directly from man to man by the bite of the fly, frequently mechanically.

In connection with the wholesale destruction of game in parts of Africa, it should always be considered that if the game is so reduced that the tsetse flies of the *Glossina morsitans* group are driven to attack man for food, a much wider dissemination of these flies is likely to occur, and hence further spread of human trypanosomiasis may result. Several human outbreaks attributed to this influence have recently been recorded. In parts of Tanganyika a much wider dissemination of *Glossina* has recently occurred, and since the institution of the Masai Reserve in Kenya Colony the fly belts within its confines have extended their boundaries and increased in number. In the case of *Glossina swynnertoni* (a vector of human as well as of animal trypanosomiasis) Lewis (1934) has obtained evidence which shows that there has been an actual invasion of it from Tanganyika Territory. Swynnerton has shown that *G. swynnertoni,* in the presence of cattle but where game is scarce, attacks man readily. More recently Lewis has found that in the presence of an abundance of game and in the presence of cattle, this fly very readily approached man and was also attracted to moving vehicles. In view of all the facts the special merits of vegetational control of the disease become emphasized in which not only elimination of the favorable breeding places of the fly is attempted, but the character of the vegetation so altered that the fly no longer inhabits such regions.

The epidemic of malaria with its high mortality which has recently been raging in Ceylon, India, is a striking example of the effect that climatic conditions and environment may exert upon a disease. This epidemic has occurred in what has been hitherto regarded as the most healthy and prosperous portion of the island, the southwestern part, in which there has usually been a high annual rainfall and where there has been evidence that the percentage of the population infected with malarial parasites has been but small, and hence the population relatively non-immune to the disease. This year the prevailing rains which are brought so regularly by the southwest monsoon failed to supply the usual amount of water, resulting in a prolonged drought. Then came a few heavy rains, and then drought again. Thus conditions arose greatly favoring the breeding of the mosquito *Anopheles culicifacies,* which transmits the disease in this region, as many shallow pools were formed along the river beds and streams. Through these innumerable temporary breeding places, more perfect conditions for the production of mosquitoes could probably not have been devised.

The outbreak of malaria was followed by failure of the crops, also due particularly to the lack of rain. Thus the people became further impoverished and the general state of their health reduced, and within five months there were 113,811 deaths, of which 66,704 were estimated to be due to malaria.

Malaria only prevails in an unsanitary environment. During the year 1934 Dr. McKinley in a statistical survey found that over 54,000 cases of this disease had been recognized and reported in a few of our southern states, or 15,000 more cases of malaria in these regions than of tuberculosis. Other statistics show that the malaria mortality is over 20 in 13.5 of the counties, and over 50 in 3.03 of the counties in the southern United States. Malaria has been banished in this country from many localities where it formerly prevailed. It is a disease that we know can be eradicated by sanitary measures. In view of the enormous sums of money that have recently been appropriated by our Federal Government for conservation and reclamation, would it not be most appropriate and indeed a wise investment if at least a small fraction of this sum were devoted to the eradication of this dreadful disease from which so many of our citizens have already died and others still suffer and are thereby incapacitated for work?

Although in support of our subject many additional examples, particularly with reference to other infectious and parasitic diseases, might be discussed, the few which have been referred to in this lecture would appear to be ample for the purpose of emphasizing the importance of ecology in the study of disease—the importance of environment upon the vertebrate and invertebrate host and the infecting organism.

OBITUARY

CHARLES ELWOOD MENDENHALL

AMERICAN science lost one of its ablest devotees and American scientists one of their most beloved leaders as Professor Charles Elwood Mendenhall passed away on August 18, after an illness of less than a year. News of his death came as a shock to his friends who, outside the intimate circle at the University of Wisconsin, had not realized the serious character of his illness. At the age of sixty-three, he was at the peak of his effectiveness as an inspiring teacher, able investigator and wise counselor.

Charles Mendenhall was the second generation of distinguished physicists. His father, T. C. Mendenhall, a Quaker, was the first professor appointed at

Ohio State University and, from 1878 to 1881, cooperated in the founding of the Imperial University of Japan. It was there, as a small boy, that Charles acquired his life-long love of Japanese art. T. C. and Charles Mendenhall were the third "father-and-son" group to be honored by election to the National Academy of Sciences. His mother, Susan Allen Marple, was of English birth.

Born on August 1, 1872, in Columbus, Ohio, Mendenhall graduated B.S. from Rose Polytechnic Institute in 1894 and received his Ph.D. degree in 1898 from Johns Hopkins, where he had the privilege of study under the great Professor Rowland. Prior to his postgraduate work he spent parts of two years as aid in the U. S. Coast Survey and was assistant in physics for one year at the University of Pennsylvania. His subsequent academic career consisted of three years as instructor in Williams College, from 1898 to 1901, followed by continued service at the University of Wisconsin, where he was an assistant professor from 1901 to 1904, associate professor from 1904 to 1905, professor since 1905 and chairman of the department of physics since 1926.

During this period, the University of Wisconsin became one of the great centers of physical research and inspiring graduate study. For many years, until the latter left to assume administrative duties at the University of Chicago and the Rockefeller Foundation, Charles Mendenhall in experimental physics and Max Mason in theoretical physics formed a notable team. Mendenhall's research interests were broad, so as to have earned him the reputation of being "one of the few remaining natural philosophers." His primary interests, however, were in surface characteristics of metals, and included, specifically, infra-red radiation from black bodies, luminous efficiencies and radiating constants of metals, and their photoelectric, thermionic and contact potential properties. His work was characterized by thoroughness, precision, insight and skill. He developed improved methods of measurement, notably improving galvanometers, bolometers and procedures for measuring high temperatures.

Being, by nature, generous and helpful, Mendenhall's creative genius found more and more expression in the work of his students and younger colleagues. Among the three dozen or more students who took their Ph.D. degrees under his immediate supervision, are a goodly number who have won national and international reputation and who now hold responsible positions in many institutions and organizations. It is through such men that his work in physics will continue, just as the truths which he discovered and the influence which he exerted constitute his permanent contribution to human welfare.

In addition to his academic work, Mendenhall has been one of the great influences in building up and making effective the leading scientific organizations in his field. He was president of the American Physical Society from 1923 to 1925 and vice-president of the American Association for the Advancement of Science and chairman of its Section B in 1929. As chairman of the Division of Physical Sciences of the National Research Council from 1919 to 1920, he was influential in effecting the transition from war-time to peace-time activities of that body. In particular, he was an invaluable member of the National Research Fellowship Board during practically its entire existence and, in this capacity, exerted a profound influence on the remarkable development of activity in the physical sciences in America in the last fifteen years. His other scientific society affiliations include the American Philosophical Society, the American Optical Society, the American Academy of Arts and Sciences and (mentioned above) the National Academy of Sciences, in which he served for several years as chairman of the Physics Division.

One of Mendenhall's notable public services was as major in the Signal Corps during the war. In this capacity, and jointly under the National Research Council, he played an important rôle in the organization of American scientists and laboratories for war service. He was particularly active in handling scientific devices and inventions for war purposes and in selecting scientific personnel for their development and use. During this period, 1917 to 1919, he resided in Washington. Immediately following the war, in 1919 and as successor to Dr. Henry A. Bumstead, he served for six months as scientific attaché to the American Embassy in London, at the same time acting as the London representative of the Research Information Service.

The intellectual distinction of the Mendenhalls has been continued in Charles Mendenhall's own family. In 1906 he married Dorothy M. Reed, an alumna of Smith College, of the Massachusetts Institute of Technology and of the Johns Hopkins Medical School and honorary D.Sc. from Smith College. Mrs. Mendenhall is a recognized authority on matters of diet and child health, has been a lecturer in the University of Chicago and elsewhere, and is a medical officer of the Children's Bureau in Washington. Their two sons are following similar intellectual lines: Thomas C. is a Rhodes scholar at Oxford and John T. is a medical student in Harvard University.

With his able devotion to his favorite field, physics, his love of art and music, his pleasure in such pastimes as fishing, his devotion to his family and to his students, his loyalty to his friends, his rugged simplicity and honesty and his invariable response to calls for service, Charles Mendenhall was a great character, an inspiration and an example, and a beloved friend.

KARL T. COMPTON