

Chapter I

THE EARLY HISTORY OF BOTANY

1. INTRODUCTORY



In the present book, the special subject treated is the evolution of the *printed herbal*, between the years 1470 and 1670, but it is impossible to arrive at clear ideas on this subject without some knowledge of the earlier stages in the development of botany. The first chapter will therefore be devoted to the briefest possible sketch of the progress of botany before the invention of printing, in order that the position occupied by the herbal in the history of the science may be realised in its true relations.

From the beginning, the study of plants has been approached from two widely separated standpoints—the philosophical and the utilitarian. Regarded from the first point of view, botany stands upon its own merits as an integral branch of natural philosophy, whereas, from the second, it is merely a by-product of medicine or agriculture. At different periods in the evolution of the science, one or other aspect has predominated, but from classical times onwards, it is possible to trace the development of these two distinct lines of enquiry, which have, at happy moments, converged, though they have more often, to their detriment, followed unconnected routes.

In the western world, botany, as a branch of natural philosophy, may be said to have owed its inception to the

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unparalleled mental activity of the finest period of Greek culture. From this time onwards the nature and life of plants were brought within the scope of research and speculation, the results of which have been handed down to us.

2. ARISTOTELIAN BOTANY

Aristotle, Plato's pupil, who lived from 384 to 322 B.C., concerned himself with science in the broadest sense, and his influence in this field, especially during the middle ages, dominated European thought. The greater part of his botanical work is unfortunately lost to us, but his writings on other subjects include many references to plants, from which we can gather some of his general ideas. He held that each member of the world of living things had its "psyche"; for this expression, which cannot be Englished rightly by any single word or phrase, we may use "soul", or "vital principle", as an approximate translation. On Aristotle's view, the soul of the plant was "nutritive" only, and thus on a lower plane than the soul of movement and feeling in animals, and the reasoning soul in man. The long survival of these ideas may be witnessed by a quotation from Trevisa's version of the encyclopaedia of Bartholomaeus Anglicus, which was printed in 1498: "For trees meve [move] not wylfully fro place to place as beestes doo: nother change appetitte and lykyng, nother felyth sorowe. . . . In tres is soule of lyfe. . . but therin is no soule of felyng."

Aristotle left his library to his pupil Theophrastus (b. 370 B.C.), naming him as his successor. Theophrastus was well fitted to carry on the great traditions of the school, since he had, in earlier years, studied under Plato himself. We happen to know far more about the botany of Theophrastus than about that of Aristotle, since a work has come down to us, called the *Enquiry into Plants*,¹ which may perhaps have been compiled from the notes made by scholars who attended the lectures of

¹ The quotations from this book are taken from Sir Arthur Hort's translation; see Appendix II.

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Aristotelian Botany

Theophrastus. The *Enquiry* opens with a discussion of the parts of plants, which the author tries to interpret by analogy with the organs of animals, though he points out that the correspondence is markedly imperfect. He realises the difficulty of fitting the vegetable world into any hard-and-fast scheme, and he concludes, rather wistfully: "In fact your plant is a thing various and manifold, and so it is difficult to describe in general terms." He proceeds to a classification of plants, which we shall consider in a later chapter (p. 163); but he is careful to point out that his proposed divisions are somewhat arbitrary, and that plants may pass from one class to another. The most striking quality of the writings of Theophrastus is, indeed, the way in which they combine delicate discrimination with freedom from dogmatism. In one passage, for instance, we find him at war with over-precise definitions, while, in another, he urges his readers not to neglect distinctions, even if they are admittedly not absolute.

The *Enquiry* is chiefly concerned with the plants of the Mediterranean region round about Greece, but it also shows some knowledge of the botany of other lands. It is believed that Theophrastus owed part of this knowledge of foreign plants to Alexander the Great, who also had been a pupil of Aristotle, and who was so much alive to the value of science that he took trained observers with him to the far east, to bring back reports on what they had seen. The parts of the *Enquiry* dealing with such subjects as "The plants of rivers, marshes, and lakes, especially in Egypt", or "The plants special to northern regions", are the earliest studies to shadow forth the ecological standpoint, which, in modern botany, has become of special importance.

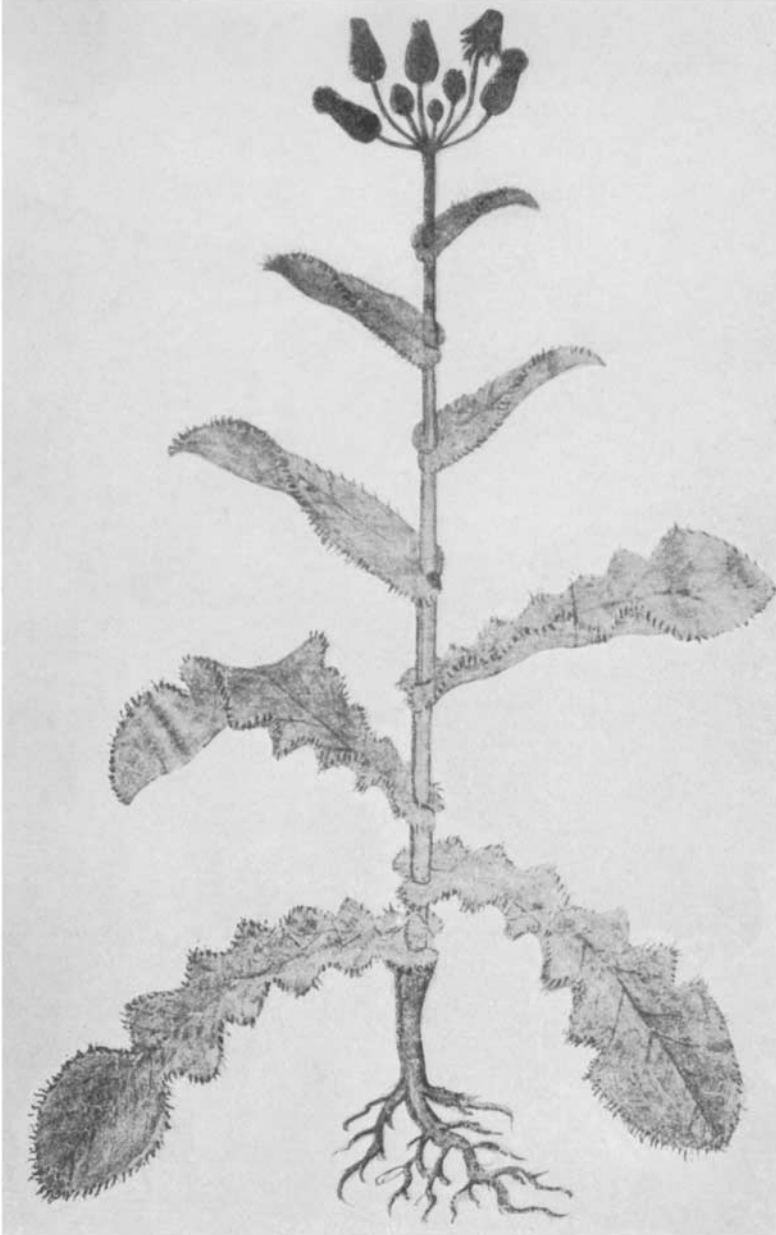
Throughout the dark ages, the botany of the Aristotelian school was little known in western Europe, but in the thirteenth century it was revived through a surprisingly indirect channel. Soon after the time of Alexander, the foundation of Greek schools began in Syria. From these centres

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the teachings of Aristotle were handed on into Persia, Arabia, and other countries. The Arabs translated the Syriac versions of Greek writers into their own language, and their physicians and philosophers kept alive the knowledge of science during the early mediaeval period, in which Greece and Rome had ceased to be the homes of learning, and while culture was still in its infancy in Germany, France, and England. The Arabic translations of classical writings were eventually rendered into Latin, and then, sometimes, even into Greek again, and in these guises found their way to western Europe.

Amongst other works which suffered these successive metamorphoses, was a pseudo-Aristotelian treatise, *De plantis*, which is now attributed to a certain Nicolaus Damascenus. We do not know when he was born, but his historical setting is indicated by the fact that Herod the Great sent him on a mission to Rome a few years before the birth of Christ. His book about plants is a compilation based primarily upon Aristotle and Theophrastus; an English version of it has recently appeared. It is of importance in the annals of western science, because it formed the starting-point for the botanical work of Albertus Magnus.

Albert of Bollstädt (d. 1280), Bishop of Ratisbon, was a famous scholastic philosopher. He was esteemed one of the most learned men of his age, and was called Albertus Magnus during his lifetime, the title being conferred on him by the unanimous consent of the schools. The Angelic Doctor, St Thomas Aquinas, became one of his pupils. His botanical work forms only a small fraction of his writings, but it is with that section alone that we are here concerned. It is embodied in a treatise, *De vegetabilibus*, dating from before A.D. 1256. Although Albertus undoubtedly found the framework for his botanical ideas in *De plantis*, which he revered as Aristotle's own words, he had too strong a mind to follow any authority slavishly, and no little part of what he wrote was original. He



ΣΟΓΧΟΣ ΤΡΑΧΥΣ, *Sonchus* sp. [Dioscorides, *Codex Aniciae Julianae*
(Vind. Med. Gr. I), circa A.D. 512, facsimile, 315 recto] *Reduced*

Albertus Magnus

was in many ways in advance of his time, especially in the suggestions which he offers as to the classification of plants, and in his observations on detailed structure in certain flowers. We shall return to his writings in future chapters dealing with these subjects. It will suffice now to mention his remarkable instinct for morphology, in which he was probably unsurpassed during the next four hundred years. He points out, for instance, that, in the vine, a tendril sometimes occurs in place of a bunch of grapes, and from this he concludes that the tendril is to be interpreted as a bunch of grapes incompletely developed. He distinguishes also between thorns and prickles, and realises that the former are of the nature of stems, while the latter are merely a surface development.

Despite his insight into structure, Albertus had an unfortunate contempt for that branch of the science now known as systematic botany. He considered that to catalogue all the existing species was too vast and detailed a task, and one altogether unsuited to the philosopher. However, in his Sixth Book he so far belied his principles as to give descriptions of a number of plants.

Albertus was troubled with many subtle problems connected with the vegetable “psyche”; he questions, for instance, whether, in the material union of two individuals, such as the ivy and its supporting tree, their souls are also united. Like Theophrastus, and other early writers, Albertus held the theory that species were mutable, and illustrated this view by pointing out that cultivated plants might run wild and become degenerate, while wild plants might be domesticated. Some of his ideas, however, on the possibility of changes from one species to another, were quite baseless. He stated, for instance, that, if a wood of oak or beech were razed to the ground, an actual transformation took place, aspens and poplars springing up in place of the previously existing trees.

On the subject of the medicinal virtues of plants, the state-

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ments of Albertus, in their temperate tone, contrast favourably with the puerilities of many later writers. Much of the criticism from which he has suffered at various times has been, in reality, directed against a book called *Liber aggregationis*, or *De virtutibus herbarum*, of which he was supposed, erroneously, to be the author. We shall refer to this work again in Chapter VIII.

After the days of Albertus, no great development occurred in Aristotelian botany until the time of Andrea Cesalpino, whose writings, which belong to the end of the sixteenth century, will be considered in later chapters.

3. MEDICINAL BOTANY

Throughout its course, Aristotelian botany suffered from one serious handicap—an inadequate basis of actual fact. It came into existence at the time when Greek philosophy was at its height, and it owed its development to men who were completely at home with general ideas, but who were unaware that, before a theoretical treatment of the vegetable world was possible, it was necessary to know in detail what plants were really like, and how they lived. Such knowledge could not be deduced merely from general principles constructed by the human mind; it needed also minute and prolonged observation. No doubt the Aristotelian botanists would have been capable of such observation, but they were not alive to the necessity for it; it was left for workers in the, apparently, less promising field of medicine to lay the foundations of the copious and exact knowledge of plants which we possess to-day. From very early times a variety of herbs had been used as healing agents, and it had been necessary to study them in special detail, in order to discriminate the kinds employed for different purposes. It was from this purely utilitarian beginning that systematic botany for the most part originated. As we shall show in later chapters, very many of the herbalists whose work we have to discuss were medical

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[More information](#)*Medicinal Botany*

men. Moreover, it is not taxonomy alone that we owe in the first instance to medicine. Nehemiah Grew (1641–1712), one of the founders of the science of plant anatomy, was led to embark upon this subject because his anatomical studies as a physician suggested to him that plants, like animals, probably possessed an internal structure worthy of investigation, since they were the work of the same Creator.

In all parts of the world systems of folk medicine have been developed, but we are here concerned with Greece alone, since it was from that region that herbal knowledge made its way into western Europe. In ancient Greece there was considerable traffic in medicinal plants. The herb-
alists¹ and druggists² who made a regular business of collecting, preparing, and selling them, do not appear, however, to have been held in good repute; Lucian makes Hercules address Aesculapius as “a root digger and a wandering quack”. The herb gatherers evidently aimed at creating a monopoly by fencing their craft about with all manner of superstitions handed down by word of mouth, most of which had for their moral that herb collecting was too complicated and dangerous a pursuit for the uninitiated. With the *Enquiry into Plants* of Theophrastus, a Ninth Book is included, which is probably a compilation brought together at some date after the death of the reputed author. In this treatise certain of the herb gatherers’ directions for collecting medicinal plants are quoted, though with ridicule. We learn that he who would obtain peony root was advised to dig it up at night, because, if he did the deed in the day-time, and was observed by a woodpecker, he risked the loss of his eyesight. The superstitions connected with procuring mandrake and black-hellebore are also cited with contempt. It seems that the herb collectors declared that “one should draw three

¹ *ρίζοτόμοι* = root diggers, or herb gatherers, for *ρίζα* signifies a medicinal plant in general, as well as a root.

² *φαρμακοπώλαι* = drug sellers.

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circles round mandrake with a sword, and cut it with one's face towards the west; and at the cutting of the second piece one should dance round the plant. . . . One should also, it is said, draw a circle round the black-hellebore. . . . and one should look out for an eagle both on the right and on the left; for that there is danger to those that cut, if your eagle should come near, that they may die within the year."

Though the Ninth Book of the *Enquiry* contains a good deal about medicinal herbs and their uses, it is of less importance in the history of botany than the work of a later Greek, Krateuas (Cratevas), physician to Mithridates, who began to reign in 120 B.C. The writings of Krateuas are no longer extant; we possess only fragments, embedded in the books of other writers. He produced, as we know from Pliny, a herbal containing coloured pictures of plants. The chief part of our knowledge of his work has reached us through one of his successors, Pedanios Dioskurides, who was born in Asia Minor, and whose life was passed probably in the first century of the Christian Era, in the time of Nero and Vespasian. He was a medical man, and he speaks of having seen many lands in his military travels, so it seems not unlikely that he was an army doctor.

Dioscorides—to give him the name by which he has generally been known in this country—compiled a work which is usually cited under its Latin title, *De materia medica libri quinque*; in this treatise he included about five hundred plants. No contemporary version has survived; the only manuscript which we shall consider here is Byzantine, and dates from about A.D. 512. It was made for Anicia Juliana, a noble lady whose father, Flavius Anicius Olybrius, had once been, for a brief space, Emperor of the West. Juliana, who lived into the age of Justinian, was renowned for her ardent Christian faith, and for the churches which she built. It is probable that the manuscript associated with her name remained in Constantinople during the first millenium of its

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history. In 1562 we hear of it in a letter¹ written by the diplomatist Ogier Ghiselin de Busbecq, who had just returned from Turkey. "One treasure", he says, "I left behind in Constantinople, a manuscript of Dioscurides, extremely ancient and written in majuscules, with drawings of the plants and containing also, if I am not mistaken, some fragments of Cratevas. . . . It belongs to a Jew, the son of Hamon, who, while he was still alive, was physician to Soleiman. I should like to have bought it, but the price frightened me; for a hundred ducats was named, a sum which would suit the Emperor's purse better than mine. I shall not cease to urge the Emperor to ransom so noble an author. . . . The manuscript, owing to its age, is in a bad state, being externally so worm-eaten that scarcely any one, if he saw it lying in the road, would bother to pick it up."

About seven years later, the great Codex was conveyed to the Imperial Library in Vienna, having been purchased, either by the Emperor, or, more probably, by Busbecq himself. It is still to be seen in Vienna to-day,² while a facsimile reproduction has made it accessible to students in other countries. Examples of the figures which it contains are shown on a reduced scale, and without colour, in pls. i, f.p. 4; ii, f.p. 10; xviii, f.p. 186; xxiii, f.p. 240. We shall return to these pictures in Chapter VII.

The earliest versions of Dioscorides appear to have been unillustrated, and there is reason to believe that some, if not all, of the pictures in the Vienna Codex were ultimately derived from Krateuas. In the part of this manuscript in which the text is specifically attributed to him, nine kinds of plant are named. It is a striking sign of the continuity of botany that seven of these nine names should have survived into the nineteenth century, or later, as generic terms.

¹ The original letter is in Latin; it is quoted here from the translation in Forster, E. S. (1927); see Appendix II.

² This manuscript is described technically as *Codex Vindobonensis Med. Gr. 1*; among Dioscorides manuscripts it is known as *Constantinopolitanus*.