[10] Report Mich. State Board of Health, 1887, pp. 197–211.

K. E. Wagner (*Annales de l'Institute Pasteur*, p. 570, No. 9, t. 4, Sept. 25, 1890) has repeated Pasteur's experiments, producing anthrax in fowls by lowering their temperature by cold water, and has found that it can be done if the lowering is by means of antipyrin. His experiments indicate that when the temperature is lowered the rate of destruction is less than the rate of reproduction of the anthrax bacilli, while at the normal temperature of fowls, and especially when raised by the injection of the bacilli, the rate of destruction of the bacilli is greater than their reproduction, in the bodies of fowls, especially in the blood. Outside the body at such temperature (42° C. to 43° C.) the anthrax bacilli do not form spores, and are killed in nine days.[1]

Experiments are needed to prove whether what is true of anthrax is also true of the other diseases which I have shown to be most prevalent after the cold weather.[2]

Whether or not my hypothesis shall be found to be the correct explanation relative to the entrance of diphtheria, experiments indicate that it is true, in part at least, relative to pneumonia,[3] and the fact now seems to be established that diphtheria, small-pox, pneumonia, and some other diseases that usually enter the body by way of the throat or air passages, are increased in prevalence at such times as people are exposed to cold atmosphere.

QUARANTINE.—It is significant of great progress, I think, that the diseases which it now seems most important to dwell upon are not the same as in former times. Comparatively little is now said of small-pox, cholera, or yellow-fever. In this country these diseases are not such important causes of death as consumption, diphtheria, or scarlet-fever. For this result, general progress in sanitary administration must receive much credit; but I think that, in this country, much credit must also be due to the greatly increased efficiency of the quarantine service, notably at such important ports as New Orleans, Quebec, and New York. Here, in Charleston, the efficiency has been greatly increased.

The United States government, also, has, in recent years, done very much more than ever before for the establishment, equipment, and maintenance of quarantine stations.

A continuance of this work is desirable; but, for substantial progress, something more than merely continuing the present methods of quarantine is needed. Diphtheria and scarlet-fever should be excluded by quarantines; but the entire country is permeated with those diseases, and with the still more important one—consumption; and a health department of the interior is needed to be established at Washington, even more than is a continuance of quarantine.

[1] Supplement to the British Med. Jour., Nov. 29, 1890, p. 72.

[2] Report Mich. State Board of Health, 1888, pp. 143–169; Jour. Amer. Med. Assoc., Jan. 18 and 25, 1890, pp. 73–84, 116–129.

[3] Dr. Vito Platania, in Italy—Giornale intern. delle scienze mediche, fascicule v; also Bulletin Général de Thérapeutique, Paris, Dec. 15, 1889, p. 520; also Boston Med. and Surg. Jour., Jan. 23, 1890; also Therapeutic Gazette, vol. xiv, No. 2, Feb. 15, 1890, p. 142.

CHOLERA.—To be forewarned *should* be to be forearmed; but our long continued immunity from cholera in this country has led to a general belief that there is no longer danger from cholera in the United States—a belief which may be true, but, in my opinion, is not fully supported by facts. The constant presence, throughout the United States, of typhoid fever,—a disease which is believed to be spread in almost the same ways in which cholera is spread,—should, it seems to me, teach us more humility as to the assumed sanitary superiority of our people and their surroundings, and should lead us to urge the people to adopt those measures which are now known to be restrictive and preventive of both cholera and typhoid fever.

It should not be forgotten that our greatly improved systems of quarantine at our leading seaports do not yet ensure us against the introduction of cholera in the same manner in which it was introduced in 1873, when three distinct outbreaks of cholera, in widely remote parts of the United States, were traced to the unpacking of personal effects of immigrants—at Carthage, Ohio; Crow River, Minnesota; and Yankton, Dakota. So long as conditions are permitted to remain which result in the annual spread of typhoid fever in every state of this Union, there is good reason to believe that cholera would spread, if introduced at a season of the year favorable thereto.

It should be, but is not, generally understood that there is coming to be a thickly populated area in a portion of this country in which by reason of alkaline waters the inhabitants are probably especially liable to typhoid fever, cholera, or other diseases propagated by microörganisms which enter the body by way of the alimentary canal, and which microorganisms are generally destroyed by the normal acid of the healthy human stomach.[1] It is not probable, but it is possible, that if cholera should become once thoroughly established in the warmest portion of the region of alkaline waters in this country, it might possibly find there a permanent home, as it has in the brackish waters of the Ganges in India.

The bare possibility of such a calamity as the permanent addition of cholera to the diseases constantly present in this country should prompt the United States government to a thorough investigation of the subject, lest, through careless disregard of such duties by the government, the lives of thousands, perhaps millions, of our people should be jeopardized.

TYPHOID FEVER.—But, after all, is cholera a more fatal disease or one more to be dreaded than its twin destroyer, typhoid fever? The number of deaths from typhoid fever reported as having occurred in the United States during the census year 1880, was 22,854;[2] and it is probable that not much more than half of the deaths were reported, because the method of collecting the statistics of death for the United States cen-

[1] Eighteenth Annual Report of the Local Gov. Board, Eng., 1888–'89. Supplement containing Med. Officer's Report for 1888; pp. 517, 521, 524.

[2] U. S. Census, Vital Statistics, vol. xii, part II, p. 366.

sus is known to be very defective. We are apt to look with contempt upon the East Indians for living under conditions which permit their destruction by cholera; while at the same time our own people are permitted to be swept off by the thousands in every year by a disease which we believe to be propagated in almost precisely the same manner that cholera is, and our national government is doing absolutely nothing to prevent its continuance; does not even grant to its National Board of Health a dollar to investigate and report on the best methods for the prevention of this great waste of life and treasure that continues to go on, notwithstanding the belief of leading sanitarians that in great part it is unnecessary, and might easily be prevented without the use of more money than is annually wasted through preventable sickness from this disease.

I think it is important that the government should investigate the reason for the prevalence of typhoid fever, "mountain fever," etc., in the region of the Rocky Mountains, especially in the region of alkaline waters. Such an investigation might throw much light upon the subject of the causation and better means of prevention of fevers throughout the entire country.

Causation of Yellow-Fever.—Are not all the facts known, relative to yellow-fever, compatible with the belief that the disease is caused by the inhalation (or otherwise taking into the human body) of the products of the growth, reproduction, or life processes of some organism, probably microscopic in size, which organism may not be capable of reproduction within the human body, but is capable of reproduction in filth outside the body, at high temperatures, but which organism is destroyed by a freezing temperature?

If there is such compatibility in the facts, is it not desirable that the United States government should take such measures as shall ensure the thorough searching for such hypothetical microörganisms, not in the bodies of yellow-fever patients, but in localities known to be infected? Is not the importance of this subject, either as affecting the lives of citizens of this country, or as affecting the money interests of our people, sufficient to warrant the employment of a number of investigators, and the expenditure of considerable sums of money for investigations in the directions indicated by the facts in the possession of physicians and sanitarians?

It has been found that without the presence of oxygen (as in the human body), the cholera bacteria produce their poison more energetically and more quickly than in the presence of air; but when developed in the absence of oxygen, the cholera bacteria are much more sensitive, traces of acid being sufficient to destroy them. When they first leave the body they are, therefore, easily destroyed by the gastric juice in the healthy human stomach, and cannot reach their habitat in the intestine, but if developed outside the body, in the presence of air, the bacteria soon become aërobic and not so easily destroyed. This seems to explain why cholera (like typhoid fever and yellow-fever) is only seldom directly

contagious, and why the disease is contracted in an infected locality.[1] Something similar or analogous to this being true in typhoid fever, and a noticeable fact in yellow-fever, the facts respecting the cholera bacteria may aid in the search for the specific cause of yellow-fever.

A Possibility of the Prevention of Cancer.—A study of the locations of 7,881 primary carcinomata,[2] as illustrating the probability of a cancerous microbe, has led Dr. Edmund Andrews, of Chicago, Ill., to believe that the facts he has collected and presented make it probable that a microbe exists, and prove the importance of searching out the microbe; also that much can probably now be done towards preventing this disease by measures looking to the prevention of access of microbes to those parts of the body most susceptible to primary cancer, especially the lower lip, its liability to primary cancer being "8,448 times greater than a similar area of the intestine."[3]

In this connection may be held in mind an epidemic or outbreak of cancer attributed to the use of cider, in the making of which water from an impure source was used.[4]

Inflammation—*A proposed general advance "all along the line."* It is coming to be the general belief of physicians, and especially of surgeons, that nearly all inflammations are caused by the presence of micro-organisms. (Some of the most common of these pus generators are the round ones—the micrococci, sometimes grouped by twos, and in chains, etc.,—*staphylococci*, and *streptococci pyogenes*, three varieties of each: the *albus*, *aureus*, and *citreous*.)

Some of these microörganisms are now very widely and generally distributed in thickly inhabited places, while in sparsely inhabited regions, especially in mountainous regions, they are not so generally found. I think we should put with this fact another one—that most new states and localities are, apparently, good health resorts. I remember well, that many years ago certain states in this Union were considered exceptionally healthful as regards diseases of the lungs, while now the mortality statistics in those states show the greatest proportion of the deaths to be from diseases of the lungs. Part of this ch ange may be due to a change

[1] Amer. Jour. Med. Sci., July, 1890, p. 77.

[2] "1. Other things being equal, primary carcinoma is most frequent on those surfaces which, by their position, would be most accessible to free-swimming microbes or spores derived from without the body.

"2. The liability to cancer is increased if the epithelial surface is so situated that the spores can remain upon it for at least some hours without being swept away, as on the lower lip; but the liability is greatly diminished if the parts are frequently swept off, as the globe of the eye by winking, or the œsophagus by swallowing food and drink.

"3. The liability to cancer is great if the membrane has vast numbers of deep glandular follicles, into which the spores can penetrate and lie free from disturbance, and have direct access to the more delicate epithelial cells, as at the pyloric end of the stomach and the follicles of the mammary glands.

"4. Those portions of the skin which are usually uncovered are oftener attacked than those covered with clothing and constantly brushed by its friction. The skin of the face, for instance, produces more cancers than all the covered portions of the integument combined."—Jour. of the Amer. Med Assoc., November 23, 1889, p. 739.

[3] Jour. of the Amer. Med. Assoc., November 23, 1889, p. 742.

[4] Science, vol. xiv, No. 342, August 23, 1889, p. 129.

in the average age of the inhabitants, but I think a part of it is due to the fact that the microscopic causes of inflammation have constantly been increasing, so that now the carpets and upholstered furniture in most residences, the floors of most public assembly rooms, the clothing, hair, beard, and hands of most of the inhabitants, are infected with these microscopic causes of inflammation.

The surgeons have been acting upon this comparatively recent addition to our knowledge, and to those of us who practised surgery only as long ago as during the late war, the successes in recent surgery are marvellous. Not long since, I listened to the recital of the details of fifty-two successive surgical operations, each involving the opening into the abdominal cavity, and each was successful.[1]

My belief is, that much of such wonderful success as is now achieved by the leaders in surgery is due to the advance of our knowledge upon what was formerly known as "the germ theory of disease," which gave rise to what was known as "antiseptic surgery," which is now giving place to what is known as "aseptic surgery." The septic microörganisms are now kept out of wounds, pus does not form, inflammation does not occur, the wounds heal, and the patient recovers.

What I am about to propose may seem to some of you at first as Utopian, but I hope to be able to enlist your enlightened sympathies in the direction of a movement designed to do away with all inflammatory diseases of man, in a manner analogous to what has been done by the leading surgeons in doing away with inflammations following surgical operations. Let us glance at the stupendous character of the suggestion, gradually but eventually to do away with all inflammatory diseases! No more consumption, pneumonia, bronchitis, pharyngitis, laryngitis, tonsillitis, rheumatism, etc., including nearly all the dangerous communicable diseases.

So far as relates to the dangerous communicable diseases, such as small-pox, scarlet-fever, and diphtheria, sanitarians now know how to restrict and perhaps to stamp out most of them, and they are doing this as fast as they are supported in doing it by governments; but the measures I have to suggest would, I think, tend to aid greatly in that work, and, in addition, would aim to *place at once all inflammatory diseases on the list of preventable diseases*—diseases which we think we know how to prevent just as soon as the people generally shall come to understand the methods proposed, and shall generally coöperate in the employment of those methods.

Without elaboration,[2] my proposition may be put in the form of preamble and questions, thus:

Since nearly all suppurative inflammations are breeding-places for microörganisms, which, when they gain entrance into another living body

[1] Trans. Mich. Med. Soc., 1890, p. 349.

[2] I hold clearly in mind methods which, if adopted, would, I think, probably be effective, but the statement of them cannot be attempted here. Among the most important measures would be the disinfection of all sputa, pocket handkerchiefs, etc.

(or into another weak or injured spot in the same body), are capable of again starting the inflammatory process,—therefore,

Should not all purulent discharges, and all pus which is accessible, be destroyed or disinfected? Should not the aim be thus to restrict the spread of, and eventually to stamp out, all inflammations ?

Immunity through Inoculation of Attenuated Virus, Albumens, and Ptomaines.—It has long been known that all animals constantly give off poisons, which, if accumulated, are fatal to their own existence.

Certain vegetable ferments, which produce alcohol, are said to be rendered inactive by the presence of no more than 2 per cent. of alcohol.[1]

Pasteur says,—"Many microbes seem to give rise in their cultures to substances which have the property of being harmful to their own development."[2]

There seems to be a universal law, that all living organisms form poisons to themselves; and there is good foundation for the hope that there may be found methods of using those poisons for the destruction of those microörganisms which cause diseases of man, or otherwise for the prevention of those diseases.

Immunity against Rabies.—Prof. Welch says,—"There can be no doubt whatever that it is possible to render animals immune against rabies both before and after inoculations which would otherwise cause the disease. The independent and careful experiments of Ernst in this country are free from all partisan bias, and have fully confirmed the statements of Pasteur and others upon this point."[3]

Prof. Henry Sewall, of the Michigan University, demonstrated the possibility, through injection of snake poison, of rendering the organism immune to the bite of the rattlesnake.[4]

The experiments and practices of Pasteur and others, for the purpose of securing for mankind immunity from dangerous communicable diseases, through the inoculation of the body with the attenuated virus of such diseases, have for several years kept this subject before the people, and there has seemed ground for the hope that eventually success would crown the efforts being made in this direction; and if once the principle is learned with reference to one disease, then there is hope with reference to the other diseases. But nearly all such efforts have been made by

[1] "Immunity through Leucomaines," by Eusebio Güell Bacigalupi. Translated from the second French edition by R. F. Rafael, M. D. J. H. Vail & Co., New York, 1889.

[2] Comptes Rendus, Séance du 26 October, 1885, p. 771. M. Pasteur said,—

"As far back as the year 1880, I had instituted research in order to establish the fact that the microbe of chicken cholera produced a sort of poison of this microbe.

"One would say, that immediately there springs into existence a product which arrests the development of the microbe, whether cultivated in contact with the air or in a vacuum.

"Mr. Raulin, my former assistant, to-day Professor to the Faculty of Lyons, has shown, in the remarkable thesis which he sustained at Paris, March 22, 1870, that the vegetation of the *Aspergillus niger* develops a substance which arrests, in part, the production of this mould when the nutritive medium does not contain salts of iron."

[3] William H. Welch, M. D., Trans. Maryland Med. and Chirurg. Faculty, April, 1889, pp. 170, 171.

[4] Mentioned in British Med. Jour., November 29, 1890, p. 1264. Trans. Am. Assoc. for Adv. of Sci.

individual workers, at their own expense, and at such irregular times as they are able to take from their regular avocations by which they maintain themselves. A few workers have been employed by governments, but there is no such governmental support of such investigations as the immense importance of the subject demands, and especially not in our own country. The United States government can be commended for what it does in this direction relative to the health of *domestic animals*, but what can one say, by way of apology, for a government that appropriates hundreds of thousands of dollars to study the causes of diseases of domestic animals, and then fails to appropriate as much to do a similar work for the lives of the people ? I wish, however, to commend what has already been done by the United States government.[1] I have already mentioned what it has done for quarantine ; but I believe there is promise of great good to the human species as a result of the governmental researches into the causation of diseases of animals. The work of Drs. Salmon, Smith, and Schweinitz, of the United States Department of Agriculture, looking to the production of immunity in animals exposed to hog cholera, has added greatly to our knowledge of the underlying principle in the production of immunity to dangerous communicable diseases of animals and of man.

Dr. Welch has said, "That immunity against infectious diseases may be secured by the injection of chemical substances produced by the growth of specific bacteria, was demonstrated first by Salmon and Smith in the case of hog cholera, and has since been demonstrated by Roux and Chamberland for malignant œdema, and by Wooldridge for anthrax,"[2] both dangerous diseases of man as well as animals.

Published accounts of experiments by Dr. Schweinitz,[3] and also by Frederick G. Novy, Sc. D., at the Michigan State Laboratory of Hygiene, indicate that by the inoculation of an animal with the albumens and ptomaines formed in culture liquids by the life-processes of the germs of hog cholera, the animal becomes insusceptible to hog cholera, whether exposed to the disease by inoculation, or by direct contact and association with animals sick with the disease. Dr. Schweinitz was even able to produce immunity in an animal by inoculation with a pure chemical prepared synthetically in the laboratory. The results of these experiments are in harmony with facts already known.[4] Perhaps the term "attenuated virus" may still be used, if we consider that the "attenuation" consists in the destruction of the germ, and in the saving of its products for use in the production of immunity. Of course much remains to be done before this knowledge can be made directly available in the prevention or restriction of dangerous communicable diseases of man, and the sooner that work is done the sooner the thousands of human lives now

[1] Jour. of the Amer. Med. Assoc., July 5, 1890, p. 1.

[2] William H. Welch, M. D., Trans. Maryland Med. and Chirurg. Fac., 1889, p. 172.

[3] Med. News, Philadelphia, September 6, 1890, pp. 231–239, and October 4, 1890, pp. 332–335.

[4] The substance used by Dr. Koch for the eradication of consumption is not yet known, but it may be expected to be in line with those facts.

lost through those diseases may be saved. Such work is for the general good, and should be done by the general government. It should be done with reference to diseases of man, and not confined to diseases of animals, nor even to diseases which, like rabies, affect man and animals.

Is it not time that human life should be recognized as a proper object, and the most important object, of solicitude on the part of the national government of the United States?

It will be a great gain, however, if it can be brought about that the government shall do such work, even if only for the saving in money values to the people, which, undoubtedly, would be immense.

ANTIDOTES TO DISEASES ALREADY ACQUIRED.—At the recent International Medical Congress in Berlin, Dr. Koch, of the Imperial Board of Health, referring to his now famous consumption cure, said,—"My researches on this substance, therefore, although they have already occupied me for nearly a year, are not yet completed: and I can only say this much about them, that guinea pigs, which, as is well known, are extraordinarily susceptible to tuberculosis, if exposed to the influence of this substance cease to react to the inoculation of tuberculous virus, and that in guinea pigs suffering from general tuberculosis, even to a high degree, the morbid process can be brought completely to a standstill without the body being in any way injuriously affected. . . . This opens up an oft promised field of work, with problems which are worthy to be the subject of an international competition of the noblest kind. . . . Allow me, therefore, the expression of a wish that the nations may measure their strength on this field of labor and in war against the smallest, but the most deadly, foes of the human race; and that in this struggle for the weal of all mankind, one nation may always strive to surpass the other in the success which it achieves."[1]

Certainly we can all join with Dr. Koch in such wishes for national effort for life-saving work; but I think that, among all the countries represented at the international congress, there are few governments which occupy such an enlightened position on the subject of sanitary researches as does the German Empire. If our own national government would even do as much as to publish and thoroughly disseminate among our people the important results of the researches made by the German Imperial Board of Health, our people would have cause to rejoice, and probably thousands of human lives would be saved through the knowledge thus obtained. Something in the direction of such publication has recently been done by the United States Marine Hospital Service. But much more than has yet been attempted should certainly be done in that line. And if our government were to wake up to the importance of doing what the highest interests of its constituents demand—cause researches to be made for the creation of such knowledge—it can find as bright intellects and as faithful workers among our own scientific men as there are in any country; and in a short time the world might be as much indebted to the United States Board of Health for life-

[1] Jour. of the Amer. Med. Association, vol. xv, No. 10, Sept. 6, 1890, p. 370.

saving knowledge as it now is to the Imperial Board of Health of Germany.

While we accord great honor to Dr. Koch, who discovered the specific cause of consumption, and who now thinks he has discovered its antidote, let us not forget that it was an honored member of our own Association, our president in 1887, Dr. Sternberg, of the United States Army, who first discovered the specific cause of pneumonia, a disease which, as a cause of mortality in this country, ranks only a little lower than consumption; and, if the subject were followed up, it should yet yield results somewhat comparable with those reached by Dr. Koch with reference to the somewhat similar disease which he seems to have conquered.

Let us consider for a moment the prospective importance of such a discovery as that suggested by Dr. Koch: It is not claimed that all deaths are reported in this country, but the reported deaths in the United States from that one disease, consumption, in the single census year 1880, were 91,270: without doubt more than 100,000 such deaths occur in the United States in each year. If, as stated by Dr. Koch, "in guinea-pigs suffering from general tuberculosis even to a high degree, the morbid process can be brought completely to a standstill without the body being in any way injuriously affected," there is certainly ground for the hope that something approaching that can be done for the human being, and that, if sufficient intelligent effort be put into the research, the substance which will do this can be found, even if it has not already been found by Dr. Koch. Let us suppose that our own national government were to pay for such researches, and that annually the lives of one half, or even of one fourth, of the 100,000 of our people, who otherwise would have prematurely died, were to be saved: how would that compare with the work of the agricultural department of our government for the distribution of garden seeds? how would provision for such work by congress compare with its work for the protection of our infant industries? how would it compare with any work that has been done by congress during the past twenty years? I admit that in 1879 it established a National Board of Health; but the government failed to sustain the board long enough to permit of many such researches as those I suggest, although, as long as it was sustained, it did excellent work.

In comparing public health work with the work of the United States Agricultural Department, I do not forget that "That art on which a thousand millions of men are dependent for their sustenance, and two hundred millions of men expend their daily toil, must be the most important of all,—the parent and precursor of all other arts."[1]

But all must concede that agricultural art has now made such wonderful progress that there is no longer need for more, fully to sustain not only the necessities of man, but to supply many luxuries. Superfluous effort, therefore, might well be diverted from agriculture to supply those provisions for public health work for the want of which hundreds of

[1] James F. W. Johnston.

thousands of our people actually prematurely perish, and hundreds of thousands more drag out a miserable existence.

So many of our people are now raising farm products, that that is claimed to be a comparatively unprofitable occupation.

Apparently, then, this country needs fewer farmers, more sanitarians.

We welcome to our ranks, however, not only farmers, but all good people.

THEY HAVE DEPARTED, BUT THEIR WORKS CONTINUE.—Custom and humanity dictate that there shall be public recognition of the services of those who have publicly labored with us, and who have ceased their labors, but whose good work will go on down through the ages. Considering our numbers, and the average age of our members, it is to be expected that in every year death will overtake some of us. Before the time for our next meeting, some of us will have passed over to the "great majority." Since the last meeting, so far as I know, only three of our members have died,—Dr. Charles Linnæus Allen, secretary of the State Board of Health of Vermont, who was elected a member of this Association in 1888; Dr. J. H. Baxter, surgeon-general of the U. S. Army, a member of this Association since 1876; and Dr. William Brodie, president of the Board of Health of Detroit, Michigan, a member of this Association since 1873. Dr. Brodie had long been a prominent member of the medical profession. He had been president of the State Medical Society of Michigan, and president of the American Medical Association. It was largely through his work that this Association held its successful meeting in Detroit in 1883. Dr. Brodie was president of the first Sanitary Convention held under the auspices of the Michigan State Board of Health.

I trust that a committee, or the secretary of this Association, will make fitting records of the services of our deceased brothers, and of tributes to their memory.

DEATH OF SIR EDWIN CHADWICK. Since our last meeting, sanitary reform has lost an able advocate in the death of Sir Edwin Chadwick in England. In recording his death, the *British Medical Journal* said,—

> Few men have deserved better of their country than the veteran sanitarian whose death, at the advanced age of 91, we have to record. His investigations of the sanitary condition of London, dating back to 1847, were the official starting-point of a reorganization of the Health Department, and laid the public legislative basis of the first of a series of sanitary reforms which have been of inestimable value during the last half century in the saving of life and the diminution of sickness and disablement. His subsequent services to the cause of army health reform, and his continuous devotion to great and small questions of public and personal sanitation, placed him quite in the first rank of non-medical sanitary reformers. . . . It has been aptly observed, that had he, as a military man, succeeded in destroying one hundredth part of the lives which he was prominent in assisting to save, his statue would have been erected long since in more than one of the great cities of the empire, and he would have been loaded with honors and titles. As it is, it was not until he attained the age of 90 that he received the honor of knighthood.[1]

[1] British Med. Jour., No. 1541, July 12, 1890, p. 96.

PRACTICAL APPLICATION OF SANITARY SCIENCE.—I have already touched that subject which was declared the second object of this Association, but mainly to show that the most rapid advancement of sanitary science is made, and is to be expected, where governmental aid is most complete and abundant,—in other words, where the people as a whole contribute according to their means. Having left the subject of advancement of science, I will briefly consider such "organizations and measures for the practical application of public hygiene."

STATE BOARDS OF HEALTH.—There is reason for a high degree of pride in the wonderful development in this country of the state boards of health. Although none of them have anything approaching the resources which are placed at the disposal of the Imperial Board of Health of Germany, or of the Government Board of England, and, it must be confessed, that the debt which humanity owes to Dr. Robert Koch, of the German Board, is perhaps greater than to any man in this country, in any field of human effort, still I think it can fairly be claimed that some of the state boards in the United States rival the boards of health in the general governments of the most enlightened countries in the world—rival them in the amount of useful services which they are continually performing for their own people and for the general sanitary enlightenment of the world; especially do they rival them in the immediate practical results of their work.

For instance: Statistics, which appear to be trustworthy, seem to prove that in one state, and apparently through measures inaugurated and maintained by the state board of health, the deaths from small-pox have been so reduced that more than one thousand five hundred persons have continued to live who would have died from that disease if its mortality rate had continued as it was before the establishment of the state board of health. A thousand five hundred lives saved from small-pox means a saving also of at least six thousand cases of sickness from that loathsome disease.[1]

In that same state, also, the vital statistics seem to prove that through similar, though not identical, work, there has already been a saving of life from scarlet-fever equal at least to five thousand persons, and (if the death-rate was ten per cent.) a probable saving of fifty thousand cases of sickness from that disease.[2]

Nor is this all. Statistics indicate that at least *one life a day is being saved* in that state by measures started and maintained by its state board of health for the restriction of diphtheria.[3] As the death-rate is about twenty-four per cent., at least fifteen hundred cases of sickness from diphtheria are prevented annually.

At least one other state (Massachusetts) has undertaken statistical effort to learn the effect of such work, and similar saving has been made apparent.

[1] Proceedings of Sanitary Convention at Vicksburgh, Michigan, 1889, p. 56.
[2] Proceedings of Sanitary Convention at Vicksburgh, Michigan, 1889, p. 58.
[3] Proceedings of Sanitary Convention at Vicksburgh, Michigan, 1889, p. 62.

It seems desirable that other states, in which similar work has been done, should collect and publish evidence of the results of their work.

THE VALUE AND IMPORTANCE OF STATISTICS.—On many questions of public policy, no useful conclusion can be reached without a thorough knowledge of the facts involved. And frequently it is important to have accurate knowledge respecting several classes of facts. For instance: In order to know what disease it is most important that we shall strive to prevent, it is necessary to know what disease causes the most deaths, or the most suffering among the people. Mortality statistics supply this knowledge. Again: In order to know whether a disease which is an important cause of death is itself caused by climatic or meteorological conditions, it is necessary to have, and to compare with the statistics of deaths and of sickness, other statistics relating to the various meteorological conditions.

For several years we had at Washington a United States Commissioner of Labor, and he collected valuable statistics on the various branches of the subject of human labor. We ought to have at Washington an officer charged with the duty of collecting statistics relating to those subjects which bear directly upon human life and health.

There is now a "Department of Labor" in the United States Government. Should there not be a Department of Life and Health?

STATESMANSHIP.—This is an age of organizations among the people, for the general benefit of all. People generally are coming to have that degree of intelligence, education, and culture which fits them for self-government. The daily papers, the magazines, the excellent postal facilities, the telegraph, and the telephone have served greatly to equalize the intelligence of the people generally. They have served greatly to do away with famines, with continual warfare, and, I believe, with great wars; and certainly they have done much to make the old-time plagues and pestilences horrors of the past.

Yet, although the general governments of countries are making progress toward conforming to the actual conditions among the people, old customs and precedents have a powerful influence in restraining progress; and I think this is more noticeable to members of this Public Health Association than to any other class of people, for the reason that sanitary science is a comparatively new science, and has not for so long a time been available for spreading its knowledge among the people. But already the leading minds in several of the most civilized countries have recognized the fact that the greatest good to the greatest number of citizens consists, first of all, in securing to them life and health. Thus, for instance, Disraeli said that action in this direction "is the wisest statesmanship." Gladstone has expressed himself similarly. And, through the lead of such statesmen, England has its useful general board of health—the "Local Government Board," with its corps of medical officers. Some of the important work of the German Imperial Board of Health is well known.

In our own country, the framers of the Declaration of Independence

declared that "life, liberty, and the pursuit of happiness" are "among the unalienable rights," to secure which "governments are instituted among men."

In times past, the minds of men and of governments have been kept so occupied with protecting the lives of their citizens from the dangers caused by the battling of other men, hostile tribes, and foreign governments, that little time or energy has been left to devote to the protection of life and health from ordinary preventable causes of death and sickness. Now that men and nations are coming to be less destructive of each other, it is rapidly coming to be seen that by organized effort and general coöperation a great proportion of the premature deaths, and of the sickness from the most common diseases, and the resulting pauperism, insanity, and crime, can easily be prevented, and this without any radically new principle of government, but by an extension of the principle of protection of life and property into new systems of effort. The constitution gives congress the power to "provide for the common defence and general welfare of the United States."

It is the same now as when the book of Hosea was written—our "people are destroyed for lack of knowledge;"[1] and a government has only to collect, search out, and disseminate among its people "knowledge" of the causation of disease, its modes of spread, and how to avoid causes of deaths and the spreading of epidemic diseases, to make it possible for its people to have safety to "life" and that "pursuit of happiness" which are only possible to persons in health. This implies, however, that the government must constantly maintain statistical investigations and scientific researches into the causation of diseases, and such a complete and thorough system of prompt notification of the outbreak of every dangerous communicable disease within its own country—and also in all parts of the world where it may readily spread to its own country—that the government shall be able to, and shall, in fact, promptly warn all its people endangered, and not only warn them, but shall at the same time place before them the best that is known or can be learned concerning the exact methods for avoiding the dangers to life and health from that particular disease which at the time is threatening.

Only by some such modification of governmental methods is it possible to do for a people that service which it is the highest function of a government to perform.

We hear much about the wisest statesmanship as applied to such questions as relate to our commercial dealings with other nations—questions whether it is wiser to have "free trade," or "protection" of home industries; yet these are questions of small consequence to the people of any country when compared with questions which involve the protection of the lives and the health of the people themselves, because the people can get sufficient food and other necessaries for subsistence under "free trade" or under "protection;" but under neglect of proper governmental protection of life and health a large proportion of the people

[1] Hosea, chapter iv, verse 6.

prematurely die, and still larger proportions suffer sickness, life-long pain, and physical and mental degradations, from causes which under proper governmental protection are easily preventable. That this is true, there is no longer question; incontrovertible facts are on record proving that it is strictly true. As soon as this knowledge comes to a majority of the people, they will surely demand that the government shall no longer neglect its highest functions; and we may confidently look forward to a "good time coming," when the *safety of life to our people* shall be the first and most important concern of the enlightened government of these United States; when the most important officer in this country, whether he be called commissioner of health, secretary of the health department, or president of the United States, shall, at all events, be its wisest sanitarian, or, at least, its most competent public health administrator. And you, the members of this Association, are and should be laying the foundations, and fitting yourselves for the performance of such highest and most sacred duties; for, in these days of rapid advances in the spreading and equalizing of knowledge, we know not how soon the clamor of our people for the protection of their lives may force upon our own national government the proper performance of its highest duties, which it has so long neglected.