

PART I

EVOLUTION OF INTERNATIONAL PUBLIC HEALTH

The International Sanitary Conferences

International public health had its origin, just over a century ago, in the International Sanitary Conference which opened in Paris on 23 July 1851. Twenty years before, cholera had for the first time in history reached western Europe, and its successive visitations were a cause not only of consternation but also of speculations—interminable as they were fruitless—about the nature of epidemic diseases in general and cholera in particular and their relation to sanitary, meteorological, and geophysical conditions. During these two decades, the development of the industrial uses of steam power, of railways, and of steam navigation had laid the foundations for international commerce on an unprecedented scale. It was also in the year 1851 that there was held in London the first great International Exhibition, at which over six million visitors were able to see side by side the products of the technical skill and craftsmanship of many nations.

But the increased speed and facility of transportation which were such a stimulus to international commerce also made possible the more rapid and extensive spread of cholera, which found a ready foothold in the squalid and overcrowded conditions which were largely a product of the industrial revolution.

In an address to the participants in the first International Sanitary Conference, the French Foreign Minister referred to the age as one in which all the industries of the universe seemed to have forgotten their former rivalries to join hands at the International Exhibition in London. If the conference achieved its aim, he added, it would not be the least remarkable accomplishment in a century “so fruitful of new and great things”. Yet the century was also fruitful of conditions in which filth and disease flourished. In the same year in which the nations of the world were demonstrating their technical

progress at the great International Exhibition, there appeared Henry Mayhew's classic of social casework—*London Labour and the London Poor*—described by its author as

the first attempt to publish the history of a people, from the lips of the people themselves—giving a literal description of their labour, their earnings, their trials, and their sufferings, in their own “unvarnished” language; and to portray the condition of their homes and their families by personal observation of the places, and direct communion with the individuals.

This work by a private individual, which came nine years after a famous official publication—Edwin Chadwick's *General Report on the Sanitary Condition of the Labouring Population of Great Britain*—gave a vivid and terrible impression of the poverty, suffering, and vice which were widespread among the poor of a great city. Yet, only one year later, William Farr, the pioneer health statistician, was to describe England—with “22 deaths annually to 1000 living”—as “the healthiest country in the world” by comparison with France with 24, Prussia 27, Austria 30, and Russia 36.¹

International public health, then, came into being at a time of great contrasts and upheavals in which unprecedented material prosperity went hand-in-hand with grossly insanitary conditions in the spreading but overpopulated towns. The world, as it was to the founders of international public health, was largely a European world, with the peoples of the Americas as distant cousins and other parts of the inhabited globe either completely isolated from the new age of material progress or brought into contact with it only through colonization by European powers. Europe itself was in rapid evolution, and a mere enumeration of the twelve governments which participated in the first International Sanitary Conference—Austria, France, Greece, the Papal States, Portugal, Russia, Sardinia, the Two Sicilies, Spain, the Sublime Porte [Turkey], Tuscany, and Great Britain—is an indication of the extent of the changes which were to take place in the following decades.

But the radical changes that were taking place were not only such as could be recorded on a map. In the words of a distinguished historian:

As the nineteenth century proceeded, the stock of ideas, beliefs, and habits which European man had inherited from long distant times underwent a profound transformation. History and scholarship, economics and physical science, the zeal of reforming prophets and the profuse ingenuity of mechanical inventors, made of Europe in many important respects a new society.

¹ Farr's conclusions from these crude death-rates would hardly be considered justified today.

Ideas arose out of Europe which, for better or worse, were to influence the future of the entire human race. New political creeds were challenging the whole basis of contemporary society, and a natural scientist, Charles Darwin, issued in his *On the Origin of Species by Means of Natural Selection* a challenge to contemporary ideas on the origin of Man himself and his place in Nature. Many other great changes were taking place in traditional conceptions of human relations. Organized labour was coming into being, and great humanitarian movements were to result in the abolition of the slave trade, restrictions on the traffic in women and children, prison reforms, and improvements in the care of wounded during wars. Free and compulsory education, aided by power-operated printing presses, started to bridge the gap between the illiterate poor and the educated middle classes. Private philanthropy became organized, and through medical missions extended its sphere of action beyond national boundaries.

Basic health legislation was enacted with a view to improving the sanitation of towns and working conditions in factories and preventing the widespread adulteration of foods, and the appointment of salaried medical officers of health was a further step in the recognition by governments that it was their responsibility to ensure a healthy environment for their peoples.

It was in such a setting that the first of the International Sanitary Conferences inaugurated in 1851 a new era of international action in public health. This was, however, not an isolated example of international co-operation, but rather one of many symptoms of a new international movement—a movement born, in an age of nationalism, as a necessary adjunct to the enormous growth of international intercourse and commerce which had been made possible by developments in transport and communications.

During the first half of the nineteenth century, many bilateral conventions had been concluded between individual countries on technical questions. For example, conventions for the regulation of postal communications were arranged between one country and another. But it became apparent that technical problems which required simultaneous and expert consideration by many nations could not be handled expeditiously by the traditional methods of bilateral negotiations between professional diplomats. These methods gave place, in the second half of the nineteenth century, to international conferences convened with the object of enabling nations to reach agreement on many non-political subjects.

Reference has already been made to the International Exhibition of 1851. This provided the stimulus and the occasion for the first discussions between English, French, German, “and even American” scholars which

led to the convening in Brussels in 1853 of the first international General Statistical Congress, at which it was recommended that an international nomenclature of causes of death should be established.¹

Among the subjects of other international conferences were postal and telegraphic communications; weights and measures; patents, trademarks, and copyright; railway freight transportation; navigation and the safeguarding of life on the high seas; the slave trade; and labour legislation. In some cases, public international unions with permanent offices were established, and among them may be cited the International Telegraphic Union² (1865), the Universal Postal Union (1874), and the International Union of Weights and Measures (1875). As will be seen later, the first permanent international health office did not come into being until after the close of the nineteenth century.

All these international conferences and unions were governmental, but the latter half of the nineteenth century saw also a great development of non-governmental international congresses and associations. Prominent among these was the long series of International Medical Congresses, the first of which was held in Paris in 1867—the year in which Lister first announced the new principle of antiseptic surgery to which he had been led by Pasteur's work on fermentation. By the end of the century, a total of twelve of these congresses had been held in eleven different countries.

The object of the first International Sanitary Conference was that the twelve nations represented should reach agreement on minimum maritime quarantine requirements and thus, in the words of the President of the Conference, render "important services to the trade and shipping of the Mediterranean, while at the same time safeguarding the public health". The original initiative for convening the conference, which was held in Paris, was taken by the French Minister of Agriculture and Trade, who described himself as "placed at the head of the sanitary and commercial administration" of his country. Each participating government was represented by two delegates—one a diplomat and the other a physician.

In the course of the conference, forty-eight plenary sessions and numerous committee meetings were held until, almost exactly six months after the opening session, it was declared closed on 19 January 1852.

¹ More than a hundred years later, the nations of the world are still acting on this recommendation by combining, through the World Health Organization, in the periodical revision and publication of the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*, of which the latest edition appeared in 1957.

² Now the International Telecommunication Union

The product of these immense labours was an international sanitary convention to which was annexed the text of international sanitary regulations containing 137 articles. A draft of this convention was signed on 19 December 1851 by all of the twenty-four delegates representing twelve nations, and they also all signed an amended draft on 16 January 1852. But they did not commit their governments, and four months later only five of the twelve powers—France, Portugal, Sardinia, the Sublime Porte, and Tuscany—had signed the convention. However, these signatures still remained to be ratified. On 18 May 1852, instruments of ratification were exchanged between France and Sardinia and the convention came into force between these two countries. Later Portugal adhered to the convention, but in 1865 both Portugal and Sardinia withdrew and the convention became completely inoperative.

The reasons for this failure may have been partly procedural, for, after a long discussion as to whether voting should be by the powers represented or by individual delegates, the latter method was adopted by a large majority. The practical effect of the choice of this method was that each of the two delegates representing the same government might vote in a contradictory sense, and that the voting might represent a difference in outlook between administrators and physicians rather than the views of a majority of participating governments. But, while such a method of voting might in any circumstances have rendered nugatory the decisions reached, the main reason for the meagre results of this and later conferences is to be sought elsewhere. In his address at the closure of the first conference, the French Minister of Agriculture and Trade congratulated the participants on their discretion and wisdom in divorcing themselves not only from all questions of politics—but also of science. For both diplomats and doctors who participated in these six-month discussions had in common their total ignorance of the nature and mode of propagation of the three diseases—cholera, plague, and yellow fever—under consideration.

The cholera pandemics of the nineteenth century made this the most discussed of all the diseases which are now known to be communicable, and, from 1831 onwards, there was a vast outpouring of published literature on cholera. Even before the disease had reached western Europe, the private and official publications on cholera which started to flow from the printing presses bear witness to the sense of fearful apprehension aroused by the calamitous outbreaks in Russia, Poland, Prussia, and Austria. The disease was, in the words of a contemporary writer, “so new, imposing, deadly, overwhelming, and terrible”. Slightly more than a year before France was

struck, the Minister of the Interior addressed an official request to the Royal Academy of Medicine that it should urgently prepare instructions for warding off and treating cholera. The Academy appointed a special committee for this purpose, and a few months later published its report in which it was concluded, *inter alia*, that cholera had never been shown to be transmissible. Across the English Channel, the Privy Council published in the *London Gazette* of 20 October

certain rules and regulations proposed by the Board of Health, for the purpose of preventing the introduction and spreading of the disease called Cholera Morbus in the United Kingdom, together with an account of the symptoms and treatment of the said disease.

It was assumed by the Board of Health that the chief danger would come from illicit cross-channel smuggling activities which could not, from their nature, come under the control of quarantine measures.¹ But, in the event, cholera broke out in Sunderland on the east coast of England some months before it invaded France.

The cholera literature published during the first three decades of cholera in Europe includes some of the most thorough epidemiological investigations undertaken in respect of any disease, and one of the earliest of these was the report of an official commission on the first cholera epidemic to strike Paris. The disease had reached Calais from England on 15 March 1832, and soon broke out in Paris, where it claimed over 21 000 victims within seven months—a toll of life which represented a mortality rate of nearly 23 per thousand inhabitants. The introduction to this report gives an impression of the contemporary attitude to such a disaster:

When a deadly scourge, such as famine, pestilence, or an epidemic strikes a great city, the first feeling that it arouses is terror. Everyone has but one thought, one object: to escape the evil. Those whose position or wealth allows it flee in all haste; those—and they are in the majority—for whom flight is impossible, forced to remain, give way to fatal despondency, already considering themselves doomed to an early death, living in continual terror, more afflicted by the real misfortunes which they bring upon themselves than by the scourge which they dread but which may not assail them.

The report itself contains sixty-seven detailed statistical tables in which cholera deaths are analysed by reference to age, sex, duration of the disease, atmospheric temperature, locality, exposure, elevation, soil humidity, population density, social class and occupation, and other factors. Even more elaborate epidemiological studies were made by William Farr of the cholera

¹ This faith in quarantine measures was not to survive for many years. (See p. 10.)

epidemic of 1848-49 in England¹ and by a committee, of which Farr was a member, on the 1854 epidemic, but these led only to the tentative conclusion that there might be a causal relationship between cholera and elevation of the ground.² These and other exhaustive reports prepared at the time demonstrate the limited value of the massive accumulation of mere facts.

The idea that an invisible living agent might play a part in cholera—sometimes referred to as the “hypothesis of insect life”—was periodically ventilated in different forms from the time when the disease was first manifested in Europe. The clearest statement of this theory was propounded by John Snow, first in 1849 and later, in greater detail, in 1855. Although the terms in which Snow expressed his hypothesis—for it was nothing more—are in striking conformity with modern knowledge, it was not until a quarter of a century after his death in 1858 that Robert Koch established the specific relationship between cholera and the comma bacillus.

Even Koch's crucial discovery did not result in a universal discrediting of the current view that some general external factor was instrumental in the causation of cholera epidemics, and it must be recognized that in the first exciting years of medical bacteriology the host-parasite relationship was greatly oversimplified. In 1892, nine years after Koch's discovery, Max von Pettenkofer postulated that three major elements were involved in the etiology of cholera, which he designated respectively as x , y , and z . The first was a germ propagated by human intercourse; the second, an external factor which he called “temporospatial disposition” (*zeitlich örtliche Disposition*); and the third was the individual disposition. At the age of 74 he demonstrated his own faith in his views by swallowing 1 cm³ of a broth-culture of cholera vibrios on an empty stomach—after having previously neutralized his gastric juices with sodium bicarbonate. The result of this experiment was mild colic and diarrhoea and the excretion of cholera vibrios in the stools for a week. Another sceptic was the great epidemiological historian, Charles Creighton, who, as late as 1894, ridiculed the “microbic theory” of cholera.

¹ Farr's report on this epidemic was described by *The Lancet* (1852, 1, 268) as “one of the most remarkable productions of type and pen in any age and country”.

² In his report on the cholera outbreaks in England of 1865-66, Farr amplified and confirmed Snow's findings on the relation of cholera incidence to polluted water-supplies, and stated, “simply as a hypothesis, that the cholera is propagated epidemically by a material substance” analogous to “the substances which produce, under given circumstances, smallpox, cow-pox, syphilis, erysipelas”. To this hypothetical substance Farr gave the name cholrine, which he conceived as a “zymotic matter” which lived “irregularly distributed in air or in water”. It was “evident that the amount of zymotic matter evaporated from cholera flux, and entering the system through air, must be inconsiderable as compared with the amount that may enter through a water supply contaminated by sewage”.

To return to the first International Sanitary Conference: early in the proceedings one of the Austrian delegates proposed that the subject of cholera should be struck from the agenda, on the ground that it was a "purely epidemic disease" and that it was therefore of no avail to use against it the quarantine measures which were supposedly successful in the cases of plague and yellow fever. This view was strongly supported by several delegates, including those of France and the United Kingdom, but others were of the opposite opinion.

In an attempt to settle the question, a committee consisting of four physicians and three consular officials was appointed. They not only deprecated as futile the incarceration of passengers from infected ships but deplored the practice on the ground that the passengers should be dispersed by all possible means. Quarantine measures for cholera were "impossible and illusory, dangerous even in certain cases, and contrary to the purpose for which they were intended". However, the convention which finally emerged from the conference provided for quarantine measures for cholera as for the other diseases.

The arguments advanced against quarantine for cholera sound strange to modern ears, but at that time words such as "epidemic", "contagion", and "infection" had meanings which were never precise and often varied widely as between one writer and another. "Epidemic" disease was widely believed to occur only in the presence of certain conditions of climate and soil, and to strike large numbers of people simultaneously without transmission from one to another. "Infection" conveyed the idea of transmission of disease from a sick to a healthy person by a poisonous exhalation or miasma, while "contagion" implied conveyance by direct or indirect contact of a *materies morbi* which some thought to be living and others not. To Jacob Henle, one of the most progressive and influential medical scientists of his time, a contagion was a living material which had started its career as a miasma and assumed its present form after passage through the human body. He classified "epidemic" diseases as (i) Miasmatic (malaria); (ii) Miasmatic-contagious (exanthemata, cholera, plague, influenza); and (iii) Contagious (syphilis, itch, rabies). Contagions were either "volatile" and conveyed by the atmosphere or "fixed" and conveyed by physical contact. While Henle's views were, as he conceded, conjectural, they stimulated many attempts at the microscopic examination of disease products. During the 1849 cholera epidemic in England, several claims were made to have discovered a causative organism, and in the same year a French physician identified vibrios in rice-water stools without, however, suggesting that they had a causal relation to cholera. In the report on the 1854

epidemic in England to which reference has been made earlier, there appeared the statement that "vibriones are constantly present in the rice-water discharge of cholera" and the report contains a number of coloured plates showing these and other forms of life revealed by microscopic examination of water from wells, piped supplies, and sewers. But the knowledge and techniques required for appraising the findings accumulated were to await another generation.

Such was the state of medical knowledge at the time of the first International Sanitary Conference and for three decades after it. The medical delegates had, in fact, nothing to contribute but unverified and often contradictory hypotheses, and in such circumstances it is hardly surprising that so little was achieved.

The second International Sanitary Conference, in which no medical delegates were included, was held in Paris eight years later, in 1859, and lasted for five months. A new draft convention was agreed upon by a majority of delegates, but nothing more was heard of it. The third International Sanitary Conference, which lasted for seven months, was held in Constantinople in 1866 and marked an advance in that agreement was reached on a number of technical questions, although some of the conclusions were later shown to be scientifically incorrect.

There was unanimous agreement that cholera was endemic in India and nowhere else, and that it was transmissible. It was also agreed unanimously, with one abstention, that air was the principal vehicle of the causative agent. However, it was conceded that:

Water appears, according to observations made principally in England by Dr Snow and in Germany by Dr Pettenkofer, to contribute, in certain circumstances, to the development of cholera in a locality.

Delegates were unanimous in declaring that the portal by which the causative agent—whether it be called a contagion, germ, or miasma—gained access to the body was "principally the respiratory passages and very probably also the digestive tract". The conference was therefore far from reaching a clear conception of the nature of cholera or of the way in which it was disseminated.

On 1 July 1874 the fourth International Sanitary Conference opened in Vienna. This conference was noteworthy because it lasted only one month; it was the first of the International Sanitary Conferences to be held since the opening of the Suez Canal in 1869; and Germany sent as its two illustrious delegates Alexander Hirsch and Max von Pettenkofer, the last of whom was, eighteen years later, to show his confidence in his mistaken theories of cholera by wagering his own life.

Delegates of the twenty-one nations represented reviewed the scientific recommendations of the previous conference in Constantinople and unanimously endorsed the following conclusions: cholera was endemic to India and was always imported into other countries; it was always transmitted by man coming from an infected place; it could also be transmitted by personal effects; corpses of cholera victims should be considered dangerous; air was the principal vehicle of the causative agent, but reports of atmospheric transmission at one or several miles' distance were not conclusive; the causative agent rapidly lost its pathogenicity in the presence of fresh air; while no certain and specific means of disinfection were known, the great value of hygienic measures such as aeration, "*lotions profondes*",¹ cleansing, etc., combined with the use of substances then regarded as disinfectant, was recognized. The conference was unable to reach unanimity on the questions of: transmissibility by food, drink, animals, and goods; the duration of the incubation period; and whether any known procedure of disinfection might have some chance of destroying the causative agent or diminishing its activity. On questions of quarantine, there was much agreement but no unanimity on all points.

Perhaps the most interesting feature of this conference was the plan for a Permanent International Commission on Epidemics which was introduced, and advocated for many years later, by Dr A. Proust, a member of the French delegation. The conference unanimously recommended that such a commission should be established, and Vienna was proposed as its seat. The commission was to be composed of physicians appointed by the participating governments, and would concern itself with "purely scientific questions", its main task being to study the etiology and prophylaxis of cholera. As the first objectives of research, the study of the rainfall and telluric conditions in the Eastern Mediterranean and Black Sea regions, the epidemiology of cholera in ships and ports, and its incubation period were suggested.

The next International Sanitary Conference, which took place in Washington in 1881, was the first in which the United States of America participated, and the only one of this series of conferences to be held in the Western Hemisphere. This time an alternative proposal for a "permanent International Sanitary Agency of Notification" was put forward. The agency was to have two offices—one in Vienna, which would collect and distribute information from Europe, Asia, and Africa, and another in Havana to perform the same function for the Americas. It was also suggested that there might be a third office in Asia. The annual budget of the agency would be determined by

¹ The meaning of this obsolete term is probably "thorough ablutions".

Austria-Hungary and Spain (Cuba then being a Spanish possession), which would notify participating governments of the contributions required of them. This emphasis on notification is of interest as indicating a growing realization of the importance of an international and reliable system of epidemiological reporting.

But the most remarkable feature of this conference was a truly historic event which passed almost unnoticed. The Special Delegate of Spain representing Cuba and Puerto Rico was no less a person than Carlos Finlay who, in the discussions on yellow fever, claimed that the sanitary precautions generally recommended were founded upon conceptions of the disease which were completely at variance with many observed facts. He maintained that the contradictory opinions of contagionists and non-contagionists both had some justification, but that to reconcile them a "third independent condition" must be sought. This was

the presence of an agent entirely independent for its existence both of the disease and of the sick man, but which is necessary in order that the disease shall be conveyed from the yellow-fever patient to a healthy individual.

Finlay added:

It will be objected that this is a mere hypothesis; and, indeed, it is only as such that I give it. But I believe it is a plausible one, which has, at least, the merit of explaining a certain number of facts which have remained hitherto unaccounted for by the current theories. I do not ask anything else, for my only object is to show that, if my hypothesis, or some other analogous to it, should be realized, all those measures which are now employed in efforts to disinfect and check the progress of the disease would turn out to be without effect, inasmuch as the principal efforts should have been directed against the third condition, by endeavoring to destroy the agent of transmission, or to divert it from the path that it follows in communicating the disease.

Thus Finlay made public for the first time his concept of the role of an intermediate vector in the transmission of an epidemic disease from man to man. In the same year, he read before the Academy of Sciences of Havana a paper in which the mosquito later to be known as *Aedes aegypti* was specifically incriminated as the medium of transmission of yellow fever. Nevertheless, his work was received with general incredulity for nineteen years until it was decisively confirmed by the United States Army Yellow Fever Commission in 1900.

Further International Sanitary Conferences took place in 1885 (Rome), 1892 (Venice), 1893 (Dresden), 1894 (Paris), and 1897 (Venice), each of which resulted in a convention of limited scope relating to cholera or plague.

Scientific differences of opinion had progressively narrowed, but this could not be said of differences prompted by the desire to safeguard national interests.

In retrospect, it is seen that in the first half-century of international public health progress was very slow. Indeed, it could hardly have been otherwise before medical science had found the key to the fundamentals of the problems under discussion. Further, the objectives and orientation of international health work were very simple and very limited. Two main ideas dominated the earlier International Sanitary Conferences. The first was the removal of hindrances to trade and transport, and the second was "the defence of Europe" against exotic pestilences. As was stated by Edouard Sève, of Belgium, at the Washington conference in 1881:

The first striking point which one comes across in examining these documents about international hygiene is that up to the present, under the name of public hygiene, the only researches made in common by the different governments of Europe were to oppose a barrier in the way of the march of epidemic diseases, and especially of cholera.

In its second half-century, international public health was to come of age by the attainment of the ideal of universality and of its present broad humanitarian objectives.
