

It must not be forgotten that the share of the organism in such processes is also important. If possible, the smoothness with which chemical reactions are carried out in the leaf, perhaps quite without any stop at the formaldehyde stage, and the certainty with which definite substances in large amounts instead of mixtures in very small amounts are produced, seem more remarkable than the underlying chemical facts. Needless to say, one great factor in such processes is the action of enzymes. Otherwise we are at a loss for a description of the ways and means by which the organism operates, though the brilliant studies of chlorophyll which have recently been carried out by Willstätter promise great achievements in the future.¹

The underlying chemical facts, however, remain; carbohydrates are among the natural products of carbon dioxide and water; they manifest in solution, especially in such conditions as obtain in protoplasm or the ocean,² unparalleled instability and variety of reactions; and they produce spontaneously an enormous number of very active chemical substances. It is easy to see that, given

¹ See his many papers of recent years in "Liebig's Annalen."

² Henderson, *Journal of Biological Chemistry*, X, 3, 1911.