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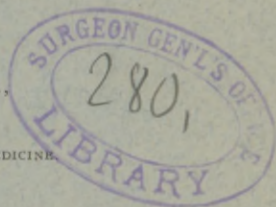
ADDRESS IN
STATE MEDICINE.

*Delivered at the Thirty-Seventh Annual Session of
the American Medical Association, in
St. Louis, on May 6, 1886.*

BY

JOHN H. RAUCH, M.D.,
OF ILLINOIS.

CHAIRMAN OF THE SECTION OF STATE MEDICINE.



*Reprinted from the Journal of the American Medical
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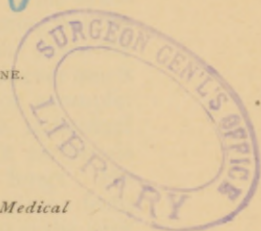
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ADDRESS IN STATE MEDICINE.

Article II, Section 4 of the By-Laws of the Association prescribes that the "chairmen of the several Sections shall prepare and read, in the general sessions of the Association, papers on the advances and discoveries of the past year in the branches of science included in their several sections."

In attempting to discharge this duty it will be well, first, to define State Medicine and the branches of science which it includes. I have been unable to find a definition sufficiently comprehensive to cover what is conceived to be properly embraced within the scope of State Medicine. Dunglison defines it to be "the medical knowledge brought to bear on State objects, as on public hygiene and matters pertaining to medical jurisprudence." In the introduction to his Manual of Practical Hygiene, Parkes, in pointing out the limitations of his subject, says: "In some cases the rules of hygiene could not be followed, however much the individual might desire to do so. For example, pure air is a necessity for health; but an individual may have little control over the air which surrounds him, and which he must draw into his lungs. He may be powerless to prevent other persons from contaminating his air and thereby striking at the very foundation of his health and happiness. Here, as in so many other cases which demand regulation of the conduct of individuals towards each other, the State steps in for the protection of its citizens, and enacts rules which shall be binding upon all. Hence arises what is now termed 'State Medicine'—a matter of the greatest importance."

But in illustrating this "matter of the greatest importance," Dr. Parkes clearly confines State Medicine to the relation of the State to purely sanitary matters—the protection of the individual against being placed under unfavorable hygienic conditions by the action of others, as of workmen by an ignorant or careless employer, of tenants by landlords, of food consumers by adulteration, etc., etc.

De Chaumont greatly widened this definition in the preliminary lecture of his course on State Medicine, delivered in 1875. "State Medicine," he says, "has been written about, talked about, and quarrelled about, but it has rarely been explicitly defined, and to many it conveys no very distinct idea. It has been confounded with public health, and generally much misunderstood, the part being frequently taken for the whole, and the wider scope of its action but little apprehended. It includes the questions of public health and hygiene, general, special and individual, but its own appropriate province is such general control as will determine the several specialties in the directions most fitted for the well-being of the community. In fact, we may succinctly define State medicine to be, in quasi-legal phraseology, 'the office of the sanitarian promoted by the State,'" and he predicts both its perfection and its extinction when the sanitarian as differentiated from the community generally, and the State as a controlling and interfering influence, shall have ceased to be—the one because every member of a perfected community will be a sanitarian, and the other because in such an ideal community State interference will have become unnecessary.

There is still the limitation of the term "medicine" to the sanitarian in this definition, a distinction between preventive medicine—the field of the sanitarian, and curative medicine—the field of the physician. But I think it is coming to be recognized that such a distinction is artificial and unnecessary, and I agree with

Richardson, who, in speaking of the preventive scheme of medicine, says of the so-called science and art of preventive medicine: "It is not a science, it is not an art, separated necessarily or properly from curative medicine. On the contrary, the study of prevention and cure proceed well together, and he is the most perfect sanitarian, and he is the most accomplished and useful physician, who knows most both of the prevention of disease and of the nature and treatment of disease; he who knows, in fact, the before and the after of each striking phenomenon of disease that is presented for his observation."

In this evolution of a definition one or two more quotations may be admissible. Addressing the Association at the Atlanta meeting in 1879, on "The Regulation of Medical Practice by State Boards of Health as Exemplified by the Execution of the Law in Illinois," Dr. H. A. Johnson suggested, in his conclusion, "that it is the duty of the State to protect its citizens from the injuries they may sustain from the practice of incompetent physicians and surgeons, as well as from any other source of danger to public health." And in the summary prefacing the Sixth Annual (1883) Report of the Illinois State Board of Health, it is observed that "Boards of health are created and maintained for the conservation of the interests of health and life. Ordinarily their functions are limited to dealing with sanitary questions; with the removal of the causes of preventable disease and premature death. This Board, however, is also charged with the execution of the act to regulate the practice of medicine in the State; and thus the medical profession, one of the most important agencies which is concerned with the interests of health and life, is brought within the scope of sanitary legislation. To improve the status of the individual practitioner, and to develop a well-trained and thoroughly educated medical profession, must result in increasing the value of this force in sanitary science and public

hygiene; a force which, in the nature of things, must always exist so long as there are physicians and patients; and the character and influence of which must always hold a direct relation to the tone, the attainments, and the competency of those by whom it is exerted."

The application of the term State Medicine is thus seen to have been successively extended from the agency of the State in matters of hygiene beyond the control of the individual, first to measures of preventive medicine in general, and thence to curative medicine in so far as it is the duty of the State to regulate medical practice. State Medicine may therefore be now defined as the connection of the State with "*that branch of science which relates to the PREVENTION, CURE or ALLEVIATION of the diseases of the human body.*"¹ It embraces not only all public sanitary measures, but also the practice of medicine in so far as this is regulated by the State. Therefore, any report upon "the advances and discoveries of the past year" in the branches included in this Section may logically begin with the subject of the regulation of medical practice, which also and necessarily includes the subject of medical education.

STATE REGULATION OF MEDICAL PRACTICE AND MEDICAL EDUCATION.

Before proceeding to discuss the present status and recent progress in these matters, it may be well to set forth, briefly, the authority by which the State assumes to regulate the practice of medicine. That authority is the inherent and plenary power which resides in the State to prohibit all things hurtful, and to promote all things helpful, to the comfort, welfare and safety of society. Speaking specifically of the Illinois Medical Practice Act, ex-Governor John M. Hamilton has recently said: "The object of the

¹The quotation is the definition of *medicine* according to Webster.

Medical Practice Act was primarily a police regulation. Incidentally it was educational. Primarily the purpose of the law was to rid the State of incompetent, ignorant and dangerous mountebanks and quacks, who were carrying on a fraudulent and nefarious business by all manner of deceit in a pretended practice of medicine among the people. It was to protect the lives, the health, the morals and the property of the people of the State from the shameless depredations of swindlers and adventurers who, by all manner of false representations and deceptive promises, were taking advantage of the misfortunes of the people in sickness and ailments of all kinds, to still further injure their health, endanger their lives and rob them of their money.

"Incidentally the law was designed to require a reasonable amount of education to fit one for the practice of medicine before he should be allowed to enter that profession, so directly and intimately connected with the lives, the health and the happiness of the people. Both these purposes come clearly within the police powers of the State in affording such protection to its citizens."

An unbroken line of authorities, from Blackstone down to the most recent decisions of the various Supreme Courts, hold that the police powers of the State are plenary and inalienable, co-extensive with the natural right of self-protection; that their exercise is demanded and justified by the "law of over-ruling necessity;" and that broadly, they are the foundation of all laws and regulations for the well-being or government of the people, and especially, of all laws, ordinances, rules and regulations for the preservation of the health or safety of the community. Early in the history of the country laws, thus founded, were enacted for the regulation of the practice of medicine. But the sparse population and the conditions which then obtained, as well as the fact that many of the enactments were so onerous and restrictive that they

came to be regarded by the public as in the nature of class legislation, operating to make the profession a close guild or trades union, rendered their enforcement impracticable. They were gradually repealed or fell into a state of "innocuous desuetude," until about 1830-1840 there were practically no restrictions, the profession became a "free-for-all;" bogus diplomas were openly and unblushingly sold and displayed by their purchasers, as credentials of membership in a learned profession. The country was overrun by hosts of ignorant, immoral and dangerous swindlers, self-styled "doctors," who preyed upon the unfortunate afflicted; "isms" and so-called "schools" of medical practice multiplied, a mushroom crop of diploma-mills sprang up over the land; and as a natural result, the general standard of medical education and of requirements for graduation—except among the best class of medical colleges—fell lower and lower.

A reaction from this condition began at about the close of the first century of our National existence, at which time, 1876, North Carolina had a well-framed law, creating a State Board of Medical Examiners, passed in 1859. Kentucky had enacted a law in 1874, creating district examining Boards, but except in a few counties, this soon became a dead letter. In 1875 Nevada, and in 1876 California and Texas legislated upon the subject. In 1877 Alabama established a State Board of Medical Examiners, and Illinois passed a Medical Practice Act, the execution of which was devolved upon a State Board of Health created by a separate enactment. Within the next two years only two other States took action—Kansas in 1879 (repealed in 1881) and New York in 1880. In 1881 nine States and one Territory enacted medical practice laws, viz.: Arizona, Arkansas, Colorado, Connecticut, Florida, Georgia, Nebraska, New Jersey, Pennsylvania and Wisconsin. In 1882, Louisiana, Mississippi, New Hampshire, New Mexico, South Carolina, West Virginia and Wyoming; in 1883, Del-

aware, Michigan, Minnesota and Missouri; in 1884, Dakota and Virginia, and, since the last meeting of the Association, Indiana and Iowa have swelled the total to thirty-three States and Territories of the Union, which now exercise some degree of legislative control over the practice of medicine within their borders.

The general drift and tendency of this legislation are toward securing a recognized standard of professional attainments, evidence of which—with a few notable exceptions—is afforded by the presentation of a diploma of graduation from some legally-chartered institution in good standing; or, in the absence of this, an examination more or less strict, in the various fundamental branches of medical science. The exceptions are in the States of Alabama, Mississippi, North Carolina and Virginia, where the diploma is ignored, and the applicant for admission to practice must establish his possession of the necessary skill and ability so far as an examination may determine the same.

As an evidence of fitness and qualification the diploma must obviously vary in character with the character of the institution by which it is issued. Medical instruction in this country is almost entirely a matter of private enterprise, and until within a few years, numerous "colleges" with the briefest of lecture-terms, conducted by the scantiest of faculties—in which one man often played many parts—innocent of clinical, surgical or anatomical material, and with the most charitable of examinations have graduated into the profession all who could pay the necessary fees and armed them with the talismanic diploma.

Since 1765 a total of 224 medical educational institutions have been founded—not established—in this country, of which number 105 are now fortunately extinct. There are still remaining 120 medical schools of all kinds in the United States, and among them, it is only fair to say are some in which the course of

instruction, the facilities and the competency of the teachers are as high as anywhere in the world. Within the last twenty years there has been, in fact, a marked and gratifying improvement in the standard of medical education. I quote a few illustrations of recent improvement from my last report on "Medical Education in the United States and Canada:" There are now 93 out of the existing 120 colleges in the United States, which exact an educational requirement as a condition of matriculation; in the first report there were only 45. Attendance on three or more lecture-courses before graduation is now required by 24 colleges, as against 12 heretofore; and provision is made for a three or four years graded course by 58 others. Hygiene is now taught in 91 colleges, and medical jurisprudence in 97; as against 42 and 61, respectively, heretofore. The average duration of lecture-terms has increased from 23.5 weeks to a fraction over twenty-five weeks; 7 more colleges have lecture-terms of five months or over, and 10 more have terms of six months or over as compared with the sessions of 1882-1883.

While much of this progress is due to a general and increasing desire on the part of the profession to raise the standard of attainments necessary to enter its ranks, and to the enforcement of certain requirements in States which have enacted laws regulating the practice of medicine, it will not be invidious to attribute a fair share to the adoption in 1880, by the Illinois Board of a schedule of minimum requirements, enforced since 1883, and which prescribes that a medical college, in order to be held in good standing for the admission of its graduates to practice in Illinois, shall exact such a general preliminary education of the intending student before his admission to the lecture-room, as will enable them to comprehend the instruction therein given; and shall issue its diploma conferring the degree of M.D., only upon the completion of such curriculum of study—as to the

branches of medical science taught, the duration of the reading, and of lecture-terms, and the amount of practical instruction in hospital and at the bedside—as obtains in the average medical school.

Minnesota, Missouri and West Virginia exact substantially the same standard, and the work of the Minnesota Board especially has been wide-reaching and beneficial in this respect. The Iowa law, just enacted, confers similar powers, and the influence upon medical education of this group of States—Minnesota, Missouri, Iowa and Illinois—in establishing a uniform test of the “good standing” of a medical college, must be felt throughout the country. Fully one-third of the new graduates every year settle in the West, and colleges must, perforce, take cognizance of this fact.

While the schedule of minimum requirements does not set up so high a standard as that aimed at by the American Medical College Association, it has the advantage of applying to all schools of medicine and of having been successfully enforced for three years. Furthermore, it is susceptible of modification, and the question is already being considered whether the time is ripe for a further advance. Until within a short time there had been, for sixty years, no marked departure from the orthodox three years of study and two courses of lectures as the requirements for graduation. But, as already shown, there are now twenty-four colleges which practically require four years of study and attendance upon three terms of lectures; and fifty-eight others which make provision for a similar extended course. The domain of medicine has so far widened its borders, especially within the present generation, that the methods and periods of study which sufficed thirty or forty years ago are no longer adequate.

A low standard of medical education, and the absence of uniform legal requirements are also responsible, almost exclusively, for the overcrowding of the

profession. Did time suffice it would be interesting to present this matter in detail, but I can now only glance at some of the results of my study of this phase. In 1880 there were, according to the National census, 83,436 physicians in the United States. Since that date there have been added—exclusive of the foreign increment—23,531 new graduates, not including those of the last session, 1885-1886. This makes a total of 106,947, and is an annual increase of over five and one-half per cent., while the annual increase of population is less than two per cent. The annual death-rate—basing that of the country at large upon the Illinois rate, which I have pretty accurately determined to be 12.38 per thousand—is less than that of adult males engaged in all occupations; and the difference will probably fairly balance the loss by those who retire from practice on account of old age, physical disability, and other causes not connected with the question of fitness and professional success.

It will, then, be within bounds to say that the excess of the per centage of new graduates over the per centage of increase of population represents the number of unnecessary recruits to the ranks of the profession every year.

The answer to the question, What becomes of them? is indicated by these figures concerning the profession in Illinois:

June 14, 1880.	
Total number in practice as shown by Official Register of that date.....	5,979
Total number of new certificates issued to new men up to February 10, 1886.....	2,063
Total number to be accounted for.....	8,042
February 10, 1886.	
Total number in practice as shown by Official Register of that date.....	6,065
Total number died.....	344
“ “ left the State.....	1,061
“ “ abandoned practice.....	572
	<u>8,042</u>

That is to say, over seven per cent. of the entire number failed as physicians and sought other modes of obtaining a livelihood. It is noteworthy, by the way, that non-graduates fall out in much larger proportion than the graduates, and that the graduates of three-course schools show the smallest per centage of loss, either by removal from the State or by abandonment of practice.

Here are some instructive figures for Chicago: In 1880 there were certificates issued to 172 new comers; five years later only 84 of these remained—a loss of over one-half. In 1881 there were 183, in 1882, 171, 1883, 209, and in 1884, 198 new comers; and in 1885 there remained of each year's group, 97, 116, 145, and 168, respectively. In one year the loss was 15 per cent.; in two years, 30 per cent.; in three years, 32 per cent.; in four years, 47 per cent.; and in five years over 51 per cent.

There are from 1500 to 2000 physicians in the State of Illinois more than are necessary to supply the legitimate demands for professional services, and who are not earning a comfortable livelihood from legitimate professional exertion. And what is true of Illinois is probably substantially true of every State in the Union. I will not stop to dwell upon the demoralizing effect of this condition—demoralizing to the individual, to the profession, and to the public. Instances of this demoralization must be familiar to every member of the Association.

On the other hand, and by way of contrast, I wish to add one further illustration from my personal experience. During the past nine years my official position has made me familiar with the professional history and status of over 13,000 men, more or less directly connected with the practice of medicine in Illinois. I have followed up, with especial interest and care, the careers of 789 out of 1000 physicians who studied four years and attended three terms before graduating. These are, with few exceptions, the

successful and prominent members of the profession in the different communities in which they reside. They are well-equipped by general education, by an ample period of professional study, by didactic and clinical instruction, and by hospital practice. They are successful, as a rule, because they have fitted themselves to command success, and this Association can do few things more directly in the interest of the public and of the profession than to exert its further influence to increase their number while decreasing the number of the opposite class.

The foregoing considerations seem to me to lead logically to the following conclusions:

1. That the best interests of the public welfare demand the highest attainable standard of educational qualifications, skill and ability, as well as of professional and personal honor, integrity and morality, among those engaged in the practice of medicine.

2. That it is the duty of the State to exercise the inherent plenary power and authority which it possesses for the protection and promotion of the public welfare, to secure such standard.

3. That uniform State laws, exacting of every one aspiring to practice medicine proof of personal fitness and professional competency, would prove the most potent agency in improving the standard of medical education and in enhancing the dignity and usefulness of the medical profession.

Specifically, I wish to suggest:

That the American Medical Association should put itself upon record at this session as recommending the extension of the period of study to four years and of attendance upon lectures to three full terms, with ample hospital practice and clinical instruction, as the requirements for graduation in medicine;

That the Section on State Medicine be instructed to frame a law for the regulation of the practice of medicine, which law, when endorsed by the Association, shall be the standard with which all existing

legislation on this subject should be made to conform as speedily as practicable, and which shall be urged for adoption by those States where no such law now exists.

Whether such a law should establish a single State Examining Board, which, independent of any influence from the teaching interest through a diploma or otherwise, should admit to practice only upon actual examination; or whether the diploma of a college in good standing should be accepted as proof of necessary qualifications; are questions for earnest consideration. If the policy of those States which are enforcing a standard of requirements whereby to test the good standing of a college, be continued in good faith and with as much effect during the next twenty years as during the past three, there would be little to choose between the two modes. But before an independent Examining Board, intent only upon ascertaining the applicant's moral and professional fitness, the graduates of all colleges would stand alike upon their individual merits. The effect would be to encourage the tendency to make the science of medicine as exact as it is complex, and to obliterate much of the element of empiricism which still justifies the use of the term "art" in its designation.

By either mode the State may promote the public welfare, and through a wise regulation of the practice of medicine elevate the standard of medical education, which is the foundation of the practice. And it seems to me especially fitting that the American Medical Association should again make its influence felt in this direction. Its earliest labors, and among its most important and successful, were devoted to securing a "uniform and elevated standard of requirements for the degree of Doctor of Medicine." Its further efforts at this time should be attended with even greater success.

ADVANCES AND DISCOVERIES IN PREVENTIVE
MEDICINE.

While there has been this marked and gratifying improvement in the branches thus far considered—now clearly recognized as belonging to the domain of State Medicine—the past year has witnessed equally satisfactory practical advances in the more familiar province of Preventive Medicine. The number of sanitary organizations, both legal and voluntary, has increased; the contributions to sanitary literature have been numerous and valuable; and professional and public interest and effort have been enlisted as never before in attempts to remove or abate the preventable causes of disease, and to discover and perfect safeguards against the great pestilences. To a great extent this has been stimulated by the prevalence of Asiatic cholera in some parts of Southern and Western Europe, and the consequent dread of its extension to our shores. Fortunately, the apprehensions entertained at the date of the last meeting of the Association have not been realized, and the country has been practically free from any general or noteworthy epidemic, notwithstanding the prevalence of smallpox in some parts of Canada.

State and Municipal Boards of Health have generally done effective work in their respective spheres. In some States a general sanitary survey has been undertaken, and in many cities, towns and villages house-to-house inspections have been pushed, and the nuisances and defects thus disclosed, both of a public and private nature, have been largely remedied. As was frequently remarked during the past summer and fall, an amount of general and local "cleaning up"—which is the essence of sanitation—was accomplished, which could not fail to have an appreciative effect upon the public health. Unfortunately, the subject of the registration of vital statistics is in such an imperfect and unsatisfactory con-

dition in this country that it is not possible to give any comparative figures by which to measure this gain for the whole country; but the mortality returns of the large cities generally show a reduction in the death-rate of 1885 as compared with the average death-rate for several years previous.

Four more State Boards of Health were established in 1885-86, the list now comprising the following thirty-one organizations, the dates of the establishment of which are prefixed: In 1869, Massachusetts;¹ in 1870, California; in 1872, ~~Michigan~~, Minnesota; in 1873, Alabama, ~~Wisconsin~~; in 1874, Maryland; in 1876, Colorado, Louisiana, New Jersey; in 1877, Illinois, Mississippi, Rhode Island, Tennessee; in 1878, Connecticut, Kentucky, North Carolina; in 1879, Delaware, Iowa; South Carolina; in 1880, New York, West Virginia; in 1881, Arkansas, Indiana, New Hampshire; in 1883, Missouri; in 1885, Dakota, Kansas, Maine, Pennsylvania; and in 1886, Ohio.

These Boards, it is proper to remark, owe their existence largely to the influence of the American Medical Association, which has for years actively promoted their organization.

While States and municipalities are thus generally exerting themselves for an efficient protection of the public health, our National health service remains in a very unsatisfactory condition. Notwithstanding the efforts of the profession generally and of many health organizations to secure action by Congress for the remedy of this condition of affairs, nothing definite has yet been done. Three different bills have been introduced during the present session, but there is little hope of either of them receiving favorable consideration.

One thing remains clear: Whether by the rehabilitation of the National Board or by the creation of

¹ This Board is now separated from the Board of Lunacy and Charity, with which it had been associated since 1872.

a new organization, it is the imperative duty of Congress to complete the health defenses of the country. Municipalities have their legitimate sphere within which they alone can act and are responsible, and next beyond which the authority and resources of the State are demanded. But neither municipalities nor States can protect themselves against foreign pestilences without the assistance of the National authority, nor can they properly guard themselves against inter-State infection or contagion without the cooperation of the same authority. I have already dealt with this subject fully in an address before the National Conference of State Boards of Health in 1884, on the "Prevention of the Introduction of Asiatic Cholera," in a report made in the early part of the present year on our "Coast Defences against Asiatic Cholera," and elsewhere.

Among the voluntary organizations the work of the American Public Health Association during the year has been of more than usual practical value. The Lomb Prize Essays, and especially the "Report on Disinfectants and Disinfection," are substantial additions to sanitary knowledge. The Sanitary Council of the Mississippi Valley has not been called upon for action, but its organization is preserved ready for an emergency. Nothing definite was accomplished at the last National Conference of State Boards of Health, which was held during the Washington meeting of the Association.

Abroad, a second series of sessions of the German Cholera Conference was held in Berlin, May 5-7, 1885, at which the subjects of the etiology and prevention of cholera were discussed by Koch, Pettenkofer, Virchow, Hirsch, and others, but without eliciting much which was new, or settling any of the mooted questions. Prof. Koch summarized the chief measures to be taken against the disease, and which, so far as they go, do not differ from those adopted by good sanitary authority in this country. They dealt,

however, exclusively with the local safeguards of sanitation, disinfection, isolation, supervision, etc., and ignored measures of exclusion of the disease by notification, maritime sanitation, supervision of ports of embarkation, and quarantines of inspection, observation and sanitary work at ports of arrival.

Following the adjournment of the Berlin Conference, an International Sanitary Conference was held at Rome under the auspices of the Italian Government. Although its paramount object was the discussion of questions relating to the prevention of cholera, the subject of yellow fever was also considered in the same relation, through the efforts of the American delegate, Dr. George M. Sternberg. The delegates were of two classes, diplomatic and technical or professional, and at an early stage a Technical Commission was formed, which finally agreed upon substantially the same measures that advanced sanitarians in this country consider necessary for the limitation and suppression of cholera, yellow fever, and other communicable diseases which, under bad sanitary conditions of vessels and places, may become epidemic. The exceptions to such agreement were the English delegates, composed of gentlemen whose experience with cholera had been mainly limited to India, and who, in consequence, deny the communicability of the disease through human intercourse, deny the infectiousness of cholera dejecta, and pronounce disinfection a farce and unscientific.

The Conference adjourned to meet again in the fall, but this intention was not carried out. As I have heretofore observed, the practical benefit to be derived from these conferences—in the absence of authority to make an international sanitary convention, binding upon all interested—is the interchange of views, the dissemination of knowledge, and the formulation of such views and knowledge. So far as this country is concerned, they have not changed the status in any respect. We must continue to rely,

for the exclusion of cholera and other Old-World pestilences, upon such precautionary measures as can be secured at ports of arrival.

The International Congress of Hygiene, which has been held successively at Brussels, Paris, Turin, Geneva, and the Hague every alternate year for the past ten years, and which should have been held this year at Vienna, has been postponed until 1887, for some reason not yet announced.

With the object of determining to what extent such precautionary measures may be secured, especially against Asiatic cholera, I have made an inspection of the quarantine maintained upon the Atlantic and Gulf coasts from the St. Lawrence to the Rio Grande. The results of this inspection have been published by the Illinois State Board of Health, and as the report is accessible to the members I will confine myself on this occasion to the following conclusions: I am more than ever convinced, since completing this inspection, that Asiatic cholera, as well as small-pox and yellow fever, may be effectually excluded from the United States by an intelligent use of the agencies still at our command. This is not a matter of speculation or theory. A great advance has been made in practical sanitary science since 1878—notably in the administration of the maritime quarantines generally, and especially in the improved safeguards at the mouths of the St. Lawrence and the Mississippi. A quarantine of exclusion of the three principal epidemic diseases is now a matter of certainty, depending upon prompt notification of threatened danger; vigilant supervision over commercial intercourse with infected localities; inspection of all immigrants and the enforcement of their vaccinal protection; sanitation and purification of infected vessels and cargoes; isolation of those sick with these diseases; the surveillance of suspects during the periods of incubation; and the employment of other well-defined preventive and precautionary measures

which now constitute the best modern sanitary practice as applied to maritime quarantine.

It must be repeated, however, that the coöperation of the National Government with State and local authorities, as well as its independent action in matters beyond the reach of States and municipalities, are indispensable to the proper protection of the public health. The duty of Congress in this connection is even more pressing than the responsibility of providing defense against an armed enemy. This latter is a more or less remote contingency, but the assaults of foreign pestilence are constant and continuous.

Thus far we have been providentially spared an invasion of the Asiatic plague which is now filling Great Britain and Europe with anxiety, and the real extent and prevalence of which we do not know. The State Department has, within a few days, been requested to appoint sanitary inspectors at the United States consulates at Genoa, Naples, Marseilles and Venice, with instructions—in the language of the dispatch—“to give prompt information of the appearance of cholera in any of the consular districts named, and to report the departure of emigrants and merchandise for the United States from infected districts.” But it is already known that the disease exists, and has for months, in several provinces of Italy, including Venetia—cases having been reported in Venice even in January last; it is known that the entire Mediterranean littoral is practically an “infected district,” and that the northward march of the pestilence is causing alarm in Austria, Germany, Northern Europe generally, and in Great Britain. The appointment of sanitary inspectors at one French and three Italian ports hardly seems adequate to the occasion. At no time since cholera was announced at Toulon in 1883 has this continent been in as serious danger of an invasion of the disease as it is now. And not alone does cholera threaten, but small pox

is epidemic in many districts with which we are in direct and frequent communication.¹

I cannot close the consideration of this branch of my subject without a brief reference to the obvious necessity of National control of immigration. Sanitary science and public hygiene touch both the individual and the National life at many points. It is a question which is daily and hourly becoming more urgent—as the columns of every issue of every newspaper show—how much longer it will be safe or prudent to continue the unrestricted influx of the vicious, the insane, the pauper and the infected immigrant into our midst. I will not attempt to discuss so momentous a question at the present time and amid the multiplicity of other topics. I have already on more than one occasion expressed my views concerning it. Neither the sanitarian nor the statesman can afford to longer ignore its consideration.

The By-Law calls for a report on the “advances and discoveries of the past year in the branches of science included” in the Section. While the workers have been active and their labors faithful in many directions, it is to be feared that the discoveries in preventive medicine are too intangible or too incomplete to warrant much of positive statement. There are new theories and claimed discoveries concerning malaria cholera, yellow fever, hydrophobia, tuberculosis and other diseases. But whether Klebs and Crudeli or Marchiafava or Celli have found the malaria-germ; whether Koch and his followers or Klein and his *confrères* are correct as to the causative connection of the comma bacillus with Asiatic cholera; whether Domingo Freire and Carmona are to share the obloquy of Ferran or the honors of Pasteur;

¹ It is worthy of passing note that cholera has invaded a new continent within the past few months. Its introduction into Australia, where it had been hitherto unknown, furnishes a fresh proof, if any were necessary, of the transportability of the contagion, of the necessity of supervision over maritime travel and commerce, and of the importance of being prepared to meet and properly deal with an infected vessel upon its arrival.

whether bacteria themselves, or only their products, or whether neither one nor the other, but ptomaines and leucomaines produced by normal vital action, are the morbid agents of disease against which the sanitarian must direct his energies—these and similar questions are yet *sub judice*.

The etiology of such common diseases as diarrhoea and diphtheria are still equally obscure, although some light seems to be thrown upon the origin of certain outbreaks of the latter disease by the observations of Dr. Cresswell, who, in a paper recently read before the London Epidemiological Society, thinks he has traced six outbreaks of diphtheria, for which there was no other obvious explanation, to persons suffering from chronic tonsillar inflammation following attacks of diphtheria, and concerning whom he asks: "Do the violent reactions of the tonsils of these persons to weather changes involve likelihood of rendering them diphtheritically infectious?" In other words, May diphtheria become chronic and liable to periods of infective recrudescence? The question acquires additional importance for the medical officer of health from the fact that the disease is unmistakably increasing in frequency and in its influence upon the death-rate.

On the other hand, bacteriology may fairly claim to have advanced the science of water analysis, which no longer depends upon chemical and microscopic examination, but for the purposes of the sanitarian must be submitted to the further test of biologic experiment. It has also certainly been of service in raising the art of disinfection to the level of an exact science, and the labors of Sternberg, Smart, Salmon and others in the bacteriological field in the United States, are not unworthy of comparison with the work in Europe.

A reaction, however, seems to be setting in against the sweeping claims of the bacteriologists, and the assertion, for example, that the typhoid bacillus, after

twenty years of experiment, has at last been demonstrated to be the true typhoid germ, will not stand the criticism of Prof. von Pettenkofer, who, in a recent address on the relationship between bacteriology and epidemiology, points out that the entire environment of a micro-organism and all the conditions which influence its growth, development and results, must be taken into the account, and that the mere fact of setting up a certain train of symptoms in a lower animal analogous to those observed in the human subject is by no means conclusive proof that the specific fungus transmitted from the one to the other is the sole cause of the disease in the higher organism. In this address, which, like all of his contributions to scientific hygiene, is replete with food for thought, Pettenkofer asks what the study of bacteriology has done in advancing practical sanitary measures, and pertinently cites Lister's antiseptic system and Pasteur's rabic inoculation as instances of practical results accomplished without demonstrating the existence of a special form of bacteria or the actual morbid agent. He might still more strikingly have referred to Jenner's immortal discovery.

Concerning this subject of vaccination I beg to call the attention of the members to the additional proof cited in recent reports of the Illinois Board, of the superiority of humanized virus, not too far removed over bovine, in cases demanding promptness and certainty of action. I think this practical point cannot be too strongly insisted upon, and it may be well to repeat, as a fitting conclusion of this address, my remarks on this subject in the paper on "The Relations of Small-Pox and Vaccination" in the Fifth Annual Report of the Board (p. 502). Treating of the promptness of action in the face of exposure it is there shown that humanized virus may be depended on much more certainly than bovine to act promptly. Usually on the second or third, very seldom so late as the fourth day after the insertion of

good humanized virus, the papular stage of vaccination will begin, and be followed, with almost unvarying regularity, by complete development of the vesicle on the eighth day, and by the subsequent appearance of the "index of safety"—the specific inflammation of the skin, or stage of areola. Bovine virus, on the contrary, is subject to all degrees of delay, even to periods of weeks. During the epidemic of 1881-83 this defect of bovine virus was more than once followed by serious consequences. Not alone were lives lost among the exposed members of isolated families, where vaccination was resorted to early enough to have averted an attack had the virus acted promptly, but epidemic outbreaks followed under similar circumstances—that is, in localities where, upon the discovery of the first case, vaccination of all unprotected or exposed was at once resorted to, with bovine virus, but which either proved so tardy in its action, or so totally inert, as to allow the disease to gain a foothold.

"The loss of a day," says Seaton in his *Hand-book of Vaccination*, "may be the loss of a life." Hence the necessity for using virus which will act promptly, and not remain latent three, five or any other number of days. Recent experience corroborates observations made during the period from 1866 to 1873, while Sanitary Superintendent of the city of Chicago, to-wit: That it is never too late to vaccinate after exposure, short of the actual appearance of the variolous eruption. If the vaccination be performed within three or four days after exposure, and the areolar stage, the index of safety, be reached in the normal time, an attack of small-pox will almost invariably be averted. With every additional day's delay the protective power will be weakened; but, contrary to the opinion laid down in the text books, experience proves that this protective power is not entirely exhausted until the vaccination is deferred at least up to the beginning of the febrile stage of small-pox.

Of 323 cases of small-pox, tabulated in the preceding pages, in which the patients had never been vaccinated until after exposure, 305 recovered and 18 died, being a less mortality rate than among the 690 cases, which occurred among those who had been vaccinated before exposure only. In some of these cases vaccination was not attempted until shortly before the beginning of the eruptive stage. A reference to the Notes appended to the Tabular Statement of 1,100 cases, pages (296-327 inclusive), will show many instances where vaccination after exposure was successfully resorted to after the expiration of the period ascribed by Marson, Seaton, and others, as the limit beyond which, "whatever the local success of the vaccination, no constitutional effects will be imparted." In these Notes will also be found the details of cases where the attempt to vaccinate with bovine virus was only successful after one or more repetitions, with loss of valuable time or where such attempt finally proved wholly unsuccessful. With the exception of one group of six cases—a family vaccinated by the father, a layman—all the vaccinations performed with humanized virus, after exposure, were successful, and the patients recovered, with mild attacks of short duration. But of such vaccinations with bovine virus, over 40 per cent. were failures—that is, in the sense of manifesting activity before the variolous disease began—and of this 40 per cent. of failures there was 30 per cent. of fatal results.

The general tenor of these views is also supported by the figures given in the January number of the *American Journal of the Medical Sciences*, quoting from the "Arbeiten aus dem Kaiserlichen Gesundheitsamte:" "The increase of unsuccessful vaccinations in the German Empire was due to the vaccinations in the Grand Duchy of Hesse, where, owing to the introduction of animal lymph, the number of successful vaccinations decreased from 97.31 per cent., in 1881, to 63.44 per cent., in 1882." And the

German Commission on Vaccination report—"For vaccination with humanized lymph may be mentioned the certainty of its action, the simplicity of its machinery, the inexpensive manipulation of the lymph. *Against* the use of animal lymph may be taken the less certainty of its results, a more complicated machinery and the greater cost of production of lymph." Nevertheless the Commission conclude that animal "is capable of supplying the place of humanized lymph." Commenting upon this, Dr. Buchanan, the medical officer of the Local Government Board, in his last report (1884) says: "In England, these are identical when the operation is done directly from arm to arm, or calf to arm; thus, two operators at the Animal Vaccine Establishment, in London, produced an average of 988 vesicles for every 1000 insertions of calf lymph made on infants. Now the employment of stored lymph reduces this average by some 20 or 30 per cent., whether humanized or animal lymph be used. Direct vaccination from calf to arm is only possible in large centres of population. In sparsely inhabited districts the use of stored lymph becomes a practical necessity, unless arm-to-arm vaccination be resorted to; hence, there is much probability that the decision of the German Commission will tend to reduce the condition of the German people, as to protection against small-pox, to the condition of the inhabitants of the Grand Duchy of Hesse."

I see no reason—but the contrary—for modifying the judgment expressed in the eleventh of the propositions, concluding the paper above referred to:

"That the relative advantages of bovine and of humanized virus are still *sub judice* as to the most important point, namely their comparative protective powers. Humanized virus has been tested for more than eighty years; bovine for about sixteen. The former descended in an unbroken line of vaccinations from the original operations of Jenner, still produces the same typical results, the same regular sequence

of phenomena, as those obtained by Jenner himself; the latter produces almost as many varying results as there are propagators. . . . In cases of emergency, where promptness of action is important, the preference must be given to the humanized."



