

ORGANIC CHEMISTRY IN ITS APPLICATION TO VEGETABLE PHYSIOLOGY AND AGRICULTURE.

The object of Chemistry is to examine into the composition of the numerous modifications of matter which occur in the organic and inorganic kingdoms of nature, and to investigate the laws by which the combination and decomposition of their parts is effected.

Although material substances assume a vast variety of forms, yet chemists have not been able to detect more than fifty-five bodies which are simple, or contain only one kind of matter, and from these all other substances are produced. They are considered simple only because it has not been proved that they consist of two or more parts. The greater number of the elements occur in the inorganic kingdom. Four only are found in organic matter.

But it is evident that this limit to their number must render it more difficult to ascertain the precise circumstances under which their union is effected, and the laws which regulate their combinations. Hence chemists have only lately turned their attention to the study of the nature of bodies generated by organised beings. A few years have, however, sufficed to throw much light upon this interesting department of science, and numerous facts have been discovered which cannot fail to be of importance in their practical applications.

The peculiar object of organic chemistry is to discover the chemical conditions essential to the life and perfect development of animals and vegetables, and generally to investigate all those processes of organic nature which are due to the operation of chemical laws. Now, the continued existence of all living beings is dependent on the reception by them of certain substances, which are applied to the nutrition of their frame. An inquiry, therefore, into the conditions on which the life and growth of living beings depend, involves the study of those substances which serve them as nutriment, as well as the investigation of the sources whence these substances are derived, and the changes which they undergo in the process of assimilation.

A beautiful connexion subsists between the organic and inorganic kingdoms of nature. Inorganic matter affords food to plants, and they, on the other hand, yield the means of subsistence to animals. The conditions necessary for animal and vegetable nutrition are essentially different. An animal requires for its development, and for the sustenance of its vital functions, a certain class of substances which can only be generated by organic beings possessed of life. Although many animals are entirely carnivorous, yet their primary nutriment must be derived from plants; for the animals upon which they subsist receive their nourishment from vegetable matter. But plants find new nutritive material only in inorganic substances. Hence one great end of vegetable life is to generate matter adapted for the nutrition of animals out of inorganic substances, which are not fitted for this purpose. Now the purport of this work is, to elucidate the chemical processes engaged in the nutrition of vegetables.

The first part of it will be devoted to the examination of the matters which supply the nutriment of plants, and of the changes which these matters undergo in the living organism. The chemical compounds which afford to plants their principal constituents, viz., carbon and nitrogen, will here come under consideration, as well as the relations in which the vital functions of vegetables stand to those of the animal economy and to the other phenomena of nature.

The second part of the work will treat of the

chemical processes which affect the complete destruction of plants and animals after death, such as the peculiar modes of decomposition, usually described as *fermentation*, *putrefaction*, and *decay*; and in this part the changes which organic substances undergo in their conversion into inorganic compounds, as well as the causes which determine these changes, will become matter of inquiry.

In the introduction of Count Chaptal's "Chymistry Applied to Agriculture," there are some excellent observations. We select a few paragraphs for this number and shall often give extracts from the work:

Without agriculture, men would live wandering and unsettled lives, disputing with each other for the possession of such animals as they could make their prey, and for the spontaneous fruits of the earth. They would have no bond of society, nor country.

By multiplying the resources for food, agriculture has permitted men to unite themselves into communities for mutual assistance. Whilst some cultivate the land, to increase its productions, others apply themselves assiduously to furnishing society with the necessary implements of industry. It is thus that, by reciprocal intercourse and exchanges, commerce has been established, and civilization extended.

If living in cities, and leading the sedentary life required by the practice of many of the arts, have softened and enervated a portion of the human species, agriculture has preserved the inhabitants of the country in a state of health, strength, and good morals. Nor is it one of the least blessings which it bestows upon society, that it thus continually repairs that portion of it which would otherwise become degenerate.

Amongst all nations, agriculture is the purest source of public prosperity. Situated under different climates, their productions and modes of cultivation are extremely diversified. But commerce scatters the productions of the various soils; and thus each nation is able to enjoy the fruits peculiar to the several portions of the earth. These exchanges have connected nations together, by rendering them dependent on each other; and the advantages arising from intelligence and industry have been made to spread through all.

The agriculturalist, then, holds the first rank amongst men.

But it is not sufficient to enlighten the agriculturalist, in order to facilitate the progress of the art; the government has an important duty to perform towards it. It is only when intelligence and encouragement are united, that the farmer can be assured of lasting prosperity.

Agriculture is the most fruitful source of the riches of a country, and of the welfare of its inhabitants; and it is only as the state of agriculture is more or less flourishing, that we can judge unerringly of the happiness of a nation, or of the wisdom of its government. The prosperity which a country derives from the industry and skill of its artisans, may be but a passing gleam; that alone is durable, which has its rise in a good cultivation of the soil. These facts ought to be constantly present to the mind of the government, and to influence all its measures.

A government awake to its true interests will seek to facilitate and increase the cultivation of the soil, and to open new channels for the disposal of its products. It will protect property, by causing it to be respected, and punishing breaches of the laws concerning it; and it will guarantee the proprietor against arbitrary exactions. The taxes should be regulated