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THE RELATIONSHIP OF CERTAIN "FREE-LIVING" AND SAPROPHYTIC MICROORGANISMS TO DISEASE¹

It seems profitable on this occasion to endeavor to take in review the progress of our knowledge of the broader outlines of biological development in respect to some of those microorganisms which at least during one stage of their existence may be referred to as free-living, saprophytic or symbiotic, and of their potentiality in a different environment to assume a parasitic existence and produce disease. A considerable growth of our knowledge of several of the microorganisms to be discussed in this connection has very recently occurred. Obviously a consideration of this nature should demand much insight into the fundamental problems which relate to the microorganisms in question, and a careful investigation not only of their morphological details but, as well, of those of a physiological and pathological nature, and of the effects of changed environment and of evolution on the microorganism. It is only through such careful observations of form, function and reaction, and by series of experimental inoculative procedures in artificial culture media, or in different animals or plants in which the microorganism is given a new environment, that we can be brought to appreciate such evolutionary changes as occur, and the relationships which exist between certain allied species morphologically indistinguishable.

Evidently the accurate determination and recognition of the species under investigation in the different environments is a primary requisite of such an investigation. This, however, particularly in the case of some of the protozoan or protistan microorganisms to be discussed, is beset with many difficulties.

There has been some difference of opinion as to whether or not some of those spirochætes which have been supposed to be purely saprophytic and to lead a free existence might, under other conditions, acquire pathogenic properties. It has been suggested that by mutation and adaptation they may in some instances be able to become transformed from harmless saprophytes into highly pathogenic parasites. Neumann² believes that non-parasitic saprophytic spirochætes

¹ Address of the retiring vice-president, Section N (Medical Sciences). Read at the annual meeting of the American Association for the Advancement of Science, December, 1924.

² Neumann, *Central. f. Bakt.*, 1923, XC, Heft 2, p. 100.

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