

II.) by nearly a hundred pages devoted to Theophrastus of Eresos, one of the most instructive parts of the book. The treatment here illustrates the author's method, who says (p. 60): "In our study of this maker of the first Landmark in the History of Botany the main object must be that of discovering in what ways, under what limitations, and yet how well, he accomplished the placing knowledge of plant life and form upon the list of the sciences." Accordingly, a dozen pages are given to a discussion of his method, which is in fact continued through nearly thirty pages more under the subtitles Organography and Anthology. After this Phytography (5 pages) leads to Taxonomy (20 pages) and Dendrology (8 pages). The chapter closes with a recapitulation in which the author shows that Theophrastus "is the father of the Science as we now have and hold it."

The short chapter on the Greeks and Romans after Theophrastus (enumerating Nicander, Cato, Varro, Virgil, Columella, Dioscorides, Pliny and Galen) leads to a still shorter one on the botany of the middle ages, the author remarking in passing that "the period has no apparent landmarks of botanical history."

Otho Brunfels (chapter V.), who is characterized as "first in point of time among the German botanical reformers of the sixteenth century," leads the way to Leonhardus Fuchs and Hieronymus Tragus, to each of whom a chapter is assigned. The short chapter (VIII.) devoted to Euricius Cordus leads naturally to the following (IX.) on Valerius Cordus, the son, "hitherto almost unknown except by name." This closing chapter of the volume will be read with keen interest by every botanist, who will learn here for the first time, perhaps, of this brilliant botanist whose death when but twenty-nine years of age closed a life of much achievement and still greater promise. To have rescued the name of Cordus and his work from oblivion was a worthy labor, and most zealously has Dr. Greene carried it out. He shows that Cordus formulated plans for his plant descriptions, and that with these he redescribed "some of the best known

and best described plants of Dioscorides," which is characterized as "the boldest innovation that was made by any botanist of the whole sixteenth century."

The "Landmarks of Botanical History" will certainly be of the greatest value to botanists the world over, since it presents the subject in a new light and from a different point of view. We shall all pray for the continued health and strength of the author, and that opportunity may be afforded him of completing the work to which he has set his hand.

CHARLES E. BESSEY

THE UNIVERSITY OF NEBRASKA

The Moon in Modern Astronomy. By PH. FAUTH. With an introduction by J. E. GORE, F.R.A.S. Pp. 160 with 66 illustrations. New York, D. Van Nostrand Company. 1909.

This attractive book gives a very interesting account of the principal features visible on the moon's surface and it embodies the results of over twenty years of careful study with small telescopes. The subject is treated in an historical manner, especial attention being given to the early maps of Lohrmann, Mädler and Schmidt. M. Fauth shows that photographic processes have not materially added to our knowledge of lunar conditions. In fixing the relative positions of the larger surface features photographs are more accurate than maps made from eye observations, but for the study of minute detail visual observations, even if made with relatively small telescopes, are superior to the best photographs.

The most conspicuous features of the moon's surface are the so-called "craters." These have heretofore been described as "cup-shaped" mountains and as resembling but greatly exceeding the great volcanic craters of the earth. M. Fauth shows that this conception of the lunar "craters" is erroneous, that they are more like shallow dishes, and could more appropriately be called "walled-plains." He shows by figures and by diagrams that in many cases the crater is "so incredibly shallow that the eye of an observer on the crest would hardly be able to see the crest on

the opposite side, because the depression is so slight that the curvature of the moon's surface covers the opposite wall." Or again "A dessert dish five inches in diameter (without the border) and less than a quarter of an inch in depth has twice as deep a cavity, proportionally, as the deepest of these depressions."

M. Fauth considers in detail the various theories that have been advanced to account for the origin of these peculiar features of the lunar surface and rejects them all as unsatisfactory. Yet it can not be said that he has disproved the volcanic theory, although he has certainly pointed out many difficulties in the generally accepted idea of that theory. But the theory that he advances in its place, that the moon's surface is covered by a deep layer of ice, will not be accepted without convincing proof.

The book is well printed and illustrated and is well worth reading by those who take an interest in the moon.

C. L. P.

In Starland with a Three-inch Telescope. By WILLIAM TYLER OLCOTT. Pp. 146 with many diagrams. New York, G. P. Putnam's Sons. 1909.

This is a convenient hand-book or guide for the amateur astronomer. A three-inch telescope is too small to show any planetary detail and the owner of such an instrument is practically limited to the study of the moon and of a small number of the brighter double stars. To a description of these objects, therefore, the book is confined.

Only the constellations visible in the latitude of the New England and Middle States are included and these constellations are divided into four groups, corresponding to the seasons of the year in which they are visible. For each constellation a clear and simple page map is given and on this map are marked the positions of the interesting double stars. Facing each map is a printed page, which gives the necessary details for finding and observing these objects.

The moon is treated in a similar manner, eight diagrams of different phases being given.

These show the principal features only and should be of great assistance to the student of lunar detail.

The book is well printed, the maps and diagrams well designed and executed, and the little volume is admirably adapted to encourage the study of the heavens.

C. L. P.

SCIENTIFIC JOURNALS AND ARTICLES

The Journal of Experimental Zoology, Vol. VII., No. 2, contains the following papers: "Wound Reparation and Polarity in Tentacles of Actinians," by Herbert W. Rand. A distal cut end of a tentacle of the large actinian, *Condylactis*, is immediately closed by muscular contraction and remains so during a slow process of structural repair which eventually replaces the muscular contraction. The distal cut end of an excised fragment of tentacle behaves similarly, but a proximal cut end does not close. In the conspicuously different behaviors of proximal and distal cut ends, and in responses to tactile stimulation, the tentacle shows a marked polarity which can not be accounted for upon the basis of its known structure. "A Biological and Cytological Study of Sex Determination in Phylloxerans and Aphids," by T. H. Morgan. An analysis of the behavior of the sex chromosomes in phylloxerans in connection with the behavior of the sex chromosomes in other hemiptera leads to the conclusion that these chromosomes can not be male and female determining as such, but that they are identical in all respects. Two alternative views offer themselves if this analysis is correct. Either sex is determined quantitatively by the amount of elimination contained in the fertilized egg—a view advanced by the author in 1907 and since adopted by Wilson and by Castle in a modified form—or else the presence or absence of the sex chromosomes are associated with other profound, invisible differences in the two classes of spermatozoa. It is difficult to decide at present between these alternatives, but the facts here recorded for the phylloxerans favor the interpretation that the visible chromosomal differences in the two