

From the first dawn of modern science until almost the middle of the last century, the chief aim of those who interested themselves in vegetation, beyond the ornamental, useful, or medicinal properties of plants, was in the accumulation of dried specimens into herbaria, in the grouping of the plants into families so as to exhibit as nearly as possible their natural relationships, in giving names to the various species, and in appending to each a curt diagnosis of a few prominent external features in a language that could be understood only by the initiated; the great desiderata of botanists being, to have a vast number of species in their collections, and to be constantly adding still more. To a certain extent these studies were useful, but it was most unfortunate for the cause of science that such desires and methods should have dominated the fields of botany so long. With the advent, however, of such master-minds of science as Charles Darwin, Herbert Spencer, Hermann Müller, Julius Sachs, the Hookers, and many others a new era arose, and then botanists began to consider plants under the refulgent rays of the new light which these men had kindled: the real study of nature then began. Instead of the *ultima Thule* of botanists being the addition of one more plant to their lists, men began to thirst for a knowledge of the phenomena of plant life and its causation—for, in fact, a Philosophical Botany. In his *Principles of Biology*, Herbert Spencer gave the keystone to the arch when he wrote therein:—"Everywhere structures in great measure determine functions; and everywhere functions are incessantly modifying structures. In nature, the two are inseparable co-operators; and science can give no true interpretation of nature, without keeping their co-operation constantly in view."

The first plant life that occurred upon the earth was probably of aquatic habit, and water has ever continued the very soul of vegetable existence, without which its life is impossible.

When the ancestors of our present terrestrial phanerogamic flora began their phylogenetic development from aquatic forms of plant life, their first need must have been an efficient water-transporting system. As the new forms began to extend into places more remote from watery environments, so the need for rapidly carrying water through the plant-body would increase. Those forms unable to respond to this requirement would die out, and their places would be occupied by others more fitting. After enormous epochs of time, during which the struggle of adaptation has proceeded apace, it comes about that at the present day the terrestrial plants that dominate the surface of the earth are chiefly those that have best succeeded in providing themselves with an efficient water-transporting system. With phanerogams of aquatic habit there is no necessity for the elaborate development of this arrangement. When, therefore, a normal ter-