

PART II

The Transition to the Armed Forces Epidemiological Board

The Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army and its Commissions continued to work on numerous studies, some on a continuing basis and others based on immediate needs. In 1944, the name of the organization was changed to the Army Epidemiological Board, but its relationship to the military, its functions, and its Commissions were unaffected. Some of the significant contributions that were made by the groups that were active through 1944 are summarized and follow:

- The Respiratory Disease Commission made epochal epidemiological studies of acute diseases of the respiratory tract at Fort Bragg. Some of their findings were: (a) that Acute Respiratory Disease (ARD) was the predominant respiratory infection at military training posts and in recruits; (b) that epidemic influenza A had a distinctive epidemiologic pattern different from ARD; (c) that patients with primary atypical pneumonia developed cold agglutinins (about one-third did; the volunteer subjects developed immunity in contrast to convalescent ARD patients); and (d) that other infections, such as Group A beta-hemolytic streptococcal infections, bacterial pneumonia, and rubella, were atypical of those diseases, and were not dependent on the occurrence of acute respiratory diseases.
- The spread in hospitals of air-borne microorganisms became a major program that led to studies of sterilization of air in occupied enclosures with ultraviolet light, propylene glycol vapor, and the combined effects of each on dust-borne bacteria. The bactericidal and viricidal properties of other glycols were also evaluated.
- In the Ninth Service Command, the Commission on Epidemiological Survey developed new knowledge of the incidence and epidemiology of coccidiomycosis; significant new information evolved regarding the prevention of this fungal infection, for which there was no specific cure. Clinical studies showed the variability of clinical manifestations; through surveillance, the incidence of infections, the pathogenesis, and preventive measures useful for control were elucidated.
- The streptococcal grouping and typing of sera useful for identifying hemolytic streptococcal infections made it possible to diagnose, detect, and understand how and where such infections occurred. The identification of the relationship between carrier rates and secondary cases was a major advance by the Streptococcal Commission. They investigated the practical use of the antifibrinolytic as a measure of streptococcal infection. The Commission's confirmation that rheumatic fever developed following hemolytic streptococcal infection was of great medical significance to the military.
- The program on influenza was aimed at (a) developing and purifying antigens, (b) detecting new antigens, (c) studying clinical and immunological features of the disease, and (d) studying the genetic

1944 **Army** Epidemiological Board and Commission Directors

Front row, left to right: John H. Dingle; Joseph **Stokes, Jr.**; **O. T. Avery**; Brig. General James S. Simmons; Francis G. Blake, President of the Board; Stanhope Bayne-Jones, Administrator; E. W. Goodpasture; and Joseph T. Wearn.

Second row, left to right: (unidentified); J. J. Phair; **A. J. Warren**; A. R. Dochez; **O. H. Perry Pepper**; **O. H. Robertson**; Kenneth F. Maxcy; Colin M. MacLeod; Chester S. Keefer; and John R. Paul.

shifts of the virus, all of which were aimed at the development of effective methods of immunization. Working in association with the pharmaceutical industry, an influenza vaccine containing types A and B of the inactivated viruses was produced. Research was also directed toward the development of chemical agents to decrease the dissemination of the influenza viruses during epidemics.

- *There were specific efforts directed toward the development of effective vaccines for measles and mumps. This early work led directly to the availability of effective biological vaccines. The Commission sponsored work on (a) the evaluation of immune globulin for passive immunization during epidemics, and (b) for therapy, especially for meningoencephalitis, which is a serious complication of these diseases, particularly of measles.
- *Members of the Commission participated actively in the investigation of outbreaks of meningococcal meningitis in various Army posts. Strains of meningococci were collected, typed, studied, and stored for use in preparing valuable meningococcal typing sera and studying pathogenesis in animals. The Commission initiated studies, which were conducted jointly and collaboratively with intramural Army scientists, that ultimately led to the preparation of a purified polysaccharide vaccine.
- *Members of the Commission worked on the isolation of virus strains and serologic surveillance that mapped, in the United States and elsewhere, the occurrence, incidence, and geographic localization of neurotropic virus diseases such as poliomyelitis, lymphocytic choriomeningitis, the eastern and western equine encephalitis, and St. Louis encephalitis. The broad objective of this program was to develop effective protective vaccines. This Commission's contributions culminated in medical advances of historical significance.
- *In addition to its field and laboratory studies, the Commission on Pneumonia sponsored and investigated polysaccharide pneumococcal vaccines. Chemotherapy using sulfonalimide, gramicidin, and penicillin were evaluated by Commission members.
- *Although not fully organized until January 1942, the Commission on Tropical Diseases planned studies on malaria, yellow fever, rickettsial diseases, and dysentery. This Commission was short-lived because the categories of interest were so important that separate Commissions were organized: those on Malaria, Rickettsial Diseases, and Enteric Diseases. Problems of yellow fever and dengue were distributed to the Commissions on Virus Diseases and Immunization. The Commission on Tropical Diseases conducted an intensive study of an outbreak of bacillary dysentery at Army posts in Texas, which was brought under control.

From May to December 1944 the Subcommittee on Dysentery of the Commission on Tropical Diseases of the Army Epidemiological Board made an extensive survey in the India-Burma theater to evaluate the incidence, epidemiology, means of detection, methods of prevention, and control of diarrheal disorders, particularly bacillary and amoebic dysenteries. This thorough field study was conducted by Drs. Carl Ten Broeck and John B. Nelson, members of the Commission on Tropical Diseases, and Major Gustave J. Dammin, MC, Executive Officer of the mission and officer on assignment to the Preventive Medicine Service in the Surgeon General's Office. The report that Major Dammin wrote stressed the need for better means of (a) clinical and laboratory diagnosis of the two major types of dysentery, (b) the importance of training technical personnel to improve laboratory and morphological diagnoses, (c) the importance of rigid control of water and food supply, and (d) the careful monitoring of food handlers.

Viral hepatitis debuted as a global problem in 1940. The initial scientific studies on jaundice related to hepatitis (formerly called catarrhal jaundice) were sponsored by several Commissions of the Board. Dr. Joseph Stokes, Jr., and his associates Captains John R. Neefe, Jr., MC, and Sydney S. Gellis, MC, working at the University of Pennsylvania, the Pennsylvania State Hospital in Philadelphia, and the New Jersey State Hospital, conducted crucial studies on the infectivity of the hepatitis virus and the protective effect of immune globulin in volunteers. This work was conducted under the aegis of the Commission on Measles and Mumps. Dr. Thomas Francis, Jr., and his group, who had been working on influenza at

July 1947, near Bayreuth, Germany. Dr. J. R. Neefe, left, **Dr.** W. P. Havens, and an unidentified acquaintance on a reconnaissance mission to determine the best location for a hepatitis center.

Ann Arbor, studied the infectivity of the hepatitis virus **using** blood serum, hepatic and brain tissues, and mosquitoes. These studies, conducted with volunteers, were performed at the state prison in Jackson, Michigan. While at Yale, Dr. W. Paul Havens, Jr., working under **Dr.** John R. Paul as a member of the Commission on Neurotropic Virus Infections, studied the infectivity of hepatitis viruses in animals and humans. Charles A. Janeway, M.D., of Harvard, was a major contributor to these studies.

This hepatitis work, performed under **AEB** sponsorship, was the first of many studies to confirm that (a) infectious hepatitis is caused by a virus; (b) there are two or more types, not one, of viral hepatitis; (c) the incubation period of the *two* types differs (ranging from about **thirty** days for infectious hepatitis to six weeks **or** more **for** serum hepatitis); (d) immune globulin either prevents or ameliorates an attack of naturally **occurring** infectious hepatitis; and (e) contaminated water is a likely source of infection. Because the hepatitis problem was immense, the Commission on Liver Diseases was organized in 1947, and was directed until 1954 by **Dr.** Cecil Watson of Minnesota.

The 1945 Annual Report of the Army Epidemiological Board

In January 1946, Brigadier General Bayne-Jones prepared the following annual report, which summarizes the activities of the Army Epidemiological Board during **1945**:

CECIL J. WATSON, M.D.

While he was a student at the University of Minnesota School of Medicine, Cecil Watson cultivated interests in pathology, clinical chemistry, and microbiology, which he continued during his residency training and throughout his career. As Chairman of the Department of Medicine at Minnesota he excelled as a teacher, and as a clinician and investigator he trained some of the future leaders in this field. He was, without doubt, one of the nation's leaders on porphyrin metabolism, and was one of his generation's most important medical statesmen.

The AFEB asked Cecil Watson to organize and direct its Commission on Liver Diseases, which he chaired from 1947 to 1954. Under his guidance, and with the help of other authorities on hepatic disorders, the Commission provided inestimable help to the military services. New means of detection, treatment, and prevention of hepatitis and other hepatic diseases were clarified, and new leads to the solution of these problems were identified.

Established by the Secretary of War in January 1941, this Board and its ten Commissions completed the fifth year of activity in the investigation and control of influenza and other epidemic diseases in the Army. It assisted in supervising the production of the influenza vaccine which was adopted for the Army and used for the vaccination of troops with successful results in the fall and winter of 1945. Foreseeing that Japanese B encephalitis would be a danger to troops invading Japanese territory, protective measures were planned and a vaccine produced in the first part of the year. These measures were ready for use when the disease broke out on Okinawa. When American troops landed on Leyte, they were exposed to a serious disease caused by a worm-parasite which develops in blood vessels. To combat this, a Commission was sent to the Philippines to investigate and devise methods of protection against schistosomiasis. The dengue fevers have at times been a considerable cause of sickness in troops. Various types of dengue virus were recognized and a vaccine against dengue was prepared. Pneumonia has not been a severe cause of sickness in this war, but was potentially dangerous and was important at some posts. To help prevent it, a method of immunization against pneumonia was developed, to be available in case of need. Troops in Italy and civilians at institutions were protected against hepatitis by injections of human immune serum globulin. A Commission aided in the study of diphtheria in troops in Italy and Germany and assisted in improving methods of laboratory diagnosis. A special study was made of special types of paralysis, some of which were attributable to diphtheria. A representative of the Board made a survey of leprosy in the Philippines. As a possible additional weapon against the spread of poliomyelitis, DDT was used to control flies which might carry the disease. The Board and Commissions worked on many problems and furnished much expert information and advice of value to the preventive medicine program of the Army.

The bibliography of scientific work done by AEB and Commission members for 1944 and 1945 follows:

1944

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The tables showing some of the contract data and expenditures for the fiscal years 1943-1946 that originally accompanied Bayne-Jones's report are shown in Appendix 1 of this volume, which deals with the funding of the Board.