

comparison it has become evident that many of the forms were separated and named on insufficient knowledge of their variation, and the authors are able to relegate a large number of specific and sub-specific names to the synonymy. They have, however, only indulged in 'lumping' to the extent justified by the evidence, and they believe that there is probably much more to be done; they have therefore arranged the sub-species in order of priority for the convenience of subsequent revisers. Nevertheless, the authors recognize no fewer than 809 species of mammals in the palæarctic and Indian regions as here defined.

Nomenclatorial difficulties are dealt with in a way that will commend itself to all right-thinking zoologists; the authors mention some of the works that have proved most troublesome, and list a number of names that they have submitted to the International Commission on Zoological Nomenclature to be placed on the "Official List". "There are workers who seem to take a delight in bedevilling zoology with esoteric changes of nomenclature. . . . Zoologists who discover a name which would cause confusion or inconvenience, though antedating a later but currently adopted name, should refrain from publishing their unfortunate find, and instead should hurry it off to the Commission for burial in the appropriate 'Index', at the same time requesting the Commission to place on the appropriate 'List' the later but currently used name. These are the principles which we have endeavoured to follow. . . ."

It is fitting that this book is dedicated to the memory of the late James Lawrence Chaworth-Musters, who had spent much time on the synonymies of the species of palæarctic mammals. The results of his patient and lengthy researches into the type localities and the dates of publication of species described in the eighteenth and early nineteenth centuries are incorporated in this volume, especially for the Insectivora, Chiroptera and Rodentia. Had Chaworth-Musters lived, he would undoubtedly have taken a large part in the work of preparing this list; his death was a great loss to systematic mammalogy.

The paper, printing and binding of this work leave nothing to be desired, and are fully in keeping with the high standard set by the publications of the British Museum since the end of the War. This splendid volume brings great credit to all concerned in its making.

L. HARRISON MATTHEWS

FLORA OF ARIZONA

Arizona Flora

By Thomas H. Kearney, Robert H. Peebles, and collaborators. Pp. viii+1032+32 plates. (Berkeley and Los Angeles: University of California Press; London: Cambridge University Press, 1951.) 56s. 6d. net.

ARIZONA, one of the largest of the American States, being almost the size of Italy with nearly 114,000 square miles, presents a wide range of topography. The land rises from almost sea-level to a plateau at an altitude of well over 12,000 ft. and includes the mile-deep Grand Canyon. The rainfall has a yearly average which varies from as little as three inches to nearly ten times that amount, while the frost-free period may be as short as three months or extending nearly throughout the year. In accordance with these variable conditions, the vegetation, while in general of a dry type, ranges from desert to

evergreen pine forests. The environments provide a remarkable range of ecological conditions and support the flora of some 3,370 species with which this work deals, comparable in extent and diversity to that of the whole of France. Moreover, the flora embraces a considerable proportion of endemics, more than 160 in number. The vegetation is notable for the unusually high representation of three families, in particular the Cactaceæ, seventy-one species, the Euphorbiaceæ, eighty-four species, and the Polygonaceæ, ninety-four species. It is undoubtedly the desert vegetation for which Arizona is most famous, and especially the Cactaceæ, in which the area is so rich, including twelve species that are endemic. Of these cacti, *Carnegiea gigantea*, the State flower of Arizona, is the best known and the largest, attaining a height of fifty feet and possibly living for 150-200 years. Its fruits and seeds furnished food for the native Indians. At the other extreme, in respect to size, is the endemic and very local *Navajoa peeblesiana*, with rounded stems only 3 cm. high bearing spongy spikes. It is the members of the Cactaceæ that are mostly portrayed in the forty-five reproductions from photographs with which this work is illustrated.

The Euphorbiaceæ are represented by no less than forty-seven species of *Euphorbia*, while in the Polygonaceæ the genus *Eriogonum* is particularly rich with fifty-seven species. The largest genus in the flora is *Astragalus*, represented by more than seventy species, of which eight are endemic. Some of these are highly toxic because of their remarkable capacity for accumulating selenium from the soil. Others, too, though reported not to contain selenium, are nevertheless very poisonous and cause the famous loco disease of sheep and cattle.

Another well-represented genus in the Scrophulariaceæ is *Pentstemon*, with fifty-eight species, of which two are endemic. Needless to say, the flora includes a number of very peculiar types, not least curious being the parasite *Ammobroma sonora*, of which the only visible portion above the ground is the saucer-shaped receptacle bearing numerous small flowers that open in concentric rings.

The introductory matter of this flora provides a useful summary of the topography and climatic conditions and other aspects of the physiological environment, with a very brief account of the geographical elements that comprise the flora. The great bulk of the text consists of keys to the families, to the genera within each family, and for each genus a key to the species. No full descriptions are provided for the species themselves; but the information in the dicotyledonous key is somewhat fuller than such usually provides. In addition to this, the distribution of each species in Arizona is stated, together with its altitudinal range, the type of habitat, time of flowering, and the general geographical distribution. The proof of the full value of such a work must be its use in the field, and it is for the convenience of this purpose that more extended descriptions have been sacrificed. If one regrets that decision, it is largely because these condensed diagnoses whet the appetite for a full account of this fascinating flora.

The chief criticism that one has to level against this book is that the page headings have been entirely wasted. If, instead of merely "Arizona Flora" or "Flora of Arizona" which appear throughout on alternate pages of the text, the relevant order or genus had been cited, it would have greatly assisted the reader in converting a redundancy to useful information.

E. J. SALISBURY