

PREFACE.

Two hundred and ninety years have now elapsed since one of the earliest introductions to Botany upon record was published, in four pages folio, by Leonhart Fuchs, a learned physician of Tubingen. At that period Botany was nothing more than the art of distinguishing one plant from another, and of remembering the medical qualities, sometimes real, but more frequently imaginary, which experience, or error, or superstition, had ascribed to them. Little was known of Vegetable Physiology, nothing of Vegetable Anatomy, and even the art of arranging species systematically had still to be discovered; while scarcely a trace existed of those modern views which have raised the science from the mere business of the herb-gatherer to a station among the most intellectual branches of natural philosophy.

It now comprehends a knowledge not only of the names and uses of plants, but of their external and internal organisation, and of their anatomy and physiological phenomena; it embraces a consideration of the plan upon which those multitudes of vegetable forms that clothe the earth have been created, of the skilful combinations out of which so many various organs have emanated, of the laws that regulate the dispersion and location of species, and of the influence that climate exercises upon their developement;

and, lastly, from botany as now understood, in its most extensive signification, is inseparable the knowledge of the various ways in which the laws of vegetable life are applicable to the augmentation of the luxuries and comforts, or to the diminution of the wants and miseries of mankind. It is by no means, as some suppose, a science for the idle philosopher in his closet; neither is it merely an amusing accomplishment, as others appear to think; on the contrary, its field is in the midst of meadows, and gardens, and forests, on the sides of mountains, and in the depths of mines, — wherever vegetation still flourishes, or wherever it attests by its remains the existence of a former world. It is the science that converts the useless or noxious weed into the nutritious vegetable; which changes a bare volcanic rock, like Ascension, into a green and fertile island; and which enables the man of science, by the power it gives him of judging how far the productions of one climate are susceptible of cultivation in another, to guide the colonist in his enterprises, and to save him from those errors and losses into which all such persons unacquainted with Botany are liable to fall. This science, finally, it is which teaches the physician how to discover in every region the medicines that are best adapted for the maladies that prevail in it; and which, by furnishing him with a certain clue to the knowledge of the tribes in which particular properties are or are not to be found, renders him as much at ease, alone and seemingly without resources, in a land of unknown herbs, as if he were in the midst of a magazine of drugs in some civilised country.

The principles of such a science must necessarily be extremely complicated, and in certain branches, which have only for a short time occupied the atten-

tion of observers, or which depend upon obscure and ill-understood evidence, are by no means so clearly defined as could be wished. To explain those principles, to adduce the evidence by which their truth is supposed to be proved, or the reasoning upon which they are based in cases where direct proof is unattainable; to show the causes of errors that are now exploded, and the insufficiency of the arguments by which doubtful theories are still defended, — in fine, to draw a distinct line between what is certain and what is doubtful, — are some of the objects of this publication, which is intended for the use of those who, without being willing to occupy themselves with a detailed examination of the vast mass of evidence upon which the modern science of botany is founded, are, nevertheless, anxious to acquire a distinct idea of the nature of that evidence. Another and not less important purpose has been to demonstrate, by a series of well-connected proofs, that in no department of natural history are the simplicity and harmony that pervade the universe more strikingly manifest than in the vegetable kingdom, where the most varied forms are produced by the combination of a very small number of distinct organs, and the most important phenomena are distinctly explained by a few simple laws of life and structure.

In the execution of these objects, I have followed very nearly the method recommended by the celebrated Professor De Candolle, than whom no man is entitled to more deference, whether you consider the soundness of his judgment in all that relates to order and arrangement, or the great experience which a long and most successful career of public instruction has necessarily given him.

I have begun with what is called **ORGANOGRAPHY**

(Book I.); or an explanation of the exact structure of plants; a branch of the subject which comprehends all that relates either to the various forms of tissue of which vegetables are constructed, or to the external appearance their elementary organs assume in a state of combination. It is exceedingly desirable that these topics should be well understood, because they form the basis of all other parts of the science. In physiology, every function is executed through the agency of the organs: systematic arrangements depend upon characters arising out of their consideration; and descriptive Botany can have no logical precision without the principles of Organography being first exactly settled. Great difference of opinion exists among the most distinguished botanists, upon some points connected with this subject, so that it has been found expedient to enter occasionally into much detail, for the purpose of satisfying the student of the accuracy of the facts and reasonings upon which he is expected to rely.

To this succeeds VEGETABLE PHYSIOLOGY (Book II.); or the history of the vital phenonema that have been observed both in plants in general, and in particular species, and also in each of their organs taken separately. It is that part of the science which has the most direct bearing upon practical objects, and with which the enquirer who would occupy himself more with the *utile* than the *dulce* is most likely to be interested. Its laws, however, are either unintelligible, or susceptible of no exact appreciation, without a previous acquaintance with the more important details of Organography. Much of the subject is at present involved in mystery, and the accuracy of many of the conclusions of physiologists is inferred rather than demonstrated; so that it has been found essential

that the grounds of the more popularly received opinions, whether admitted as true or rejected as erroneous, should be given at length. No particular chapter is assigned to the practical application of physiological principles, because this has been constantly taken as illustrative of the separate functions of individual parts.

Next follows TAXONOMY (Book III.); or some account of the Principles of Classification; — a very important subject, comprehending not only an account of the various methods of arrangement employed by botanists in their systematic works, but an explanation of the principles by which the limits of genera and species are determined. It also explains the mode of obtaining a correct view of vegetation, of conducting the examinations of unknown plants with precision, of avoiding errors in consequence of accidental aberrations from the ordinary structure, and of forming a just estimate of the mutual relation that one part of the vegetable kingdom bears to another.

After this I have taken GLOSSOLOGY (Book IV.); or, as it was formerly called, TERMINOLOGY; restricting it absolutely to the definition of the adjective terms, which are either used exclusively in Botany, or which are used in that science in some particular and unusual sense. The key to this book, and also to the substantive terms explained in Organography, will be found in a copious index at the end of the volume.

These four topics exhaust the science considered only with reference to first principles; there are, however, a few others which it has been thought advisable to append, on account of their practical value. These are, firstly, PHYTOGRAPHY (Book V.); or an exposition of the rules to be observed in describing

and naming plants. As the great object of descriptions in natural history, is to enable every person to recognise a known species, after its station has been discovered by classification, and also to put those who have not had the opportunity of examining a plant themselves into possession of all the facts necessary to acquire a just notion of its structure and affinities ; it is indispensable that the principles of making descriptions should be clearly understood, both to prevent their being too general to answer the intended purpose, or more prolix than is really requisite. It is the want of a knowledge of these rules that renders the short descriptions of the classical writers of antiquity, and the longer ones of many a modern traveller, equally vague and unintelligible. In this place are inserted a few notes upon the formation of an herbarium.

After this, has been introduced (Book VI.) a summary of the little which is known of the laws that regulate the distribution of plants upon the surface of the earth ; a question which, however indefinite and unsatisfactory our information may at present be, has begun to assume such an appearance as to justify the expectation, that future discoveries will explain the causes of the characters of vegetation being determined, as they surely are, by climate.

Finally, the work is concluded by an exposition of what is called MORPHOLOGY ; a subject which is in the vegetable what Comparative Anatomy is in the animal kingdom, and which is by far the most important branch of study after Elementary Anatomy and Vegetable Physiology. Organography itself is in all respects an exposition of the doctrines of Morphology ; but the novelty of the subject, and a persuasion that it would be better understood if treated

separately, has induced me to make it the subject of particular consideration. Unknown before the time of Linnæus, and first placed in its true light by the venerable poet Göthe, it lay neglected for nearly thirty years, until, having been revived by Du Petit Thouars, De Candolle, Brown, and others, it has come to be considered the basis of all scientific knowledge of vegetable structure.

It has been my wish to bring every subject that I have introduced down, as nearly as possible, to the state in which it is found at the present day; but, alas! tasks that are infinite can never be accomplished by finite means. While the MSS. has been going through the press, my table has been covered with works illustrating the fundamental principles of the science, of scarcely any of which has it been possible to make the slightest use. This I regret the more, as some of them are of high interest*, especially with regard to Vegetable Anatomy.

In the statements I have made, I have uniformly endeavoured to render due credit to all persons for the discoveries by which they may severally have contributed to the advancement of the science; and

* The more important of these works are, —

Agardh, C. A., *Lehrbuch der Botanik. Copenhagen, 1831.*

Kunth, K. S., *Handbuch der Botanik. Berlin, 1831.*

Meyer, F. J. F., *Phytotomie. Berlin, 1830.*

De Candolle, A. P., *Physiologie Végétale, &c. Paris, 1832.*

Martius, Palmæ. The part containing the Anatomy.

Arnot, G. W. The article Botany in the *Edinburgh Encyclopædia.*

Bischoff, G. W., *Handbuch der Botanischen Terminologie und Systemkunde. Nuremberg, 1830.*

Annales des Sciences Naturelles, par MM. Audouin, Ad. Brongniart, et Dumas. Several Numbers.

Mirbel, C.B., *Mémoire sur le Marchantia. Paris, 1832.*

if I have on any occasion either omitted to do so, or assumed to myself observations which belong to others, it has been unknowingly or inadvertently. It is, however, impracticable, and if practicable it would not be worth while, to remember upon all occasions from what particular sources information may have been derived. Discoveries, when once communicated to the world, become public property: they are thrown into the common stock for mutual benefit; and it is only in the case of debatable opinions, or of any recent and unconfirmed observations, that it really interests the world that authorities should be quoted at all. In the language of a highly valued friend, when writing upon another subject: — “The advanced state of a science is but the accumulation of the discoveries and inventions of many: to refer each of these to its author is the business of the history of science, but does not belong to a work which professes merely to give an account of the science as it is; all that is generally acknowledged must pass current from author to author.”*

London, Sept. 10. 1832.

* Brett's Principles of Astronomy, p. v.