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PROGRESS IN THE CONQUEST OF VIRUS DISEASES¹

By Dr. W. M. STANLEY

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VIRUSES are small infectious agents that can cause disease in man, other animals, plants and bacteria. They range in size from about 10 mμ, or a size slightly smaller than that of certain protein molecules, in an almost continuous spectrum of sizes up to about 300 mμ, or a size slightly larger than that of certain accepted living organisms. A given virus can multiply and cause disease only when within the cells of certain specific living organisms. No virus has been found to reproduce in the absence of living cells. During multiplication viruses occasionally change or mutate to form a new strain which in turn causes a new disease. Viruses were not discovered until 1892, when Iwanowski demonstrated that the causative agent of the mosaic disease of tobacco would pass through a filter that retained all known living organisms. Six years later

Beijerinck proved that this agent was not an ordinary living organism and recognized it as a new type of infectious disease-producing agent—namely, a virus. The same year Loeffler and Frosch demonstrated that foot-and-mouth disease of cattle was caused by a virus. The discovery of the first virus disease of man, that of yellow fever, was made in 1901 by Reed and coworkers. Since then over two hundred diseases of man, other animals and plants have been found to be due to viruses. Among such diseases are smallpox, measles, poliomyelitis, St. Louis encephalitis, influenza, virus pneumonia, fever blisters, equine encephalomyelitis, rabies, hog cholera, dog distemper, fowl pox, jaundice of silkworms, tumorous growths in fowls and in other animals, various yellows and mosaic diseases of plants and the transmissible lysin of bacteria.

The agents responsible for these and other virus diseases are characterized by their small size, by their

¹Address at the Scientific Award Ceremony of the American Pharmaceutical Manufacturers' Association, at the Waldorf-Astoria in New York, December 11, 1944.

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