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ON THE FORMATION OF ORGANIC COMPOUNDS FROM INORGANIC BY THE INFLUENCE OF LIGHT

THE incentive for my first photochemical research, which was begun in 1911, was received through reading Schimper's work on the relation between nitrate reduction in green leaves and exposure to light. According to Schimper, leaves in the shade are always much richer in nitrates than leaves which have been exposed to direct sunlight. Little or nothing was known at that time in regard to the chemical aspect of nitrate reduction under the influence of light. It was not until later that I became acquainted with the important work of E. Laurent in which the formation of oxygen gas and potassium nitrite by the action of sunlight on sterilized potassium nitrate was described.

My photochemical experiments, carried out in Zürich, between 1911 and 1914, were concerned with the reduction of nitrates by light energy, either alone or in the presence of organic substances. At that time I did not employ iron in my experiments. My attention was first called to the importance of iron in nitrate reduction by some bacteriological experiments which I carried out during the war. In my work with cholera bacilli I found that their iron absorption and assimilation must be in direct relation with their power of reducing nitrates to nitrites and ammonia. On searching the literature for similar observations, I found that Schimper describes an experiment in which iron free (chlorotic) leaves were unable to reduce any nitrate at all, even on exposure to intense light.

It is very striking to observe the great rapidity with which cholera bacilli, taken from the intestine of a cholera victim immediately after death, reduce nitrates to nitrites in a peptone culture. In the case of cholera bacteria the reduction proceeds just as rapidly in the dark as it does in the light. The reduction of ni-

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